



# ASHRAE

*Technology for a Better Environment*

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Yaara Grinberg  
Massachusetts Department of Energy Resources  
100 Cambridge Street  
Suite 1020  
Boston, MA 02114

**Regarding “Public Comment on An MPG Rating for Commercial Buildings: Establishing a Building Energy Asset Labeling Program in Massachusetts”**

Dear Ms. Grinberg:

The American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc. (ASHRAE), founded in 1894, is an international organization of over 52,000 members. ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

As a leader in developing and maintaining premier consensus-based standards, and through ASHRAE’s Building Energy Quotient (bEQ) building energy labeling program<sup>1</sup>, and professional energy auditor certification and other training and certification programs for commercial buildings, ASHRAE wishes to be an essential partner as the Massachusetts Department of Energy Resources (DOER) moves forward in its development of a commercial building energy asset rating and labeling program.

As DOER continues collecting information on the Department’s White Paper, *An MPG Rating for Commercial Buildings: Establishing a Building Energy Asset Labeling Program in Massachusetts*, we offer the following comments to the above-referenced request for public comment.

**Summary of Recommendations**

1. *Establishing the Rating Scale: Use a technical rating scale with net zero or better as the fixed energy target, allowing buildings to earn credit for producing more energy than they consume. This scale should include a statistical component, allowing relative performance comparisons of buildings of the same type.*
2. *Type of Energy Use Rated: ASHRAE recommends using source energy to determine the asset rating for DOER’s commercial building labeling program.*

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<sup>1</sup> <http://www.buildingeq.com>

3. *Multiple Building Categories: ASHRAE supports DOER's recommendation to begin Massachusetts' commercial building rating program with a small number of building types, and expand the number of building types over time to cover all commercial building types.*
4. *COMNET Data Normalization: Employ ASHRAE's bEQ Asset Rating to standardize data input to produce the building asset rating.*
5. *Operational and Asset Ratings: ASHRAE encourages DOER to continue working with the Society to develop the bEQ program, and to eventually adopt the bEQ as Massachusetts' commercial building energy label for both operational and asset ratings.*
6. *Rating System: ASHRAE encourages DOER to adopt an alphabetical system for its commercial building energy label.*
7. *Various Label Elements: ASHRAE encourages DOER to refrain from including a specific greenhouse gas metric on its commercial building energy label. Similarly, DOER should not include a textbox summarizing key findings and recommendations, as this information is more appropriate for a report to accompany the asset and operational ratings.*
8. *Assessment Process: ASHRAE strongly supports the use of a building energy efficiency recommendations report (BEERR) as part of DOER's commercial building rating program, including the use of ASHRAE Level 2 assessments. ASHRAE also supports the use of certified building energy modeling and assessment professionals to collect data for building ratings. ASHRAE supports the use of separate individuals, or one individual that has the necessary skill sets as demonstrated by ASHRAE's Building Energy Assessment Professional (BEAP) and Building Energy Modeling Professional (BEMP) certifications, to conduct the asset and operational ratings, given the different skill sets these two professionals require.*
9. *Resources: ASHRAE encourages DOER to include a reference and link to the bEQ program in the "Resources" section of the White Paper.*

### **Recommendations & Background**

1. *Establishing the Rating Scale: Use a technical rating scale with net zero or better as the fixed energy target, allowing buildings to earn credit for producing more energy than they consume. This scale should include a statistical component, allowing relative performance comparisons of buildings of the same type.*

Under Section 2.1 B, Establishing the Technical Scale, of the White Paper, the Department recommends establishing a rating scale with "a fixed energy target that sets a standard metric for each building type," stating that "it would be inappropriate to rely on a statistical scale that establishes a building's rating based on a comparison to other buildings' energy performance." However DOER earlier recommends under Section 2.1 A, Technical Scale vs. Statistical Scale, that "Buildings are proposed to be rated in comparison to a median score determined for representative building types." The recommendation to compare buildings against a median score indicates support for a statistical component of a building rating. ASHRAE feels that it is important to acknowledge this apparent contradiction in the White Paper, and to encourage DOER to clarify the recommendations in the White Paper to include support for a rating scale that includes both a technical rating and statistical component. ASHRAE believes that a technical potential scale is superior to a purely statistical scale, and notes that a technical scale that includes a component for comparing buildings of the same type aligns with the approach the Society has taken with the bEQ rating.

