BERDO POLICIES & PROCEDURES

Air Pollution Control Commission

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Version 2.3

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1. INTRODUCTION

This document includes policies of the Air Pollution Control Commission related to the Building Emissions Reduction and Disclosure Ordinance (BERDO). These policies may be updated by the Air Pollution Control Commission. All policies are to be considered in conjunction with the BERDO ordinance language and with all adopted Regulations.

2. DEFAULT ENERGY USE VALUES

Pursuant to BERDO Regulations Section 1.04(e), if no Energy use is known for a floor area, the appropriate energy use per square foot per month shall be multiplied by the floor area of that Building Use for which Energy use is unknown. If Energy use is known for one or more fuel types for a floor area, but is missing for others, report the actual Energy use for the known fuel types, and also report the net of the default values minus the actual Energy use.

Building Use	Total Energy Use (kBtu/sq ft/month)	2021 Emissions Factors (kgCO2e/MMBtu)
Assembly	13.7	68.3
College/University	17.0	67.1
Education	9.3	59.8
Food Sales & Service	34.0	71.7
Healthcare	32.4	69.8
Lodging	11.8	66.6
Manufacturing/Industrial	53.7	54.9
Multifamily housing	8.0	63.9
Office	9.4	75.0
Retail	6.9	72.6
Services	14.9	65.8
Storage	3.9	70.2
Technology/Science	33.5	69.6

Default values are based on 2018 BERDO data. They represent total annual Energy use (kBtu) by each Building Use type, divided by the square footage of buildings of that Building Use type, divided by 12 to obtain the monthly value, and multiplied by 150%. Since the total annual Energy use is the sum of multiple fuel types, each Building Use type has a blended emissions factor that represents the mix of fuels for that Building Use, applying the

emissions factors used in the Technical Methods Overview. Blended emissions factors by Building Use type will be updated annually.

3. THIRD-PARTY VERIFICATION

A. The third-party verifier of a Building cannot be the same person who completes reporting for that Building.

B. The following credentials are approved as Qualified Energy Professional Credentials. All third-party verifiers must have at least one active credential from this list.

Profession	Credential	Organization
Architect	Licensed Architect	National Council of Architectural Registration Boards (NCARB)
Architect	Registered Architect (RA)	American Institute of Architects (AIA)
Building Operator	Building Operator Certification (BOC) Level 2	Northwest Energy Efficiency Council
Building Operator	BREEAM USA In-Use Assessor	BREEAM USA
Certified Passive House Consultant	Certified Passive House Consultant (CPHC) Training	Passive House Institute US (PHIUS)
Commissioning Professional	Commissioning Process Management Professional Certification (CPMP)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Commissioning Professional	Certified Commissioning Professional (CCP)	Building Commissioning Association (BCA)
Commissioning Professional	Associate Commissioning Professional (ACP)	Building Commissioning Association (BCA)
Commissioning Professional	Certified Building Commissioning Professional (CBCP)	Association of Energy Engineers (AEE)

Profession	Credential	Organization
Commissioning Professional	Existing Building Commissioning Professional (EBCP)	Association of Energy Engineers (AEE)
Commissioning Professional	Certified Commissioning Authority (CxA)	AABC Commissioning Group (ACG)
Commissioning Professional	Qualified Commissioning Process Provider (QCxP)	UW-Madison
Commissioning Professional	Phius Certified Verifier	Passive House Institute US (PHIUS)
Energy Auditor	Building Energy Assessment Professional (BEAP)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Energy Auditor	Certified Energy Auditor (CEA)	Association of Energy Engineers (AEE)
Energy Auditor	Building Energy Modeling Professional (BEMP)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Energy Auditor	RPA/FMA High Performance Designation (RPA/FMA-HP)	BOMI International
Energy Auditor	Certified Measurement and Verification Professional (CMVP)	Association of Energy Engineers (AEE)
Energy Auditor	LEED Advanced Professional (AP) Building Operations & Maintenance	U.S. Green Building Council (USGBC)
Energy Auditor	SEP Performance Verifier	Association of Energy Engineers (AEE)
Energy Manager	Operations and Performance Management Professional (OPMP)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
Energy Manager	Certified Energy Manager (CEM)	Association of Energy Engineers (AEE)

Profession	Credential	Organization
Energy Manager	Energy Management Professional (EMP)	Energy Management Association (EMA)
Energy Manager	50001 Certified Practitioner in Energy Management Systems	Association of Energy Engineers (AEE)
Energy Modeler	Phius Certified Consultant	Passive House Institute US (PHIUS)
Engineer	Professional Engineer (PE)	National Society of Professional Engineers (NSPE)
Greenhouse gas verification professional	Greenhouse Gas Validation/Verification according to ISO 14065 standard.	ANSI National Accreditation Board (ANAB)

C. Pursuant to the Regulations Section 1.08(a), the Review Board may approve additional credentials for designation as qualified energy professionals.

