

**Building EQ Committee
Houston Annual Meeting
June 24, 2018**

Participants: Hugh Crowther (chair), Bill Klock (vice-chair), Esteban Baccini, Chris Balbach, Nate Boyd, Bill Dean, Charles Eley, Hywel Davies, Jeff Clarke, Bruce Hunn, Ross Montgomery, Edward Tsui (Coordinating officer)

Incoming Members: Doug Cochrane, John Constantinide, Daniel Redmond

Not available: John Dunlap

Staff: Lilas Pratt, Jim Scarborough

Guests: Stephen Roth, Michael Deru, Paul Torcellini, David Handiwork, Peter Strazdas, Chris Hsieh, Walter Lenzi, Darryl Boyce, Francisco Gomez, Henry Greist, Nick Armstrong,

Principal Motions¹

Motion #1: Bill Dean moved and Hywel Davies seconded that the meeting minutes from the January 21 meeting be approved.

Vote: Motion passed 7-0-0, CNV

Motion #2: Methodology Subcommittee moved that Building EQ Committee approve the new procedure to calculate the baseline median EUI for lab buildings.

Vote: Motion passed 7-0-0, CNV

Motion #3: Methodology Subcommittee moved that Building EQ committee support the university building energy performance research proposal from TC 9.7.

Vote: Motion passed 6-0-0, CNV

Motion #4: Business Development Subcommittee moved that Building EQ Committee approve the proposed updated EEM lists as noted in the meeting agenda.

Vote: Motion passed 6-0-0, CNV

Motion #5: Business Development Subcommittee moved that Building EQ Committee approve the Level 1 Narrative Audit Report as noted in the agenda.

Vote: Motion passed 5-0-1, CNV (Nate Boyd abstained as he did not review the report)

Motion #6: Business Development Subcommittee moved that Building EQ Committee approve the Portal report pricing as follows:

- Spreadsheet Audit Report @ \$50
- Disclosure Report @ \$50
- Credential Verification fee @ \$25 (non-members), \$15 (members)
- Narrative Report @ \$200
- ASHRAE plaque creation @ \$400

Vote: Motion passed 6-0-0, CNV

New and Open Action Items

¹ All votes are recorded as yes-no-abstain.

June 24, 2018 Houston Annual Meeting

- **AI 1: Business Development Subcommittee** to vet the idea of a Portal kiosk/demonstration and determine the real pricing to implement that.
- ✓ **AI 2: Eley** to connect with **Michael Deru** to update him on what Methodology Subcommittee is doing in regards to Appendix G and Building EQ as it might relate to RP-1771. (Note: Emails sent)

June 23, 2018 Methodology Subcommittee Meeting

- ✓ **AI 1: Pratt** to get rough RTAR from Corey Metzger and distribute to committee for feedback (Note: draft RTAR distributed to committee on 7/2/2018).
- **AI 2: Pratt** to get a quote from Stephen Roth to designate the currency used in the Portal.

June 23, 2018 Business Development Subcommittee Meeting

- **AI 1: Pratt** to request that **Stephen Roth** update the EEMs in the Portal.
- **AI 2: Pratt** to request a quote from **Stephen Roth** to implement the Narrative Audit report into the Portal.
- **AI 3: All committee members** to identify and customers who are trying to compile energy information and send those leads to **Lilas Pratt** for additional follow-up.

January 21, 2018 Chicago Winter Meeting

- **AI 5: Building EQ Committee** to work with GGAC to improve the way PAOE points are awarded.
- **AI 6: Business Development Subcommittee** to work with ASHRAE Marketing staff to create a campaign targeted at the grassroots member and to create tools for the grassroots members to use with owners
- **AI 7: Pratt** to talk with Brendan Owens for an update on incorporating Building EQ in LEED. **On-going**

January 4, 2018 Business Development Subcommittee meeting

- **AI 3: Pratt** to ask Stephen Roth about common interface programs that might be necessary to interface with Dashboard programs.