Specifically, the bEQ Asset (As Designed) Rating employs a zero to 100 scale, in which zero refers to zero net energy use (the technical component of the rating), and 100 is set at the average Commercial Building Energy Consumption Survey (CBECS) source energy use index (EUI) for a specific building type (the statistical component). Buildings using energy above the average will rate higher than 100, while buildings that are net energy producers will receive ratings less than zero. The rating, or score, is the ratio of the Rated Building's energy use to the reference EUI corresponding to the 100 point on the scale (i.e. average.) for buildings of the Rated Building's type. Both source energy EUIs are normalized for weather under standard operating conditions. ASHRAE encourages DOER and other interested parties to use the results of the bEQ Asset Rating pilot program that Massachusetts and others are participating in to continue discussions and further refinement of the bEQ rating scale.

ASHRAE also supports DOER's proposal to use CBECS data to obtain a median energy use by building type, normalized for climate and operational characteristics. ASHRAE's bEQ building label employs a similar method for obtaining its Asset Rating.

*2. Type of Energy Use Rated: ASHRAE recommends using source energy to determine the asset rating for DOER's commercial building labeling program.*

ASHRAE uses source energy in determining Asset and Operational Ratings for its bEQ program, and encourages DOER to use source energy for its own commercial building labeling program.

Source energy also is currently used by the U.S. Environmental Protection Agency's (EPA) Energy Star program, and has several advantages over site energy. For instance, using source energy (and the appropriate source energy conversion calculations) in building rating determinations is less likely to unintentionally favor or penalize the use of one energy fuel type over another, due to the different efficiencies of the various fuel types and their providers. As EPA notes in *ENERGY STAR Performance Ratings Methodology for Incorporating Source Energy Use*<sup>2</sup>, "Because billed site energy use includes a combination of primary and secondary forms of energy, a comparison using site energy does not provide an equivalent thermodynamic assessment for buildings with different fuel mixes. In contrast, source energy incorporates all transmission, delivery, and production losses, which accounts for all primary fuel consumption and enables a complete assessment of energy efficiency in a building."

While ASHRAE acknowledges the benefit using site energy provides to building owners/operators in that it is information they have more direct control over, we believe this benefit is outweighed by the advantages of source energy, which provides a more complete picture of a buildings' environmental impact.

To capture the environmental impact information that is missed by site energy DOER proposes to include greenhouse gas (GHG) emissions as a secondary metric in Massachusetts's commercial building rating program. ASHRAE believes information on a buildings' energy environmental impact is encompassed by rating a building based on source energy, and that DOER may be able to better accomplish its goal of informing and empowering building owners/operators by using source energy without having to include a separate metric on GHG emissions.

*3. Multiple Building Categories: ASHRAE supports DOER's recommendation to begin Massachusetts' commercial building rating program with a small number of building types, and expand the number of building types over time to cover all commercial building types.*

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<sup>2</sup> [http://www.energystar.gov/ia/business/evaluate\\_performance/site\\_source.pdf](http://www.energystar.gov/ia/business/evaluate_performance/site_source.pdf)

ASHRAE supports DOER's proposed approach and notes that the bEQ is following a similar approach, beginning with a small number of building types during the pilot phase of the bEQ program, and increasing this number to eventually cover the 16 CBECS building types, as ASHRAE develops additional design calculations and performance rating methods.