4. SPECIAL CONDITIONS

A. The Environment Department may determine a building is vacant and therefore not subject to third-party verification. A vacant building shall be demonstrated by one or more of the following: demolition permits, insurance policies, no active water or gas utilities, transfer of all utilities to a construction company with an active construction permit, or if energy use is less than 5% of previously reported annual BERDO data. Owners must submit documentation in writing to the Environment Department. The Environment Department may ask for additional documentation and will issue a determination in writing to the Owner. An Owner may appeal the Environment Department's decision to the Commision in writing.

B. Buildings with active demolition permits in 2021 or 2022, as demonstrated by an Article 85 approval from the Boston Landmarks Commission and a demolition permit from Inspectional Services, do not need to complete third-party data verification of their 2021 data.

5. EMISSIONS FACTORS

A. Emissions factor methodologies will be reviewed at least every five years by the Commission.

B. Electric Grid Emissions Factors

   a. The Environment Department shall calculate an annual average electric grid emissions factor based on ~~data published by ISO-New England using~~ methodologies established by ISO-New England.

      i. Factors that the Environment Department shall consider include, but need not be limited to:

         1. Emissions Factors for electricity imported into and exported out of the ISO New England grid.

         2. Corrections to the allocation of emissions from District Energy Systems that send electricity to the ISO New England grid and thermal products to Boston buildings, to avoid duplication of emissions within BERDO Emissions Factors accounting.

   b. The Environment Department shall publish ~~estimated~~ projected electric grid Emissions Factors through 2050. ~~for forward-looking grid electricity.~~ ~~at least~~

~~every five years.~~ Initial projections are included in Appendix A. These initial projections will be reviewed by the Commission before the 2030 compliance period and may be updated by the Commission based on available data and projections. Projected emissions factors will be reviewed by the Commission at least every five years thereafter and may be updated at the discretion of the Commission.

i. Projections shall be based on ISO-New England, NEPOOL, and federal datasets, ~~and~~ state decarbonization and electricity generation policies~~.~~, and other factors determined relevant by the Environment Department.

~~ii. Estimated emissions factors shall only be used for planning purposes. If the estimated emissions factors differ from the published annual average emissions factor, the annual factor shall be used for compliance.~~

C. Boston Municipal Electricity Aggregation Program

a. The Environment Department shall identify which Buildings include accounts that are enrolled in the municipal electricity aggregation program and shall provide each Owner with annual aggregated electricity usage and the associated RECs for each product available through the program.

b. Owners are obligated to report the Building's total annual electricity usage regardless of whether any accounts are enrolled in the municipal aggregation program.

D. District Energy Systems

a. District Energy System operators shall use the following methodology to calculate annual E~~e~~missions F~~f~~actors for District Energy Systems:

i. Calculate the total direct greenhouse gas emissions for all fuels consumed using Emissions Factors defined in Regulations and Policy.
ii. Calculate the energy content of each output stream for the district energy system. Include each output stream of thermal energy (e.g., water/steam at various temperatures and pressures) and electricity. Convert all outputs to consistent units, such as MMBtu and calculate the energy content (enthalpy) of each output stream.
iii. Identify the efficiencies of production of each output stream from the district energy system.
iv. Allocate the total emissions to each output stream. Use the following formula:

$$E_i = \frac{Q_i / e_i}{\sum_{i=1}^{n} Q_i / e_i} \times E_T$$

Where:

E_i = emissions allocated to output stream i

Q_i = energy content of output stream i

e_i = efficiency of the production of output stream i

E_T = total emissions of the district energy system

n = number of output streams

v. Calculate E~~e~~mission F~~f~~actors for each output stream. Divide the total emissions from each output stream by the total quantity of that output stream.

vi. Guidance documents may provide additional instructions for reporting and verification necessary for compliance.