August 30, 2017 Web Meeting

- **AI 2: Business Development Subcommittee** to evaluate a volume discount on the report fees for large customers and report back to full committee.

August 24, 2017 Business Development Subcommittee meeting

- **AI 1: Montgomery** to look into the option of personalizing labels with individual company logos and assessor information.

June 25, 2017 Long Beach Annual Meeting

- **AI 3: Pratt** to work with Eley to create new EEM measure payback ranges for Stephen Roth.
- **AI 6: Methodology** to look at how to address Data Centers and using PUEs. **On-hold**
- **AI 12: Committee** to add French and Spanish to the Web Portal after initial launch. **On-going**

Meeting Minutes

1. Call to Order – **Meeting convened at 8:32am CDT**
2. Opening Remarks, Introductions, Review of Agenda
 - Hugh Crowther noted that the Building EQ Portal is up and running and that the focus of the committee is on getting people to use what the Portal and getting information about the Portal

out in the marketplace. The committee must select what to pursue and they want to choose routes with the best possibility of success first.

- There were no changes to the agenda.

3. Old Business

- a. Approval of minutes - January 21 meeting

Motion #1: Bill Dean moved and Hywel Davies seconded that the meeting minutes from the January 21 meeting be approved.

Vote: Motion passed 7-0-0, CNV

- b. Letter Ballot Results

- On 4/24/2018, Building EQ Committee voted to approve co-sponsorship of tentative research proposal TRP-1836, Developing a Standardized Categorization System for Energy Efficiency Measures, 6-0-1-1, CV.

- c. Review of [Action Items](#)

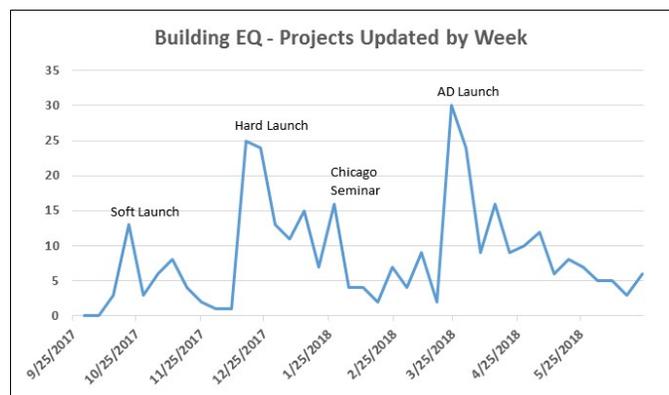
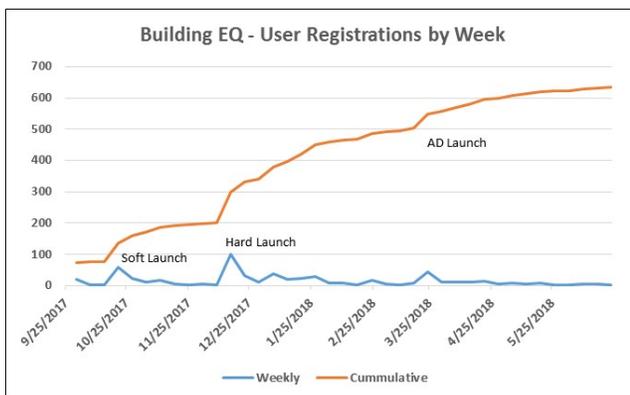
- d. Building EQ University Course update

- As of June 5, there have been roughly 70 downloads of the sample course materials (compared to 53 in January) and roughly 37 downloads of the full course materials (compared to 26 downloads in January).
- A survey was conducted in February of the downloaders at that time. Responses were generally favorable to the course and some good feedback was received in regards to updating the course materials to reflect the Portal.

- e. Web Portal Update/Statistics

- Lilas Pratt reported on relevant statistics for the Building EQ Portal as of June 23 (roughly 6 months after initial launch):
 - Users: 636
 - Projects: 263
 - Submitted/Approved projects: 11
 - Reports purchased: 1 (\$250)
 - Paid credentials: 27 (\$565)

- Portal usage trends are demonstrated in the following graphs.



