



Improve Your Building's Bottom Line



Control rising energy costs with the
Building Energy Quotient

Building EQ Reference Manual

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I. Background/History of the Business Energy Quotient Program

Understanding a building’s energy performance and how to make it better is at the core of what ASHRAE is all about. In 2007 the ASHRAE BOD recognized the need in the marketplace for a building energy rating program that was of high technical quality. The ABEL (as it was known back then) Ad Hoc was formed to investigate and report to the BOD.

The proposal from the ad hoc was to create a building energy rating tool that would compare the buildings actual (utility bills) operating performance to known similar buildings (*in operation*) and compare the theoretical energy performance to known similar buildings (*asset* or as designed rating).

Figure 1 – Original BUILDING EQ Scoring System



The approach was to use a letter grading system from A to F similar to that used in Europe. The A+ grade was set at zero net energy (a very high benchmark). The data base to compare the building was the US based 2003 CBECS (Commercial Building Energy Consumption Survey).

While there are many organizations participating in building energy rating, the ad hoc agreed that there is a meaningful role for ASHRAE in this market. Participating in the energy rating sector engages ASHRAE with the market and key organizations that are strategic for ASHRAE. At the grassroots level many of our members are involved in rating professionally so it is incumbent that ASHRAE add value to their needs

The program was developed to provide two separate ratings that can be used together or separately. An operational (Building EQ *In Operation*) rating compares the building’s real energy usage (utility

bills) to other buildings of a similar type and location. This provides insight to how the building is actually operating. An asset (Building EQ *As Designed*) rating uses a standardized energy model to compare the building’s envelope, HVAC, lighting, and water heating systems to other buildings of a similar type and location. This provides insight to what the building should be capable of doing as compared to what it actually delivers (as shown in the *In Operation* rating).

The Building EQ standing committee was appointed in July 2011 and met for the first time later that year with the charter of launching the Building EQ *In Operation* and *As Designed* ratings.

The Building EQ *In Operation* rating was launched in March 2012. The *Asset* rating was launched in May 2013. Both programs were originally launched as offline workbook operations. The workbooks were filled out and sent to ASHRAE where they were manually reviewed by ASHRAE staff. It was recognized that this manual process would eventually be a limiting factor in the ability of the program to grow and succeed, but the committee agreed that a manual process was appropriate at the onset in order to work out any issues or problems in the process.

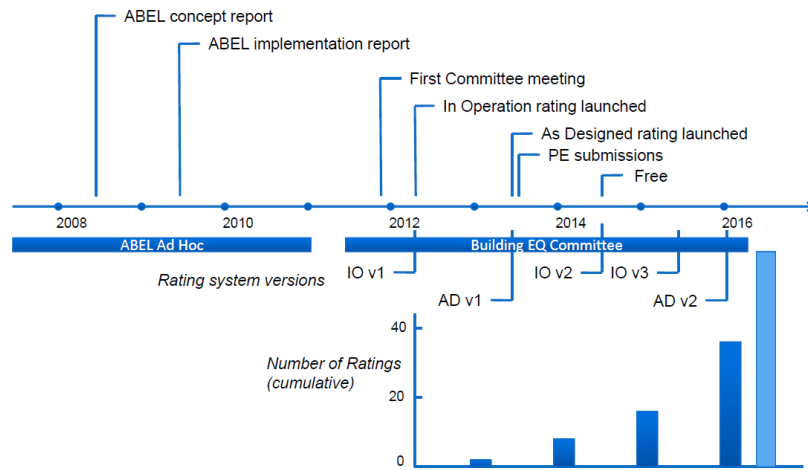


Figure 2- Building EQ Timeline and Results

At the onset, the program required that only ASHRAE BEMP or BEAP certified personnel could perform the analysis. This supported the ASHRAE certification program and its members. However, the committee realized that the low number of certified personnel would severely limit the number of ratings that could be performed, which led the committee to expand the required credential to include those with PE status.

The original financial model for the Building EQ assumed that a \$500 fee could be charged to certify a buildings performance for either In Operation or As Designed rating and also charge to produce a plaque for display on the rated building. Unfortunately, it was quickly determined this business model would not work because the ENERGY STAR Portfolio Manager program is the market leader (over 400,000 applications) and the service is free. As a result, the committee permanently dropped the submission fee.

