ASHRAE Triangle Chapter

ASHRAE's bEQ Bldg Energy Label Program

2017–2018 ASHRAE Triangle Chapter Meeting

January 10, 2018

Royal Banquet and Conference Center
Raleigh, NC

Agenda

1. Welcome
2. Introductions
   - Distinguished Visitors
   - New Members/Visitors
3. Old Business
4. New Business
5. Introduce Speaker
   - Bruce D. Hunn, PhD
   - ASHRAE bEQ Labeling Program
6. Announcements
7. Adjourn

WakeMed Soccer Park

Saturday, December 2, 2017

Bring your best FOOT forward to an efficient future

WakeMed Soccer Park in Cary

TOWN of CARY
NORTH CAROLINA

ASHRAE's Building Energy Quotient Labeling Program

ASHRAE Triangle Chapter
Raleigh, North Carolina
January 10, 2018

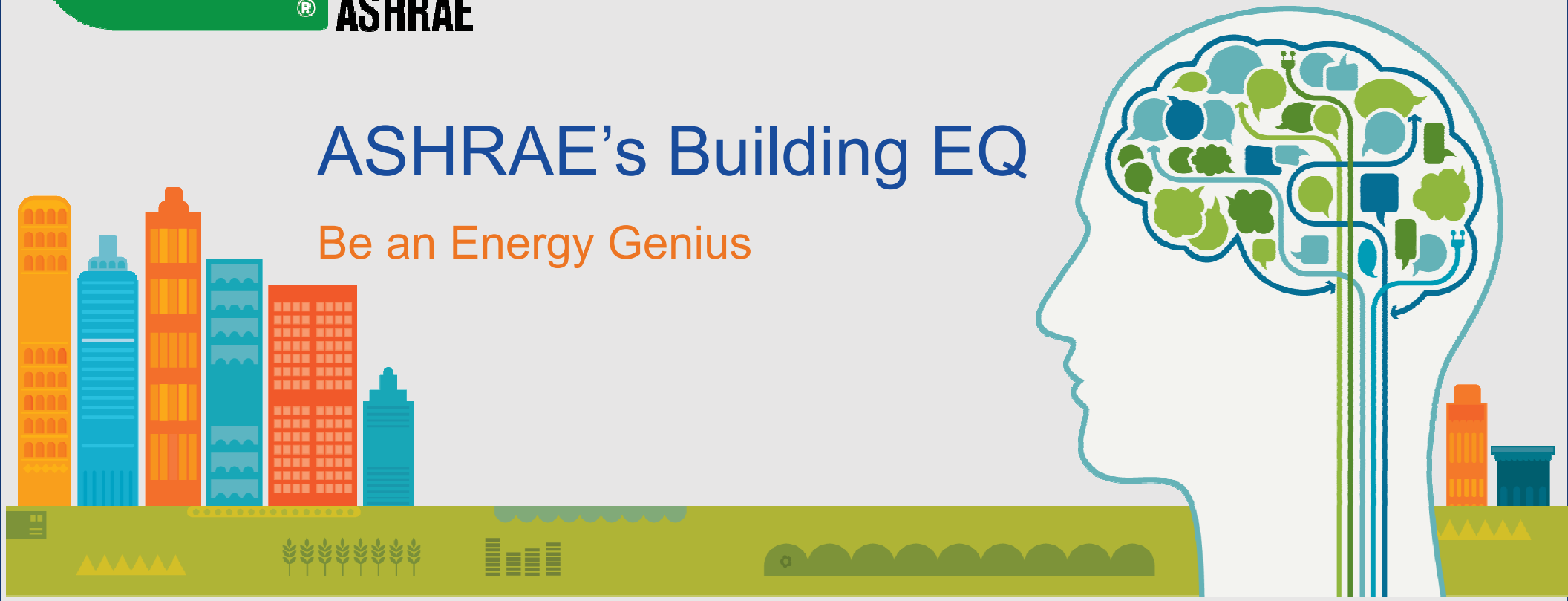
Bruce D. Hunn, Ph.D
Fellow, ASHRAE

Building eQ®

POWERED BY ASHRAE

ASHRAE's Building EQ

Be an Energy Genius



Building EQ Seminar Description

- ASHRAE's Building Energy Quotient program ***provides a quick energy analysis*** that compares your building to similar buildings with the same climate
- Building EQ helps ***identify means to improve your building's energy performance*** and provide data on Indoor Environmental Quality
- Provides details on ***how to use the Building EQ program*** in new building design and to manage building energy consumption