4. Officer Remarks

- Edward Tsui noted that things are looking up for Building EQ.

- Darryl Boyce suggested that the committee needs to communicate the value of the program to get it out into the market and to get people to use it and make buildings better.

5. Methodology Subcommittee Report

- Charles Eley recapped the discussion from the Methodology Subcommittee meeting on a number of issues as detailed in [Attachment A](#). Several items were brought forth to the main committee for consideration.
- Eley introduced a new procedure has been developed for the Laboratory Buildings Baseline Median Calculation as detailed in [Attachment B](#). The new procedure was approved by the Methodology Subcommittee 4-0-0, CV.

Motion #2: Methodology Subcommittee moved that Building EQ Committee approve the new procedure to calculate the baseline median EUI for lab buildings.

Discussion: Peter Strazdas of APPA suggested that the Building EQ committee considering incorporating the FICM codes for building classification on college campuses. One approach would be a conversion table to connect CBECS building categories to FICM building codes.

Vote: Motion passed 7-0-0, CNV

- Eley introduced a request for co-sponsorship of an [RTAR](#) on building energy performance for university buildings from TC 9.7. The research is regarding building energy performance for university buildings (including lab buildings). Corey Metzger from TC 9.7 will join a future methodology call to review the draft RTAR and hammer out details. Sponsorship of the RTAR was approved by the Methodology Subcommittee 4-0-0, CV.

Motion #3: Methodology Subcommittee moved that Building EQ committee support the university building energy performance research proposal from TC 9.7.

Discussion: David Handiwork (TC 9.7 chair) noted that CBECS does not have a lot of granularity on this type of building. This research would help remedy that and therefore be very useful to Building EQ.

Vote: Motion passed 6-0-0, CNV

6. Business Development Subcommittee Report

- Ross Montgomery recapped the discussion from the Business Development Subcommittee meeting on a number of issues as detailed in Attachment C. Several items were brought forth to the main committee for consideration
- Montgomery reported on proposed updates to the energy efficiency measure (EEM) descriptions currently in the Portal. The subcommittee has reviewed the list originally taken from Standard 100 annexes D and E. As a part of that review, the subcommittee proposed changes to make the lists more current and useable. The proposed EEM lists were approved by the Business Development Subcommittee 4-0-0, CV.

Motion #4: Business Development Subcommittee moved that Building EQ Committee approve the proposed updated EEM lists as noted in the meeting agenda.

Discussion: The proposed changes to do not change the lists very much. It was noted that the ASHRAE Handbook will now reference the Building EQ EEMs and that there is an RTAR in development for the categorization of EEMs.

Vote: Motion passed 6-0-0, CNV

- Montgomery introduced the proposed Level 1 Audit Narrative Report. The intent is to add this report to the offerings from the Portal. The report was approved by the Business Development Subcommittee 4-0-0, CV.

Motion #5: Business Development Subcommittee moved that Building EQ Committee approve the Level 1 Narrative Audit Report as noted in the agenda.

Vote: Motion passed 5-0-1, CNV (Nate Boyd abstained as he did not review report)

- Montgomery provided an update on proposed changes to the Portal report pricing. Updates were made based on market experience and feedback from the first six months of Portal operation. The pricing was approved by the Business Development Subcommittee 4-0-0, CV.

Motion #6: Business Development Subcommittee moved that Building EQ Committee approve the Portal report pricing as follows.

- Spreadsheet Audit Report @ \$50
- Disclosure Report @ \$50
- Credential Verification fee @ \$25 (non-members), \$15 (members)
- Narrative Report @ \$200
- ASHRAE plaque creation @ \$400

Discussion: No additional discussion

Vote: Motion passed 6-0-0, CNV

- Montgomery briefly introduced ideas for marketing the Building EQ Portal including content additions, videos, training, and LEED EBOM points.
- The committee discussed an idea for a kiosk for or live demonstration of the Building EQ Portal at the Atlanta Winter meeting. The kiosk concept was approved by the Business Development Subcommittee 4-0-0, CV.