*4. COMNET Data Normalization: Employ ASHRAE's bEQ Asset Rating to standardize data input to produce the building asset rating.*

Significant progress has been made through COMNET in standardizing data input into building modeling tools. ASHRAE will build on this progress by adding to COMNET in the bEQ program to further refine data modeling for bEQ's Asset Rating. The bEQ Asset Rating approach is intended to create synergy, via the COMNET protocols, between a CBECS-based Operational Rating and a modeling-based Asset Rating. ASHRAE encourages DOER to follow the bEQ approach to improve building energy modeling data input.

*5. Operational and Asset Ratings: ASHRAE encourages DOER to continue working with the Society to develop the bEQ program, and to eventually adopt the bEQ as Massachusetts' commercial building energy label for both operational and asset ratings.*

ASHRAE's bEQ program fulfills DOER's goal of developing and implementing a commercial building energy rating that contains both an operational and an as-designed (asset) rating. One key principle of the bEQ approach is to create asset and operational ratings that share a common comparative approach with both ratings keyed to CBECS representative data. Apart from the bEQ there is no one labeling program that comprehensively addresses both these ratings, and DOER has invested considerable time and effort into helping pilot the Operational Rating for the bEQ, and is continuing these efforts through the pilot program for bEQ's Asset Rating.

Several lessons have been learned as a result of Massachusetts' participation in the bEQ program, and ASHRAE encourages DOER to continue working with ASHRAE to further develop and refine this program, and to eventually adopt bEQ as Massachusetts' commercial building energy label for both operational and asset ratings.

*6. Rating System: ASHRAE encourages DOER to adopt an alphabetical system for its commercial building energy label.*

As DOER notes in its discussion of rating systems in the White Paper, numeric systems can be confusing and not universally understood, and symbols while at times effective, do not always convey their meaning. An alphabetical system on the other hand is generally understood by the public and other stakeholders. A significant benefit of this understanding is a decreased need for educating the public and others on the meaning of various letter ratings.

ASHRAE employs an alphabetical rating system in its bEQ, and acknowledges the disadvantages inherent in this system – building owners likely may not desire a lower letter rating and may decline to publish the results of their operational and asset assessments if they receive a lower than expected rating.

While acknowledging this possibility, the goal of DOER's commercial building rating system is to spur investments in greater building efficiency and energy use by building owners/operators, and so a degree of discomfort with the process can be expected. ASHRAE thus encourages DOER to adopt a letter rating system for its commercial building energy label.

- 7. Various Label Elements: ASHRAE encourages DOER to refrain from including a specific greenhouse gas metric on its commercial building energy label. Similarly, DOER should not include a textbox summarizing key findings and recommendations, as this information is more appropriate for a report to accompany the asset and operational ratings.*

A primary function of the building label is to clearly and effectively communicate information on buildings' energy efficiency to the public, tenants, building owners/operators, and other stakeholders. Another key feature is to develop information to help make improvements to the building efficiency. Including information in DOER's label on GHGs and a textbox adds unnecessary detail and may ultimately cloud rather than clarify building performance. This information is more appropriately placed in a building energy efficiency recommendations report (BEERR) for building owners/operators that would accompany a buildings' operational and asset ratings. The bEQ program employs this approach and ASHRAE encourages DOER to adopt this methodology as well.

- 8. Assessment Process: ASHRAE strongly supports the use of a building energy efficiency recommendations report (BEERR) as part of DOER's commercial building rating program, including the use of ASHRAE Level 2 assessments. ASHRAE also supports the use of certified building energy modeling and assessment professionals to collect data for building ratings. ASHRAE supports the use of separate individuals, or one individual that has the necessary skill sets as demonstrated by ASHRAE's Building Energy Assessment Professional (BEAP) and Building Energy Modeling Professional (BEMP) certifications, to conduct the asset and operational ratings, given the different skill sets these two professionals require.*

ASHRAE includes a BEERR as part of the bEQ Asset Rating and Operational Rating. We believe the information provided to building owners and operators in these reports on potential cost-effective improvements in energy use are among the most valued and unique aspects of the bEQ program, as they help inform investment decisions in equipment upgrades, re-commissioning or retro-commissioning, and operations and maintenance. ASHRAE supports DOER's proposal to use an ASHRAE Level 2 energy audit to obtain this information.