b. District Energy System annual Emissions Factors must be verified by a third-party prior to submission to the Environment Department.

i. Third-party verification must include a review of the data, calculations and final Emissions Factors. Verifiers must provide a signed affidavit affirming the accuracy of the data and emissions factors.

ii. District Energy Emission Factor verifiers shall include entities with expertise on district energy system operations and electricity emissions accounting. District Energy System operators shall submit preferred verifiers and their relevant experience to the Environment Department for approval prior to completing third-party verification and no later than March 1st. The Environment Department may request additional information on a verifier's qualifications.

c. Records documenting the E~~e~~missions F~~f~~actor calculations shall be provided to the Environment Department, including documentation of system configuration, annual system fuel use, emissions for all fuels consumed, plant-specific efficiencies, ~~annual thermal balance on the total system,~~ total energy content of each output stream, total emissions and emissions factors for each product.

d. Where possible, District Energy System operators are encouraged to provide interim estimated Eemissions Ffactors to customers and the Environment Department periodically for planning purposes.

E. Time-of-Use Electricity Emissions Factors ~~Rate~~

a. Owners or system operators that opt-in to a time-of-use (TOU) Eemissions Factor ~~rate~~ shall: ~~do the following:~~

i. Notify the Environment Department of the intent to use a TOU ~~time-of-use~~ Eemissions Ffactor and provide the contact information of the entity providing independent, third-party verification of the TOU ~~time-of-use~~ data.

ii. Provide hourly (8,760) or better metered data to the designated third-party verifier and the Environment Department and maintain a record pursuant to Section XI in the Regulations.

iii. The verifier shall review and quantify electricity-based emissions and interval electricity consumption data. After matching each interval with grid intensity, the verifier shall sum the total to calculate one custom CO_2e electric emissions factor. All verified records shall be preserved pursuant to Section XI in the Regulations.

iv. The Owner shall submit the verified total annual electricity consumption, total electricity emissions, the site-specific average annual electricity emissions, and any accompanying documentation to the Environment Department.

v. Guidance documents may provide additional instructions for reporting and verification necessary for compliance.

b. TOU ~~time-of-use~~ accounting can include behind-the-meter battery storage and solar generation as long as appropriate interval data is documented and verified.

c. TOU ~~time-of-use~~ reporting verifiers shall include entities with demand management, automated emissions reduction, electricity emissions accounting, or other related service as a primary area of service.

6. CALCULATING BUILDING EMISSIONS

A. Emissions from fuel or electricity consumption shall be calculated by multiplying the total amount of each fuel used by the Emissions Factor for each fuel or electricity type.

B. The total Emissions per square foot shall be calculated by adding all emissions from all fuel and electricity consumption and then dividing this amount by the gross square footage of the Building or the corresponding primary use(s), as defined in the Blended Emissions Standard. This number shall be used to determine compliance with the appropriate Emissions Standard.

7. BLENDED EMISSIONS STANDARDS

A. Building Owners shall use the following equation to calculate a blended emissions standard:

$$BES = \frac{\sum_{i=1}^{m} (SF_i \times ES_i) + (SF_{np} + ES_1)}{\sum_{i=1}^{m} (SF_i) + SF_{np}}$$

$$= \frac{(SF_1 \times ES_1) + (SF_2 \times ES_2) + \ldots + (SF_m \times E_m) + (SF_{np} \times ES_1)}{SF_1 + SF_2 + \ldots + SF_m + SF_{np}}$$

Where BES = blended CO2 Emissions standard, measured in kgCO2e/SF/yr
SF = square footage of a primary use
ES = emissions standard of a primary use, as defined by the Ordinance
SF_1= square footage of the largest primary use
ES_1=emissions standard of the largest primary use
SF_{np} = total square footage of all non-primary uses

B. For the purposes of calculating a building's blended emissions standard, the square footage of all non-primary uses shall be aggregated and added to the square footage of the largest primary use.
C. The sum of the gross square footages allocated to each primary use shall be equal to the total Gross Floor Area of the Building.
D. Blended emissions standards shall be third-party verified. The Third-party verified blended emissions standards shall be used for compliance until the following Verification Year unless there are changes in primary use(s).
E. If a building changes a primary use between verification years, a revised, third-party verified blended emissions standard shall be submitted.
F. If errors are identified, a revised standard may be submitted. A variation in area of primary use(s) of 2% or less shall not be considered an error, so long as the sum of areas of primary uses equals the total gross floor area of the Building.
G. Valid documentation to verify the primary use(s) include the Gross Floor Area listed in City of Boston Assessing Department records or Building documentation such as blueprints, architectural plans, or capital needs assessments.