Motion #7: Business Development Subcommittee moved that Building EQ Committee approve the concept of a kiosk for demonstrating the Portal at the Atlanta meeting.

Discussion: There is a small amount of money for promotion for FY18-19 and this idea would be expensive depending on how it is implemented. Therefore, the subcommittee needs to further investigate this idea.

Vote: Motion passed 6-0-0, CNV

AI 1: Business Development Subcommittee to vet the idea of a Portal kiosk/demonstration and determine the real pricing to implement that.

- Montgomery recapped the subcommittee's discussion on the Licensee Program. The Argentina Green Building Council (AGBC) is a possible customer for this concept. More information is needed to the committee will continue to work with them.
- It was noted that Brazil is another market to explore – they have an aggressive green building market and a program to be aware of that is somewhat like ENERGY STAR.

7. New Business

- a. Marketing Plan Update ([Attachment D](#))
 - Lilas Pratt briefly reviewed the update from the ASHRAE Marketing department.
 - It was noted that there needs to be a targeted approach to universities active with both APPA and ASHRAE chapters. This would be for a university initiative.
- b. ASTM E50 Standard – Building Energy Performance Assessments
 - Bill Klock reported on an initiative from ASTM regarding a standard on Building Energy Performance Assessments. ASHRAE Standards Committee is looking into this and will report back to Building EQ committee.
- c. Business Plan Update

- Hugh Crowther reported on the Business plan forecasts that have been updated for this meeting as shown in [Attachment E](#).
 - Now that the Portal is being used because jurisdictions are requiring assessments or ratings, this ups the market relevance and generates more opportunity/work.
- d. Budget Update
- The proposed budget information for SY18-19 is shown in [Attachment F](#).
- e. 1771-RP Research Project Update (Michael Deru)
- Michael Deru reported on the status of 1771-RP which is modeling to support Building EQ. The purpose is to adjust modeling results of design buildings to better match performing buildings to models better match building performance.
 - The contractor has formed the models: grocery, university, service, religious worship.
 - They are looking at new construction built to different ASHRAE standards and also existing buildings based on reference buildings.
 - They have tested models with various EEMs to see what impact those have and are now calibrating those models to actual buildings and looking to see what is driving the differences between the models and actual.
 - The contractor asked for a one-year extension, so work will continue for another nine months or so. They are currently on Task 4. The relation to 90.1 is Task 6.

AI 2: Eley to connect with Michael Deru to update him on what Methodology Subcommittee is doing in regards to Appendix G and Building EQ as it might relate to RP-1771.

8. Closing Comments
- Hugh Crowther thanked the outgoing members for their input during the last year.
9. Incoming Chair
- Bill Klock announced the Subcommittees and their chairs for SY18-19 as follows:
 - Charles – Methodology
 - Bill Dean – Business Development
 - Hugh Crowther – BEQ Evangelist
 - Klock also noted the following initiatives for the upcoming year:
 - All voting members to create a BEQ Portal account and a sample project in both IO and AD
 - Committee success to be scored by the number of projects in process at the end of the year.
 - Implementation of the French translation and the new lab methodology.
 - A straw poll to the committee on what else needs to be addressed including the Level 1 Audit Narrative Report, Spanish translation, and projects from APPA universities.
 - Lastly, Klock thanked Hugh Crowther for his leadership of the committee and Lilas Pratt for her support as staff support (babysitter) of the committee for the last year.
10. Upcoming Meetings
- TBD
11. Adjourn – **Meeting Adjourned at 10:54am CDT**

Attachment A – Methodology Subcommittee Meeting

Saturday, June 23, 2018, 11:00am-12:45pm

Methodology Subcommittee Members:

Available: Charles Eley (chair), Chris Balbach, Hywel Davies, Bruce Hunn

Not available: Shanta Tucker

Other Committee members: Hugh Crowther, Bill Klock, Ross Montgomery, Bill Dean,

Guests: John Constantinide, David Underwood, Mitchell Swann, Daniel Redmond, Pranav Godbole, Doug Cochrane, Corey Metzger, Peter Strazdas