After several years, the Building EQ program pivoted from a benchmarking and building labeling program that competed with other products in the marketplace to a benchmarking, assessment, and energy audit tool to improve building stock. The pivot was supported by a marketing study that was done through a contract with Godfrey in 2016-2017. The work included a market survey, a rebranding package, an updated logo, and new collateral to use with the brand. At that time, the BEQ acronym was taken out of usage in favor of Building EQ. The program pivoted because the committee listened to the feedback from the marketplace that this is what was needed.

As part of the pivot, the Building EQ program was relaunched as a web-based portal in 2017-2018. This rebranded and relaunched program places a much stronger emphasis on the alignment that Building EQ has with an ASHRAE Level 1 Energy Audit as defined by ASHRAE Standard 211 *Standard for Commercial Building Energy Audits*. Since its inception, Building EQ was created to measure building energy performance, with the ultimate goal of creating a conversation with the building owner to implement energy efficiency measures. Building EQ also offers the unique ability to look at both a building's potential energy use (As Designed) and actual energy use (In Operation) in order to identify and close the energy gap between design and operation. These measures result in better buildings, bringing tomorrow's built environment as a reality for today

II. Building EQ Subcommittees

Building EQ currently operates with two subcommittees. Leadership and membership of the subcommittees is appointed by the Chair of the Committee. Subcommittee membership may include consultants and liaisons as needed.

Business Development Subcommittee

Part 1 Responsibilities

Marketing and sales support:

- Developing and updating marketing collateral for use at chapter and regional member meetings, conference presentations, association meetings, potential user presentations, and other opportunities to showcase the value of Building EQ.
- Solicit successful applications to be showcased in presentations, case studies, etc. Coordinate development and dissemination of materials.
- Identify new opportunities and methods to showcase the value of Building EQ to organizations and practitioners. These may include:
 - Blogs
 - Videos
 - Case studies
 - Presentations
 - Strategic web links
 - Podcasts
- Support, and in some cases coordinate, the creation and delivery of industry presentations, panel discussions, forums, etc. Target audiences may include:
 - ASHRAE technical conferences, regional / chapter meetings, GAC meetings, etc.
 - Other association conferences and member meetings
 - Training
- Continually assess market needs. Identify and apply methods for assessing value for various market segments. Method may include:
 - Analysis of user database and portal
 - Direct surveys to current and/or future users
 - Potential focus group discussions or user forums
 - User interviews
- Manage interactions with ASHRAE committees and entities and outside organization groups:
 - Maintain tracking system to ensure timely and consistent responses.
 - Delegate, within committee or outside as appropriate, coordination of interaction with target associations, organizations, governments, etc.
 - Review requests for modifications and improvements suggestions and report to committee for potential program changes.
- Identify revenue sources based on industry needs and service-providing trends, including the following:
 - Report types for purchase
 - Advertisements
 - Recognition
- Pursue and secure funding opportunities for portal maintenance and development, including the following avenues:

- ASHRAE Foundation, non-profit organization, and government grants
- ASHRAE Foundation endowments
- Government or private cost-sharing partnerships that preserves ASHRAE's ownership of the portal and its features

Part 2 Membership

- Members of the Commerce Subcommittee include voting members and may include non-voting members and consultants to provide specific expertise or stakeholder representation.
- Service on this committee is at the discretion of the Committee Chair and may change annually as membership of the committee changes.
- The chair of the subcommittee shall be appointed annually by the chair of the committee.
- The chair of the subcommittee may appoint a vice chair of the subcommittee to assist with administrative and leadership duties.

Part 3 Meetings

- The Commerce Subcommittee may meet via web and/or phone conference as needed to support its assigned responsibilities.
- The subcommittee may meet at the Annual and Winter Meetings of the Society. Conference calls between face-to-face meetings will be scheduled on as needed basis.

Part 4 Reporting

- The Commerce Subcommittee will provide information on the status of its assigned responsibilities to the committee at leadership and general committee meetings.