Learning Objectives

After attending this presentation, participants will be able to:

- Understand how Building EQ rating applies to building energy use
- Explain features of the Building EQ Portal
- Use Building EQ Performance Score to differentiate energy performance
- Explain the characteristics of Building EQ actionable energy recommendations for existing buildings
- Describe how the Building EQ process standardizes modeling so that comparisons can be meaningful

AIA/CES Registration PLACEHOLDER SLIDE

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EDUCATION PARTNER

PLACEHOLDER SLIDE

By ASHRAE

GBCI cannot guarantee that course sessions will be delivered to you as submitted to GBCI. However, any course found to be in violation of the standards of the program, or otherwise contrary to the mission of GBCI, shall be removed. Your course evaluations will help us uphold these standards.

Course ID: TBD

Approved for:

X	General CE hours	LEED GREEN ASSOCIATE ☐
		LEED AP BD+C ☐
X	LEED-specific hours	LEED AP HOMES ☐
		LEED AP ID+C ☐
		LEED AP ND ☐
		LEED AP O+M ☐

Using ASHRAE's Building EQ

Rate Your Building's Efficiency

- Compare your building to similar buildings with the same climate.

Improve Your Building's Energy Performance

- Act on *As Designed* and/or *In Operation* assessments.

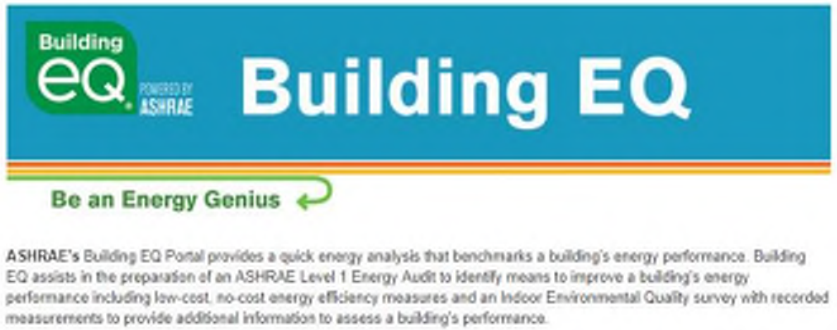
Powered by ASHRAE

- Rests on ASHRAE methodologies and standards and the experience of credentialed practitioners for reliable, consistent results.

Building EQ is the most comprehensive assessment program providing actionable recommendations for today's commercial and institutional buildings.

ASHRAE's Building EQ

- Voluntary rating/labeling program
- Two ratings that work together
  - *In Operation* (operational) rating assesses actual energy use
  - *As Designed* (asset) rating evaluates potential energy use
- Complements other building rating/labeling programs



Benefits of Building EQ

- Helps building owners make informed decisions managing their building portfolios
- Assists in the preparation of an ASHRAE Level 1 Energy Audit
- Identifies actionable recommendations, costs, and payback ranges for energy improvements
- Provides the credentialed practitioner with a consistent evaluation methodology
- Provides the building owner with easily understood and applied information

Value of Building EQ

Building EQ provides a framework for realizing energy improvements in existing buildings