1. Call to Order – Meeting convened at 11:02am CDT
2. Review of Agenda
3. Lab Buildings Baseline Median EUI Calculation (File: [Building EQ Baseline for Laboratories \(Rev 1\).pdf](#))
 - The subcommittee is proposing a third method for calculating the baseline median EUI for laboratory buildings. This new procedure based on the Labs21 database (I2SL) which has 589 labs representing 5 different laboratory types.
 - Downloaded the publicly available data from the database and created some fairly simple regression coefficients that predict the baseline median EUI for lab buildings. The variables are the square footage, type of lab, and operating hours.
 - Question raised about differences between university and industry labs as well as geographic location of the lab. The Labs21 data is proprietary and is owned by the lab managers and information on those variables is not available.
 - Might want to talk to TC 9.10 (labs) again to see what information they have on labs and whether or not it is broken out between universities and industry.
 - The procedures will use climate zone information in the same way that Standard 100 procedures use it.

Meth SubC Motion #1: Bruce Hunn moved and Hywel Davies seconded that the Meth SubC recommend that the Building EQ Committee approve the new procedure for calculating the baseline median EUI for lab buildings.

Discussion:

- Paul Matthew and Alison Farmer were both involved and the data used is publicly available.
- This is a snap shot of the data and the Labs21 database continues to accumulate data. If the data is moving, the ratings could move as well. The intent is to go with this snapshot and not update the calculations over time. This is in keeping with the current decision of the committee is to keep a consistent baseline as is done with Std 90.1.
- Terry Sharp noted that the results of this calculation are pretty close to the CBECS 2003 data. So this is also consistent with the other data being used in Building EQ.

Fiscal impact: Money can be used from the committee's proposed 2018-19 budget and re-allocated as capital money.

Vote: Motion passed 4-0-0, CV

4. [TC 9.7 – RTAR](#) on building energy performance in university buildings
 - The subcommittee would be supportive of this effort and it will not affect the implementation of the new lab calculations at this time.
 - Building EQ is a delivery mechanism.
 - The committee needs to know what will be in the RTAR and Work Statement.

- It was noted that RAC now allows a project to go directly to a work statement (rather than do an RTAR first). There is some risk in going straight to a Work Statement. If they go that route, they need to talk with their RL and the other appropriate folks at RAC.
- TC 9.7 would be looking for support or co-sponsorship from Building EQ.
- The TC currently has a very rough draft of a RTAR which they will be working on during their meeting in Houston. They would be happy to share with the draft RTAR with the Building EQ committee for their input/feedback.

Meth SubC Motion #2: Hywel Davies moved and Chris Balbach seconded that the Meth SubC recommend that Building EQ committee support the university building energy performance research proposal from TC 9.7.

Vote: Motion passed 4-0-0, CV

AI 1: Pratt to get rough RTAR from Corey Metzger and distribute to committee for feedback.

5. Integration of the Building EQ As Designed rating with the performance rating method of Standard 90.1-2016
 - The current methodology uses a simulated candidate building EUI as compared to an empirical baseline median EUI. The modeling inputs are those things that affect the assets. The other items are kept “neutral” by using the standardized inputs. Standard inputs from COMNET appendices B and C are used in the simulation for operational variables. The challenge is to pick the correct inputs that would be similar to the CBECS data.
 - 1771-RP was intended to help calibrate all of these inputs, the PMS members should be invited to any subcommittee discussions on this.
 - CBECS data is limited and has considerable variability as well --- operating hours is one example.
 - This new proposal takes a different tack using the Appendix G Performance Rating Method (PRM). This might make sense as an alternate path for As Designed.
 - This seems really elegant, but needs some vetting. It would be good to design some stress tests perhaps using a mixed use building.
 - Need to look at where this fits in on priorities and to understand the value proposition for the customer. Is this a workable procedure and is a market for it?
 - The big thing this brings to Building EQ is credibility. The assumptions in the prior approach make credibility more difficult.
 - Note: This will be reported as an information item only to full committee.
6. Update on Standard 214 interpretation request
 - Charles Eley had submitted an interpretation request regarding Building EQ’s requirement to use only metered data. An interpretation committee was convened and they responded that the interpretation request was correct.
 - Based on this, Building EQ is now confident that they are fully in compliance with ASHRAE’s Standard 214 for building rating programs.
7. Parking Lot Item Updates (File: *BEQ Portal New Feature Parking Lot List 12June2018.docx*)
 - a. Status of items approved for development
 - Copy Project – 100% done
 - Additional credential users – 100% done
 - Additional Fuel Accordions – 100% done
 - Updated Disclosure Report – 80% done
 - French Translation – In progress