Technical Development Subcommittee

Part 1 Responsibilities

- Coordinate portal updates, feature development, and maintenance
 - Oversee, with staff support, contract services for portal and server updates, revisions, and product development
- Assess and implement technical changes based on Standards, Guideline, and publication updates, completed research projects, and industry needs
- Develop and submit ASHRAE research projects, with appropriate TC coordination as needed
- Coordinate with TC and research initiatives
- Identify and develop products incidental to building energy performance assessment to enhance portal offerings, standing, and features

Part 2 Membership

- Members of the Development Subcommittee include voting members and may include non-voting members and consultants to provide specific expertise or stakeholder representation.
- Service on this committee is at the discretion of the Committee Chair and may change annually as membership of the committee changes.
- The chair of the subcommittee shall be appointed annually by the chair of the committee.
- The chair of the subcommittee may appoint a vice chair of the subcommittee to assist with administrative and leadership duties.

Part 3 Meetings

- The Development Subcommittee may meet via web and/or phone conference as needed to support its assigned responsibilities.
- The subcommittee may meet at the Annual and Winter Meetings of the Society. Conference calls between face-to-face meetings will be scheduled on as needed basis.

Part 4 Reporting

- The Development Subcommittee will provide information on the status of its assigned responsibilities to the committee at leadership and general committee meetings.

Executive Committee

Part 1 Responsibilities

- Developing a report and providing an updated Business Plan to the BOD per the MOP
- Create MBOs that align with the society's strategic plans.
- Conduct training and assign mentors to new members.
- Review and revise the ROB, MOP, Reference Manual, and Business Plans.
- Manage liaison activities.

Part 2 Membership

- Membership will include the Committee Chair, Vice-Chair, and Subcommittee Chairs.
- The Chair may invite consultants or other members at his/her discretion.

Part 3 Meetings

- Meeting cadence will be at the Chair's discretion.
- Meetings will be held in executive session.

Ad-Hoc Committees and Working Groups

Ad-Hoc Committees may be convened by the Committee Chair as needed for specific initiatives. Working Groups may be convened by the Committee Chair for the general committee and the Subcommittee Chairs for their respective subcommittee as needed for specific initiatives. Membership and responsibilities will be directed by the convening Chair. The convening chair may appoint a vice chair to assist with leadership and administrative duties.

III. Building EQ Support of ASHRAE's Strategic Plan

Building EQ supports ASHRAE Strategic plan goals

1. Position ASHRAE as an Essential Knowledge Resource for a Sustainable, High-Performance Built Environment
 - Building EQ is a building energy performance tool that pulls together information from a number of ASHRAE resources (standards and documents) to help buildings improve their energy performance which supports a sustainable high-performance built environment.
 - ASHRAE Resources utilized and promoted by Building EQ include:
 - Standard 211 *Standard for Commercial Building Energy Audits*
 - Standard 100 *Energy Efficiency in Existing Buildings*
 - Standard 90.1 *Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings*
 - Standard 90.4 *Energy Standard for Data Centers*
 - Standard 62.1 *Ventilation for Acceptable Indoor Air Quality*
 - *Performance Measurement Protocols*
 - *Performance Measurement Protocols: Best Practices*
 - Through the projects entered into the Building EQ Portal, a database of information is being developed on buildings that in the future can be used in aggregate to support ASHRAE committees and ASHRAE research. Because this is a working tool, it is a database that will be continuously maintained and updated providing an expanding knowledge resource.
 - Building EQ becomes a compliance path for completing ASHRAE Level 1 Energy Audits in compliance with Standard 211 where that standard has been incorporated into code, such as in the City of Orlando.
2. Maximize member value and engagement
 - The Building EQ Portal provides a member value as an audit tool for commercial use by ASHRAE membership, i.e., as a direct revenue generator for those members and as a tool to use in their day to day jobs.
 - Building EQ supports building energy assessment professionals by providing a consistent, replicable approach to assessing and auditing building energy performance.
 - The Portal also offers pre-populated energy audit reports that meet the reporting requirements for Standard 211 *Standard for Commercial Building Energy Audits*. A pre-populated report saves time and money for energy assessment professionals.
 - Through the projects entered into the Building EQ Portal, a database of information is being developed on buildings that in the future can be used in aggregate to support ASHRAE committees and ASHRAE research. Because this is a working tool, it is a database that will be continuously maintained and updated providing an expanding knowledge resource.
 - When used in universities, Building EQ becomes an experiential learning tool for engineering students to learn the process of completing an ASHRAE Level 1 Energy Audit (as required by Standard 211 *Standard for Commercial Building Energy Audits* under the supervision of a ASHRAE certified BEAP or licensed professional engineer.