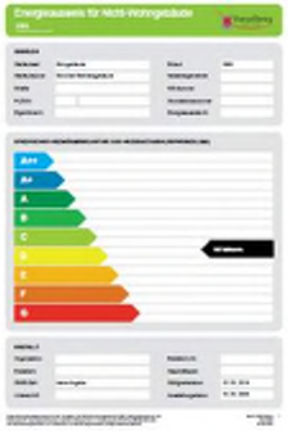
- **Greatest Value:**
  - Streamlining of the energy audit process
  - Comparison of your building performance to that of peer building
  - Actionable recommendations for improving building energy performance
  - Documentation of the assessment and results
  - Building Label to recognize high performance
- **Long Term Value:**
  - Ability to assess effectiveness of EEMs after implementation
  - Standard and consistent process to track improvement over time

Current US/Canada Labeling Efforts

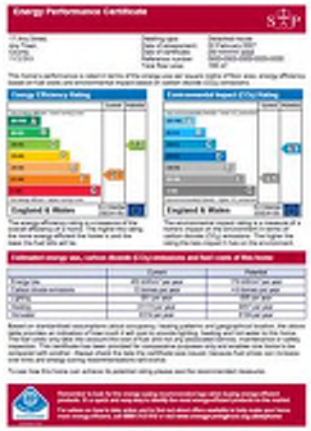
- EPA ENERGY STAR Portfolio Manager (***benchmarking***)
- DOE Commercial Building Energy Asset Score
- USGBC LEED (***sustainability rating***)
- GBI Green Globes (***sustainability rating***)
- BOMA 360 (six ***O&M focused criteria*** including energy)
- State and municipal building energy ***reporting and disclosure*** ordinances (BERDO)

Current Global Labeling Efforts

- Widespread acceptance internationally



Austria



England & Wales

Greece

Italy

Building EQ is Different

From green building programs:

- Based solely on a building's energy use
- Focused on understanding energy use
- Identifies opportunities for improved energy performance (*In Operation*)
- Allows for comparison between buildings with different operating variables (*As Designed*)
- Consistent energy rating method for both Existing Buildings and New Construction programs

Building EQ is Different

From other benchmarking programs:

- Greater differentiation for high performing buildings - score emphasizes zero net energy
- Site visit required
- Identifies actionable recommendations for improving energy performance (In Operation)
- Connects building owners with a credential practitioner to help implement recommendations
- Unified system for assessing assets and operation

In Operation Rating

- Assessment of actual energy performance with the existing characteristics and how it is operated
- Based on metered energy use of a building
- Confirmation that indoor environmental quality is not compromised for energy savings.
- On-site assessment with actionable recommendations for improving energy performance
- Applicable for buildings after at least 12 months of operation

As Designed Rating

- Assessment of energy performance potential, based on building's physical characteristics and systems
- Independent of building occupancy and operating conditions
- Based on results of a standardized energy model as compared to a baseline
- Applicable to both new and existing buildings

Comparing Ratings

Building eQ® POWERED BY ASHRAE

In Operation Rating

- Metered energy consumption
- Influenced by operational and occupancy variables
- Improved by upgrading building fabric, systems, or operating procedures

As Designed Rating

- Simulated standardized energy use
- Independent of operational and occupancy variables
- Improved only by upgrading building fabric or systems

Building EQ Performance Score

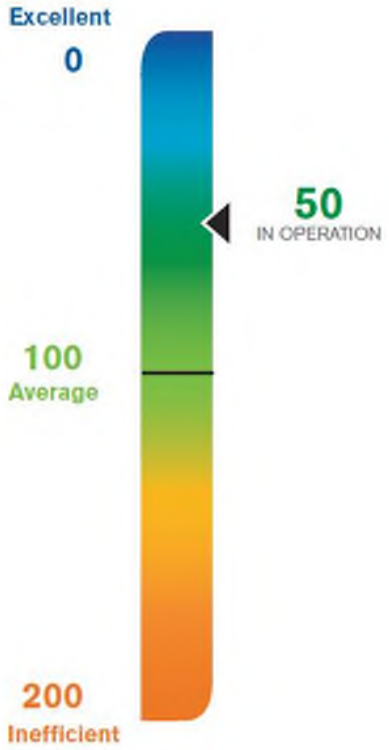
- Building EQ tracks a building's energy performance with the Building Performance Score
- The score compares the candidate building's EUI to a baseline EUI for that building type.

$$(EUI_{building} / EUI_{baseline}) \times 100$$

- EUIs are calculated for source energy using US national site-to-source ratios.