ASHRAE also supports the use of certified building energy modeling and assessment professionals to collect data for DOER's commercial building rating program. To this end, ASHRAE developed, and in 2010 launched, a new Building Energy Modeling Professional (BEMP) certification<sup>3</sup>. ASHRAE has also developed a new Building Energy Assessment Professional (BEAP) certification<sup>4</sup>, which was launched in February, 2011.

The BEMP certification was developed in collaboration with the U.S. affiliate of the International Building Performance Simulation Association (IBPSA-USA) and the Illuminating Engineering Society of North America (IES). The purpose of this program is to certify individuals' ability to evaluate, choose, use, calibrate, and interpret the results of energy modeling software when applied to building and systems energy performance and economics and to certify individuals' competence to model new and existing buildings and systems with their full range of physics.

The BEAP certification was developed in collaboration with representatives from the bEQ program, IES, the National Institute of Building Sciences (NIBS), the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), and the Testing Adjusting and Balancing Bureau

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<sup>3</sup> For more information on the Building Energy Modeling Professional certification, visit <http://www.ashrae.org/certification/page/2491>.

<sup>4</sup> For more information on the Building Energy Assessment Professional certification, visit <http://www.ashrae.org/certification/page/2704>.

(TABB). The purpose of this program is to certify individuals' ability to audit and analyze residential, commercial, and industrial buildings including determining project scope, collecting data, analyzing building performance, interpreting results, evaluating alternatives, submitting recommendations for energy conservation measures, and assisting with the implementation of these recommendations.

To help control and reduce the upfront costs for building owners/operators of obtaining asset and operational ratings, DOER proposes to have a single assessor perform both ratings and to combine asset and operational on-site visits into a single on-site visit.

ASHRAE strongly urges DOER to use separate individuals, or one individual that has the necessary skill sets, as demonstrated by the BEAP and BEMP certifications, to conduct the asset and operational ratings, as opposed to having a single assessor perform both ratings. Having a single assessor perform both functions is problematic because the skills sets required for building asset (modeling) and operational ratings differ greatly. The difference between these two professionals is a primary factor in why ASHRAE and others saw the need to create separate BEMP and BEAP certifications.

ASHRAE recognizes that upfront costs can be a significant deterrent to obtaining a rating, and agrees with DOER that the value of obtaining a rating needs to be clearly articulated to building owners and other financial stakeholders. To help defer upfront costs, we support DOER's approach to integrate the building labeling program with existing utility and other incentive programs.

9. *Resources: ASHRAE encourages DOER to include a reference and link to the bEQ program in the "Resources" section of the White Paper.*

As the developer of a premier building energy asset and operational rating program which Massachusetts is considering as its own or the basis of its commercial building labeling program, ASHRAE encourages DOER to include a reference and link to ASHRAE's Building Energy Quotient program in the "Resources" section of the White Paper, *An MPG Rating for Commercial Buildings: Establishing a Building Energy Asset Labeling Program in Massachusetts* to facilitate communication and assist readers who may be interested in the bEQ program.

### **Conclusion**

ASHRAE hopes that these comments and recommendations in response to the request for public comment on the *An MPG Rating for Commercial Buildings: Establishing a Building Energy Asset Labeling Program in Massachusetts* will assist DOER in overcoming challenges and helping Massachusetts meet its efficiency goals.

We look forward to responding to any questions or comments DOER may have on ASHRAE's response. Please feel free to contact Mark Ames, ASHRAE Manager of Government Affairs, at [mames@ashrae.org](mailto:mames@ashrae.org) or 202-833-1830.

Personal regards,



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