Building EQ supports ASHRAE Strategic Plan initiatives

1. Resilient Buildings and Communities
 - The Building EQ In Operation rating not only benchmarks a building's energy performance, it also provides actionable recommendation to improve that energy performance with the ultimate goal

being a zero net energy building. Improving energy performance and moving towards net zero increases the resilience of both buildings and communities.

- The Building EQ As Designed rating identifies the potential energy efficiency of a building and used in conjunction with the In Operation rating identifies and helps close the gap between design and operation resulting in a consistent approach to facility hardening and resilience.
2. Indoor Environmental Quality (IEQ)
 - The Building EQ In Operation includes an IEQ screening that requires measurements and observations of lighting, thermal comfort, and ventilation for IAQ conditions. The information from this screening provides additional information to a building owner to help them improve their building's performance and indoor environmental quality.
 - Specific measurements associated with IEQ included in the Building EQ In Operation process include; temperature, relative humidity, vertical temperature variance, sound levels, lighting levels, in-space airflow, ventilation, and carbon dioxide levels.
 3. Improve Chapter engagement, capacity, and support
 - Building EQ is working with APPA and the ASHRAE Student Branch Advisors to engage students and local chapters to work together to use Building EQ on local public school, university or public service buildings. This engages the chapter members to use the Portal and provides student members with experiential learning which prepares them for the engineering workforce and introduces them to the HVAC field.
 - Building EQ is also working with GAC to engage local members to advocate for ASHRAE standards that are supported by Building EQ including Standard 211, 100, and 90.1.

Building EQ supports ASHRAE Strategic Plan outcomes

1. Increased operational efficiency and market responsiveness
 - The Building EQ In Operation rating not only benchmarks a building's energy performance, it also provides actionable recommendation to improve that energy performance.
 - The Building EQ As Designed rating identifies the potential energy efficiency of a building and used in conjunction with the In Operation rating identifies and helps close the gap between design and operation.
 - Annual use of the Building EQ in Operation assessment allows for tracking of a facility's energy performance over time in order to maintain the designed performance and also assists with identifying preventative maintenance measures.
2. Demonstrated leadership in meeting societal needs through expanded research, application to practice and strategic partnerships
 - Building EQ has already initiated one research project that will add substantial knowledge and resources to the modeling community (*RP-1771 Energy Modeling of Typical Commercial Buildings in Support of ASHRAE Building Energy Quotient Energy Rating Program*).
 - The Building EQ Portal specifically applies Standard 211 *Standard for Commercial Building Energy Audits* to the actual practice of energy audits and assessment and does so in a consistent, replicable methodology.
 - The strategic partnership with APPA has also provided a way to engage students in the benchmarking and assessment of building energy performance while giving them hands on experience with actual practicing engineers and exposing them to the HVAC design and engineering field.

3. Increased awareness of ASHRAE and use of its technical resources among priority stakeholders
 - The marketing outreach for the Portal that is done by the Building EQ and ASHRAE grassroots committees increases awareness not just of the Building EQ Portal but also of the various standards and other technical resources on which Building EQ relies and supports. These resources include the Building Energy Assessment Professional (BEAP) and Building Energy Modeling Professional (BEMP) certification programs.
 - Building EQ becomes a compliance path for completing ASHRAE Level 1 Energy Audits in compliance with Standard 211 where that standard has been incorporated into code, such as in the City of Orlando.
4. Increased global adaptation of ASHRAE Standards
 - Building EQ has a strong following in a number of countries outside the United States and North America. The Portal has been translated into both French and Spanish to support those users. Because Building EQ is so strongly tied to a number of ASHRAE standards, the use of the Portal in these countries is also supporting those standards.
 - Because the Building EQ methodology utilizes climate zones in calculating the baseline median, use of the Portal provides a global comparison of buildings by building type within specific climate zones regardless of international boundaries.
5. Increased breadth in ASHRAE's product offerings
 - Building EQ broadens the products offered by ASHRAE by providing a tool that supports:
 - building energy performance benchmarking, assessment, and auditing
 - improving building energy performance
 - building energy performance disclosure in the real estate market
 - identifying and closing the energy gap between design and operation

IV. Building EQ Value Propositions

The following is summary of current value propositions that Building EQ offers the marketplace and the ASHRAE membership.