Rating Scale

- Rating based on Building Performance Score – letter grades eliminated
- Excellent (score of 0) set to “zero net energy”
- Score below zero for net energy producing buildings
- Average set to U.S. median EUI for existing buildings of that building type, with adjustments
- Score exceeding 100 for buildings with higher than average energy usage.



Rating Scale

Score Range	Energy Performance
≤ 0	Net zero or energy producer
1-25	75-99% energy savings over median
26-55	45-74% energy savings over median
56-85	15-44% energy savings over median
86-115	Within 15% of median energy use
116-145	16-45% more energy than median
>145	>45% more energy than median

Introducing
Building EQ Portal

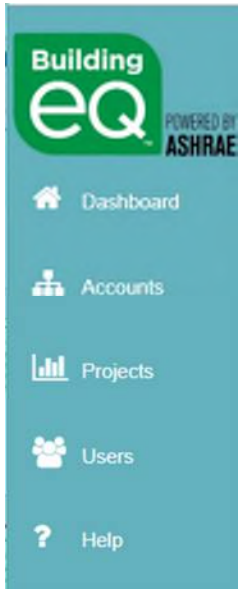
Building EQ Portal

- Web Portal for In Operation Rating – Launched November 2017
- Web Portal for As Designed – To launch in February 2018
- To date 350+ registered users

Building EQ Portal Features

- Online data entry and submission process
- Metered energy data exchange from Portfolio Manager
- Median EUI calculation aligned with ENERGY STAR™
- Reports automatically generated by credentialed users
- Improved submission approval process with help and validation built in
- Customized reporting capabilities in development

Using the Building EQ Portal



- Create log-in and password to register as a user
- Menu on the left side of screen used to navigate around the Portal.
- Set up an account to manage users and projects
- Create a project to begin entering building data
- Projects must be submitted by a credentialed practitioner for an official Building EQ rating

Using the Building EQ Portal

Data input screens are arranged by tabs and accordions

System Outputs/Reports

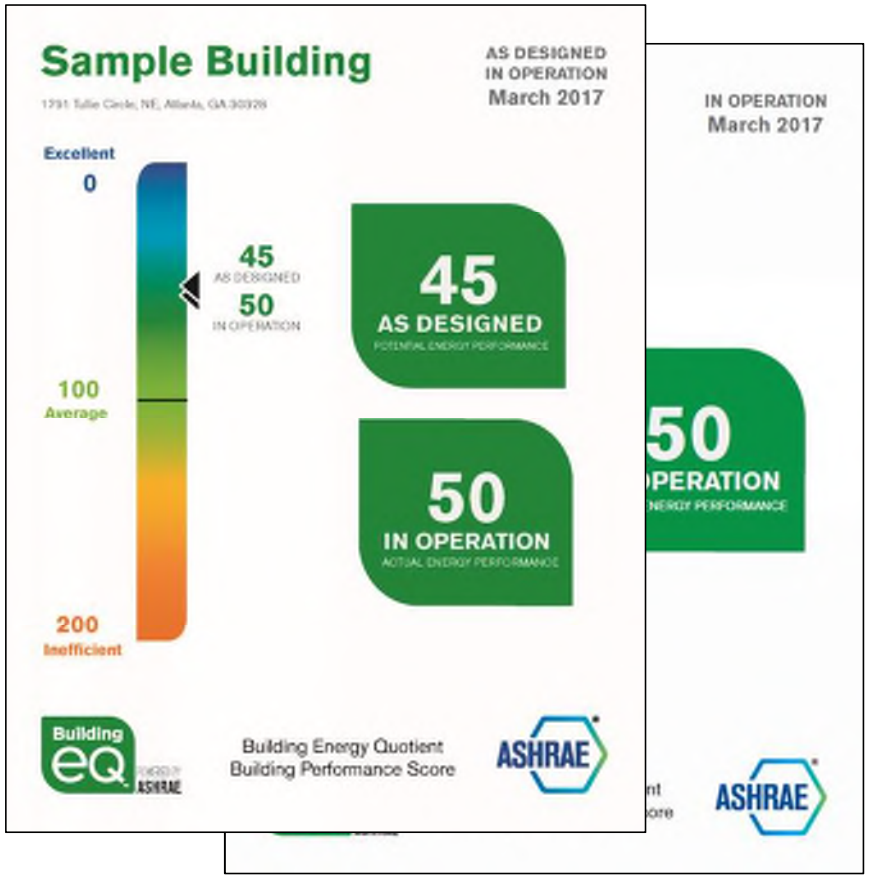
- Building EQ Performance Score – available to all users
- User Input Report – available to all users
- Building EQ Label Report– available for credentialed submissions
- Disclosure Form – Coming Soon for approved submissions
- Audit Report Spreadsheets – Coming Soon for approved submissions