8. ADDITIONAL COMPLIANCE MECHANISMS

A. Local Renewable Energy

a. In the event that an interconnection request for an on-site renewable energy system was filed in a timely manner but significantly delayed due to no fault of the Owner or anyone working for the Owner, the Owner may appeal to the Review Board to use estimated renewable energy generation for compliance. Owners must provide proof of system installation and extended delay, and verification of the estimated renewable energy generation. The Review Board shall have discretion to approve or deny such a request, provided that approval for a particular compliance period shall not guarantee approval for future compliance periods.

9. REVIEW BOARD POLICIES

A. COMPENSATION OF REVIEW BOARD MEMBERS

a. Review Board members who are eligible for and request compensation shall receive a stipend of $200 per day of service, up to a maximum of $4,800 per year. Compensation rates may be updated from time to time by the Commission.

b. Staff and volunteers of nominating Community-Based Organizations who are appointed as Review Board members shall be eligible for compensation.

B. DESIGNATION OF COMMUNITY-BASED ORGANIZATIONS

a. Section XIII.a.i.a. of the Regulations states that, "the requirement in Section 7-2.2(b) that the majority of the governing body and staff in Community-Based Organizations be "local residents" means residents of the Greater Boston area." "Greater Boston area" shall be defined as the municipalities in the Metropolitan Area Planning Council's Inner Core Committee subregion.

   i. The definition of Greater Boston may be reevaluated by the Commission prior to each application period for Community-Based Organizations and may be revised as needed.
   ii. All other references to residents in the definition of Community-Based Organization in the Ordinance shall mean residents of the City of Boston.

b. Applications to qualify as a nominating Community-Based Organization shall request evidence on how the applicant meets the requirements defined by Section 7-2.2(b), including:
   i. What not-for-profit status does the organization have?
   ii. Where do members of the governing body and staff live?
   iii. Where are the operating offices located?
   iv. How are priority issues for action and/or advocacy defined and developed?
   v. How are Boston residents involved in leadership?
   vi. How are Boston residents involved in program design, implementation, and/or evaluation?
   vii. How long has the organization been active in Boston?

C. SELECTION OF REVIEW BOARD MEMBERS

a. The nomination form for Review Board members shall request evidence on how the nominee meets the requirements defined in the Ordinance and Regulations, including:
   i. Self-attestation of Boston residency

ii. Self-attestation of expertise(s) represented
iii. Resume
iv. Personal statement
v. If the nominee is nominated by a nominating Community-Based Organization, the CBO shall provide a statement of support for the nominee. Additional letter(s) of support detailing how the nominee represents said expertise(s) may be submitted for all nominees.

b. Preference will be given to nominees that:
   i. Demonstrate more than one of the required expertise.
   ii. Demonstrate expertise in areas not represented by active Review Board members.
   iii. Bring diversity, including experience, expertise, geography, and background, to the Review Board.

D. WORKING GROUPS

a. Within 90 days of being seated, the Review Board shall convene (i) a working group focused on healthcare institutions connected to district energy systems and (ii) a working group focused on commercial real estate.
b. Individuals with appropriate expertise should be invited to participate in working groups. Boston residency is not a requirement to participate in working groups.
c. Working group meetings shall be open to the public.
d. Working groups shall provide updates to the Review Board and Environment Department periodically.

APPENDIX A - PROJECTED GRID EMISSIONS FACTORS

Year	Projected Grid Emissions Factor (lb/MWh)
2022	595
2023	580
2024	564
2025	548
2026	533
2027	517
2028	501
2029	486
2030	470
2031	454
2032	439
2033	423
2034	407
2035	392
2036	376
2037	360
2038	345
2039	329

Year	Projected Grid Emissions Factor (lb/MWh)
2040	313
2041	298
2042	282
2043	266
2044	251
2045	235
2046	219
2047	204
2048	188
2049	172
2050	157

Source: These projected emissions factors were prepared by Synapse as part of the development process of the BERDO Emissions Standards. See complete report here.