- b. Currency Designations
 - While any currency could be entered into the Portal, does the committee want to capture what currency is being input?
 - This might help make the database more robust and useable.

AI 2: Pratt to get a quote from Stephen Roth to designate the currency used in the Portal.

- c. Auto calculation of HDD/CDD
 - The suggestion is to include instruction on how to get this information in the monthly tips.
- 8. New Business
 - Building Sync XLM meeting on Monday as part of TC 7.6 meetings.
- 9. Adjourn – **Meeting adjourned at 12:30pm CDT**

TC 9.7 RTAR on Building Energy Performance in University Buildings

From: Corey Metzger
Sent: Thursday, May 17, 2018 6:13 PM
To: Hugh Crowther; Bill Klock; Cochrane, Doug CCS
Subject: ASHRAE TC 9.7 - Possible RTAR

Hugh, Bill, and Doug,

I am writing in my capacity as Research Subcommittee Chair for TC 9.7, as we are working on a possible RTAR related to building energy consumption for higher education facilities. Specifically, we are looking at trying to develop a more useful database for “common” facility types on college and university campuses that may not be adequately covered by existing CBECS database information (e.g. teaching laboratories, wet chemistry laboratories, vivariums, athletic facilities, process driven spaces, etc.). In preliminary discussions, we believe this information could prove useful for Building EQ, and we’d like to get your feedback to determine if this seems useful from your perspectives. Would you be open to a short conversation, either before the Houston meeting or at the Houston meeting, to discuss this topic further? Whatever thoughts you have would be much appreciated. Thank you.

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Labs21 Baseline		
Current Building EQ Baseline for Laboratories		
<i>Climate Zone</i>	<i>Source EUI (kBtu/ft²-y)</i>	<i>Source Zonal EUI Ratio</i>
1A	625	95.4%
2A	630	96.1%
2B	615	93.8%
3A	643	98.1%
3B-Coast	505	77.1%
3B-Other	608	92.8%
3C	522	79.7%
4A	657	100.3%
4B	588	89.7%
4C	595	90.8%
5A	695	106.1%
5B	621	94.8%
6A	747	114.0%
6B	675	103.0%
7	764	116.6%
8	995	151.8%
Average	655	

Charles Eley, FAIA, PE, June, 2018

Labs21 Baseline	
Labs21 Database – Circa May 2018	
<i>Lab Type</i>	<i>Sample Size</i>
Biological	131
Chemical	104
Chemical/Biological	131
Combination/Others	124
Physical	99
	589

Charles Eley, FAIA, PE, June, 2018

Labs21 Baseline

Labs21 Available Data Dependent Variables

-  **Facility:** An ID number for the building.
-  **Lab Type:** The lab types are biological, chemical, chemical/biological, combination/others, and physical.
- Year:** The year for which the data was reported and entered into the database.
- Source EUI:** The source energy consumption of the laboratory divided by the gross square feet of floor area. The units are kBtu/ft²-y of gross floor area
-  **Lab Area Ratio (LAR):** The percent of the building that is lab space, as opposed other uses like offices.
-  **Weekly Occupancy Hours (OH):** The hours per week that the laboratory is operated.
-  **Climate:** The ASHRAE/DOE climate zone where the lab is located.
-  **Electricity Use:** The annual kWh of electricity used in the building divided by the gross floor area. Units are kWh/ft²-y.
-  **Site EUI:** The site EUI of the building in kBtu/ft²-y of gross floor area. This includes gas and other forms of energy used in the laboratory in addition to electricity.