User Input Report

- Use blank version to collect data off-line
- Print final version to document data entered
- Available to all users
- No cost

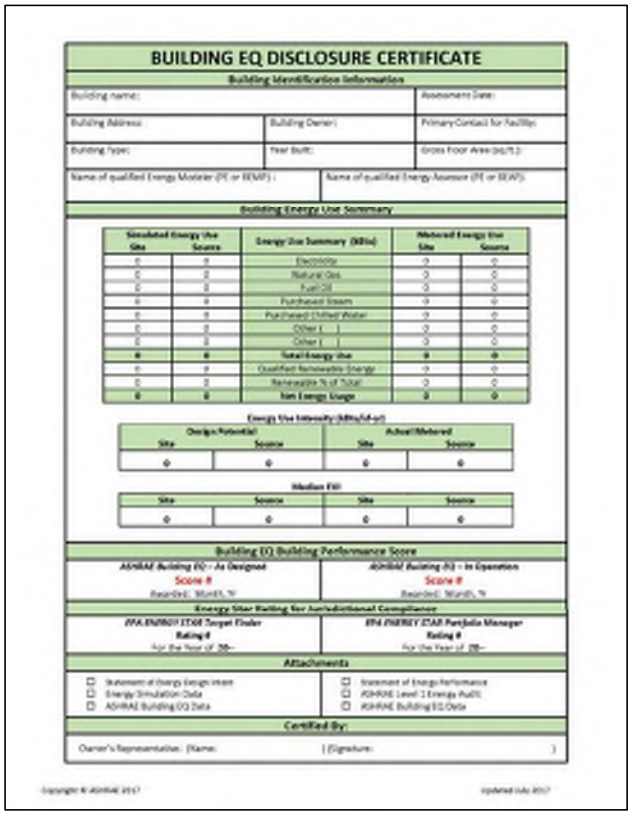
Building EQ Label Report

- Provides visual indicator of Building EQ Performance Score on a barometer/scale
- Generated by credentialed user for approved submissions
- No cost



Building EQ Disclosure Form

- Presents key energy information for compliance with disclosure ordinances
- Generated by credentialed users for approved submissions
- Fee charged per building submission



BUILDING EQ DISCLOSURE CERTIFICATE

Building Identification Information

Building name: | Assessment Date:

Building Address: | Building Owner: | Primary Contact for Facility:

Building Type: | Year Built: | Gross Floor Area (sq.ft.):

Name of qualified Energy Modeler (PE or BEMP): | Name of qualified Energy Assessor (PE or BEAP):

Building Energy Use Summary

Simulated Energy Use Site	Simulated Energy Use Source	Energy Use Summary (MBtu)	Metered Energy Use Site	Metered Energy Use Source
0	0	Electricity	0	0
0	0	Natural Gas	0	0
0	0	Fuel Oil	0	0
0	0	Purchased Steam	0	0
0	0	Purchased Chilled Water	0	0
0	0	Other ( )	0	0
0	0	Other ( )	0	0
0	0	Total Energy Use	0	0
0	0	Qualified Renewable Energy	0	0
0	0	Renewable % of Total	0	0
0	0	Net Energy Usage	0	0