- Every time a user enters a Building into the web portal, the user is coming to ASHRAE for technical assistance. Every time a Credentialed user submits a building, we are providing a service to a professional.
- As buildings are entered ASHRAE builds a database that will be very helpful in developing strategies and programs that will improve real building performance.
- Rating buildings will lead to improved building stock which is a primary goal of the Society.
- Providing an ASHRAE Level 1 Energy Audit will lead to better buildings (see above). It is also part of how many ASHRAE members make a living so it becomes a tangible member benefit.
- The Building EQ labeling program may be more important outside of North America thus providing a real benefit for global members.
- The Building EQ program has the option to rate the building and acknowledge the energy performance of a building with both the **As Designed** (potential) and **In Operation** (actual) ratings. and is the only tool that has both and can therefore focus on identifying and eliminating the “energy gap” between design and operation.
- The output from In Operation rating aligns with and generates information required for an ASHRAE Level 1 Energy Audit as defined in Standard 211Standard for Commercial Building Energy Audits. This is a key deliverable in helping building owners improve their buildings and providing an ASHRAE member benefit to those who perform this service professionally.
- The ASHRAE-APPA Coordinating Committee, established by President Boyce, is well on their way to creating a jointly supported program wherein Building EQ would be used campus wide in the USA. Several universities are already using Building EQ extensively and plan to expand that use campus wide. It will take relatively few campuses to buy into this emerging movement for Building EQ to reach a critical mass and expand rapidly to campuses nationwide.
- Some of these universities are using Building EQ on their buildings in conjunction with the ASHRAE Benchmarking and Assessment of Building Energy Performance university course which engages students in hands-on learning and partners with local ASHRAE chapters & members.
- The Building EQ program has the ability to offer a *Licensee* feature, which allows ASHRAE to work with specific large customers to create custom tools and databases that meets their needs.

V. Building EQ Products and Services

Building EQ Web Portal

- Web based
- Works for In Operation and As Designed
- Provides immediate error checking on data entered into the Portal.
- Includes metered energy data exchange from ENERGY STAR Portfolio Manager.
- Provides median EUI calculations that are aligned with ENERGY STAR Portfolio Manager
- Offers additional building types beyond those offered in ENERGY STAR
- Supports multiple languages and units of measure for markets outside of the USA.
- Can be used by anyone for an unofficial rating, but requires a professional engineer, BEAP (in operation) or BEMP (Asset rating) certified person to submit a project for an official rating and get a report.
- Streamlines and improves the audit process by offering a consistent process across multiple audits and/or auditors.
- Generates auto-populated reports aligned with the requirements of ASHRAE Standard 211. This supports the goal to help customers understand where they can make changes to improve their buildings.

Building EQ Rating and Awards

1. Calculated Building EQ Performance Score
 - Visible at top of Portal page after inputting minimum required data
 - Free to all users
2. User Input Report
 - Recaps all data entered into the Portal
 - Blank report can be printed for use of data collection offline
 - Free to all users
3. Building EQ Label Report
 - Graphic representation of Building EQ score
 - Can be used to create a building plaque (see Plaque Guidelines on Portal)
 - Free to credentialed users for approved submissions
4. Building EQ Disclosure Report
 - Presents summary of building's energy use and Building EQ Performance Score
 - Suitable for real estate transaction energy disclosure
 - Available for a \$50 fee to credentialed users for approved submissions
5. Building EQ Spreadsheets Audit Report
 - ASHRAE Level 1 Energy Audit spreadsheets in MS Excel format
 - Auto populated with all information collected during In Operation assessment
 - Additional information entered by user
 - Available for a \$50 fee to credentialed users for approved submissions
6. Building EQ Narrative Audit Report
 - Full narrative ASHRAE Level 1 Energy Audit report in MS Word format
 - Follows ASHRAE Standard 211 reporting requirements
 - Auto populated with all information collected during In Operation assessment

- Report customization and additional information entered by user
- Available for a \$200 fee to credentialed users for approved submissions

Building EQ Database

Once the Building EQ database becomes adequately robust, access to the data in aggregate can be provided to members and to non-members on a subscription basis. The data would be potentially valuable for ASHRAE research, equipment manufacturers, developers, and building owners.