Charles Eloy, FAIA, PE, June, 2018

Labs21 Baseline

Estimation of Gas Use

- All non-electricity energy use is assumed to be gas.
- An estimate of gas use is determined from the reported electricity use and source energy use.

$$EUI_{Source} = EUI_{SiteElect} \times 3.15 + EUI_{SiteGas} \times 1.09$$

$$EUI_{SiteElect} = Electricity\ Use \times 3,412 \frac{Btu}{kWh}$$

$$EUI_{SiteGas} = Site\ EUI - EUI_{SiteElect}$$

Charles Eloy, FAIA, PE, June, 2018

Sample Data

Appendix A

Table 7 - Labs21 Publicly Available Data

PKID	Lab Type	Year	2009 EUI	Lab Area sq. ft.	Primary Occupancy M2/ft ² /yr	Electricity Use (kWh/ft ² /yr)	2009 EUI (kWh/ft ² /yr)	
20849	Biological	2014	286.79	8%	2	84	28.77	85.91
20854	Biological	2014	432.14	7%	87	28	38.31	128.7
20120	Biological	2018	528.16	10%	88	84	22.08	148.88
20820	Biological	2007	248.77	11%	88	84	19.27	170.08
20892	Biological	2007	412.27	13%	82	84	24.74	214.71
20128	Biological	2018	887.4	14%	88	84	41.87	281
20820	Biological	2014	426.89	14%	82	84	35.48	121.2
20476	Biological	2011	648.32	17%	82	28	38.11	152.87
20210	Biological	2012	397.27	17%	42	84	22.19	249.4
20889	Biological	2012	212.3	17%	82	84	22.28	136.8
20087	Biological	2007	483.48	18%	78	84	22.83	248.38
20207	Biological	2014	882.88	18%	188	84	26.77	896.9
20170	Biological	2018	829.88	18%	88	84	42.17	273.02
20828	Biological	2007	107.48	18%	72	82	38.37	223.48
20394	Biological	2014	829.77	20%	148	84	32.88	282.74
20840	Biological	2008	648.07	21%	82	84	48.87	248.18
20170	Biological	2018	508.13	22%	88	84	13.76	177.86
20241	Biological	2009	728.9	24%	82	84	41.32	287.73
20898	Biological	2018	294.27	24%	42	82	18.88	189.82
20128	Biological	2018	818.18	26%	88	84	34	207.88
20128	Biological	2018	487.7	26%	88	84	38.88	182.78
20322	Biological	2014	973.38	28%	188	84	38.19	810.88
20820	Biological	2007	1246.78	28%	78	84	88.9	482.84
20841	Biological	2018	887.08	28%	188	84	37.88	346.13
20786	Biological	2011	827.84	28%	42	88	24.47	284.7
20128	Biological	2018	898.9	28%	88	84	43.28	337.88
20128	Biological	2018	287.82	28%	88	84	14.48	188.12
20814	Biological	2007	1022.78	28%	144	84	47.28	882.88
20828	Biological	2010	1244.81	28%	188	84	46.22	811.88
20120	Biological	2018	788.88	28%	88	84	32.88	487.3
20828	Biological	2009	418.88	28%	188	82	32.78	187.07
20780	Biological	2012	877.7	28%	48	84	28.84	312.88
20128	Biological	2018	442.33	31%	88	84	28.87	288.24
20128	Biological	2018	288.88	31%	88	84	22.88	188.7
20182	Biological	2018	828.88	31%	88	84	34.82	187.08
20818	Biological	2018	1192.78	31%	82	88	102.28	387.42
20840	Biological	2010	218.87	31%	188	84	12.18	112.47
20843	Biological	2008	828.42	31%	81	84	34.82	870.1
20128	Biological	2018	881.78	32%	88	84	38.18	242.24
20380	Biological	2014	842.88	32%	188	84	47.47	181.97
20121	Biological	2018	742.88	32%	88	84	42.42	387.28
20849	Biological	2008	888.41	32%	188	84	38.38	280.88
20888	Biological	2014	888.21	34%	42	82	24.18	488.42