Energy Use Intensity (kBtu/sf-yr)

Design Potential Site	Design Potential Source	Actual/Metered Site	Actual/Metered Source
0	0	0	0

Median EUI

Site	Source	Site	Source
0	0	0	0

Building EQ Building Performance Score

ASHRAE Building EQ - As Designed	ASHRAE Building EQ - In Operation
Score #	Score #
Awarded: Month, Yr	Awarded: Month, Yr

Energy Star Rating for Jurisdictional Compliance

EPA ENERGY STAR Target Finder	EPA ENERGY STAR Portfolio Manager
Rating #	Rating #
For the Year of: 20__	For the Year of: 20__

Attachments

☐ Statement of Energy Design Intent	☐ Statement of Energy Performance
☐ Energy Simulation Data	☐ ASHRAE Level 1 Energy Audit
☐ ASHRAE Building EQ Data	☐ ASHRAE Building EQ Data

Certified By:

Owner's Representative: (Name: | (Signature:)

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Coming Soon / In Development

- ASHRAE Level 1 Audit Report Spreadsheets – Coming Soon
  - Automatically populated with information gathered during the In Operation assessment
  - For use in a final audit report
  - Available to credentialed users for a fee per building submission
- Building EQ Database – In Development
  - Access to aggregated information from submitted buildings
  - Customized reporting capabilities for a fee per project or account

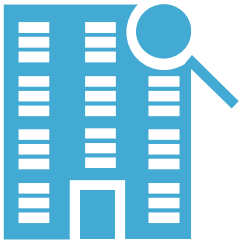
Getting Started with an In Operation Rating

In Operation
Building Performance Score

$$(EUI_{metered} / EUI_{baseline}) \times 100$$

- Compares metered energy use of candidate building to baseline EUI
- Baseline EUI is based on CBECS median for the building type, adjusted for location and hours of operation
- EUIs calculated for source energy using U.S. national site-to-source factors

Building Demographics



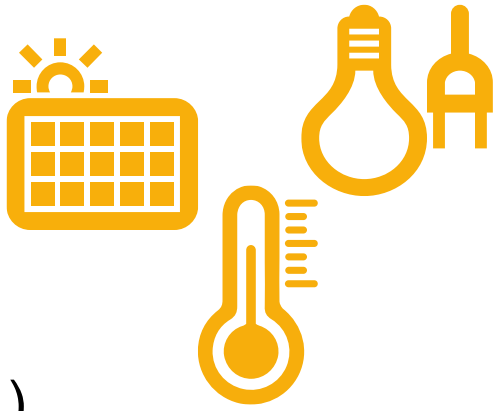
- Location / Climate
- Operating Hours
- Building gross area
- Building use type
- Multiple-use Buildings or Properties
  - Apportioned by % of area
- Output of this data determines $EUI_{baseline}$

Energy Calculations

- Metered energy use and cost by fuel type
  - Electricity
  - Natural Gas
  - Biomass, etc.
- May exchange data from Portfolio Manager
- Review of utility information
- Output of this data determines $EUI_{measured}$

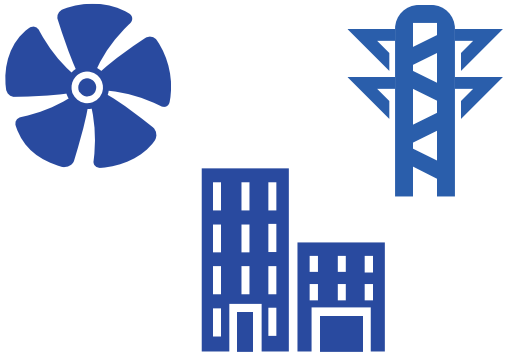
IEQ Screening

- Review issues logs and conduct occupant survey (optional).
- Requires representative measurements
- Thermal comfort
- Lighting quality
- Indoor Air Quality
  - Problems noted
  - Ventilation
  - HVAC system observation (drains, filters, etc.)