Building EQ Licensee Program

Licensee programs can be developed where ASHRAE operates the portal for an interested group and the tool is tailored to their needs including language, units of measure, databases, building types etc. The portal could have the customer's look and feel with "Powered by ASHRAE" as the tag line. Each licensee program would be customized for the particular use and the cost to implement the changes negotiated as part of the licensee agreement.

VI. Revenue Plan

Sales and marketing are two different things. Rarely does just marketing result in a successful venture. It is critical for Building EQ's success that we identify our customers and go ask them for their business. Over the next 12 months the Building EQ committee will restructure itself away from a technology focused committee to a business development and marketing focused committee in support of this critical issue. In doing so it will also leverage its relationship with over 56,000+ ASHRAE members world- wide by utilizing chapter resources to develop a grassroots campaign to revitalize Building EQ.

The challenge is to focus on a few opportunities and execute well versus chasing every possible lead and executing poorly. Building EQ Committee will target the best initial opportunities and focus on these. This is aligned with market tools and our roll out strategy. Each year the plan will be reviewed and amended as necessary.

Building EQ Customers

The following is a list of Building EQ priority and secondary customers and what is important to them. Refer to the Commerce Committee's sales lead documents and spreadsheets for complete updated leads and MOUs.

Priority Customers

Institutional Building Owners

Universities are a key account for Building EQ. They are interested in both recognition of successful buildings but also identifying opportunities to improve underperforming buildings. Larger universities may be interested in the Licensee program for specific building types (i.e. a Lab) or for their campuses.

Local State and Federal Governments

Governments at all levels are a Building EQ customer both by the policies they implement and as a building owner. They are interested in building ratings as well as the licensee programs. This opportunity extends beyond North America.

Organizational Partners Representing Building Owners

Organizational partners such as APPA represent a means to reach customers. Building EQ program can be an alternative compliance path.

Secondary Customers

Individual Building Owner

This is a person or group with one to five buildings. They most likely want recognition of a successful building. They may also want to know how well their building stacks up against similar buildings and how to improve it.

Utilities

Utilities often develop their own rating programs to support energy efficiency goals within their marketplace. Building EQ licensee program allows the utility to create rating program tailored to their needs. This customer is best approached with GGAC and the grassroots.

Multi Building Owners

There are organizations and owners who have large building stock that need services with tailored solutions to meet their needs. Examples include health care, large commercial property owners (Heinz, Bovis Lend Lease etc), K-12 schools districts etc. Each group has specific needs and will require a different sales channel to be

successfully serviced. In future sales plans, Building EQ Committee will target specific groups and develop a plan to serve their needs.

Revenue Sources

Credential Verification

A credentialed user is required to submit projects for an official rating. While BEAP and BEMP certifications are automatically verified by the system, the verification of professional engineers must be done manually. A one-time verification fee (\$15 members, \$25 non-members) is charged for this.

Portal Reports

While several reports are free in keeping with the what has become the norm in the marketplace due to the bar set by ENERGY STAR and other programs, the auto-populated energy audits report are sold for a fee. As the program gains traction, these reports are expected to be purchased in greater numbers. Training and Certification

A successful Building EQ program should spawn needs and opportunities for training courses and certifications. This is an indirect revenue source.

Membership

Any program that enhances membership value will improve membership growth and retention. A successful Building EQ program will add value to ASHRAE members. This is an indirect revenue source.

Publication Sales

A successful Building EQ program will support the use of Standard 211 and other publications thus improving revenue. This is indirect revenue source.

VII. Building EQ Portal Feature Development List

Refer to the complete Portal New Feature List for projects in progress, quoted projects, other projects for consideration, projects requiring more definition, and projects that are not needed or feasible. New projects should be driven by industry demand that will lead to increased ease of use of the Portal and use of revenue sources (e.g. reports).