Energy Savings Opportunities

- ASHRAE Level 1 Energy Audit process
- Actionable Recommendations with estimated costs and payback
- Standardized EEMs including:
  - Building Envelope
  - Lighting/Daylighting
  - HVAC Systems
  - Refrigeration
  - Energy Generation/Distribution
  - Others



Getting Started with an As Designed Rating

As Designed
Building Performance Score

$$(EUI_{simulated} / EUI_{baseline}) \times 100$$

- Compares simulated energy use of candidate building to baseline EUI
- Baseline EUI is based on CBECS median for the building type, corrected for location
- Uses standardized modeling inputs of operating parameters (COMNET)
  - Occupancy, plug and process loads, schedules, setpoints
  - Depends on building and space type
- EUIs calculated for source energy using US national site-to-source factors

Standardized Modeling Inputs

- A building modeled by different modelers will produce different energy outcomes because of different assumptions
- Building EQ As Designed models are required to use standardized inputs from COMNET
- COMNET is a quality assurance initiative to standardize building energy modeling using consistent baselines relative to various energy codes and standards .

Standardized Input Variables

- Automatic Lighting Controls
- Plug Loads
- Occupancy
- Ventilation Rates
- Processes
- Schedules – includes lights, receptacles, HVAC Operating hours, HVAC set points, domestic hot water use, refrigeration, elevators, etc.

Using the As Designed Rating

- Compare buildings in terms of energy consumption characteristics
- Scale highlights normalized energy costs among similar buildings
  - Linear Scale
  - Building that matches baseline will receive a 100 rating
  - Building that uses half the energy of the baseline will get a 50
  - Building designed as net-zero will get a 0

Qualifications for Building EQ Submissions

Credentialed Users

Official submissions require:

- PE licensed in the jurisdiction where project located

  or

- ASHRAE Certified Provider
  - Building Energy Assessment Professional (BEAP) for In Operation rating. www.ashrae.org/BEAP
  - Building Energy Modeling Professional (BEMP) for As Designed Rating www.ashrae.org/BEMP

Building Energy Assessment Professional (BEAP)

Certifies ability to:

- Audit and analyze buildings
- Determine project scope and collect data
- Analyze building performance and interpret results
- Evaluate alternatives and recommend EEMs
- Assist with EEM implementation

www.ashrae.org/BEAP

Building Energy Modeling Professional (BEMP)

Certifies ability to:

- Evaluate, choose, use, calibrate, and interpret results of energy modeling software as applied to building and systems energy performance and economics.
- Competence to model new and existing buildings and systems with their full range of physics.

www.ashrae.org/BEAP

Building EQ Growth Plan

Individual Buildings

- ASHRAE members using Building EQ to evaluate individual buildings
- Value Added
  - Member price on credential verification one-time set up fee
  - Credential verification fee waived for Certified Providers
- Outreach through Chapter Technology Transfer Committee (CTTC)

Institutional Buildings

- Universities and organizations with campuses
- Value Added:
  - Multiple projects entered into system/database
  - Review data for entire building inventory
- Outreach to APPA: Leadership in Educational Facilities

Government / International

- State and federal governments, municipalities, utilities
- Value Added:
  - Customize portal to meet specific needs of customer
- Phase 2 of Web Portal development (2018)
- Outreach through GGAC (Grassroots Government Advocacy Committee), Chapters and Regions

New ASHRAE University Course

- Course name: *Benchmarking and Assessment of Energy Performance for Existing Buildings*
- University or college senior-level undergraduate or graduate course developed by ASHRAE
- Covers building energy auditing and analysis using Building EQ as a learning framework
- Students experience project-based learning through hands-on engineering in real buildings under the guidance of industry professionals

www.ashrae.org/educationalresources

Questions?

www.ashrae.org/buildingEQ

buildingEQ@ashrae.org