Sample Regression – Electricity and Biological Labs

Appendix C – Regressions against Site Electricity (kWh/ft²-y)

Note: X Variable 1 is Coef_{LAR} and X Variable 2 is Coef_{CH}

Biological Regression

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.29211005
R Square	0.08532828
Adjusted R Square	0.07103653
Standard Error	14.2734707
Observations	131

ANOVA

	df	SS	MS	F	Significance F
Regression	2	2432.74663	1216.37331	5.97045882	0.00331876
Residual	128	26077.6917	203.731966		
Total	130	28510.4383			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	25.9034993	3.92369908	6.60180579	9.788E-10	18.1397903	33.6672083	18.1397903	33.6672083
X Variable 1	19.4073942	5.83176603	3.327876	0.00114287	7.86824878	30.9465397	7.86824878	30.9465397
X Variable 2	0.02539208	0.03022195	0.84018695	0.40237022	-0.0344072	0.08519137	-0.0344072	0.08519137

The Procedure

Data Tables

Table 8 – Summary of Site Electricity EUI Regression Results (kWh/m²-y)

Lab Type	ElectIntercept	ElectCoef _{Le}	ElectCoef _{Lo}	GasIntercept	GasCoef _{Lo}	GasCoef _{Le}
Biological	25.90	19.41	0.025	76.11	149.70	0.678
Chemical	29.89	8.59	0.063	136.42	91.37	0.584
Chemical/Biological	31.99	16.46	-0.020	62.47	267.12	0.673
Combination/Other	20.33	15.30	0.110	162.25	-36.46	0.458
Physical	18.86	21.72	0.102	81.72	73.62	0.445

Table 9 – Source Zonal EUI Ratios

Climate Zone (CZ)	Zonal EUI Ratio
1A	95.4%
2A	96.1%
2B	93.8%
3A	98.1%
3B-Coast	77.1%
3B-Other	92.8%
3C	79.7%
4A	100.3%
4B	89.7%
4C	90.8%
5A	106.1%
5B	94.8%
6A	114.0%
6B	103.0%
7	116.6%
8	151.8%

Table 10 – Source-Site Multipliers

Energy Type	Source-Site Multiplier (unitless)
Imported Electricity	3.15
Exported Renewable Electricity	3.15
Natural Gas	1.09
Fuel Oil (1,2,4,5,6, Diesel, Kerosene)	1.19
Propane & Liquid Propane	1.15
Steam	1.45
Hot Water	1.35
Chilled Water	1.04
Coal or Other	1.05

Charles Eloy, FAIA, PE, June, 2018

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Attachment C – Business Development Subcommittee Meeting

Saturday, June 23, 2018, 1:15pm-3:00pm

Marketing Subcommittee Members:

Available: Ross Montgomery (Chair), Bill Dean, Nate Boyd, Esteban Baccini, Jeff Clarke

Not available: John Dunlap

Other Committee members: Hugh Crowther, Bill Klock, Charles Eley, Bruce Hunn, Edward Tsui

Guests: John Constantinide, David Underwood, Daniel Redmond, Doug Cochrane, Billy Austin, Dave Palty.

1. Call to Order (Montgomery) – **Meeting convened at 1:18pm CDT**
2. Review of Agenda (Montgomery)
3. Old Business – Completed Action Items
 - Volume discounts (to be addressed when requested)
 - Marketing Plan (see main meeting agenda)
 - Personalizing labels with individual details (not to be pursued)
4. EEM Description Updates (File: [EEM Descriptions_Std 100_Updates1_17May2018.docx](#))

Bus Dev SubC Motion #1: Esteban Baccini moved and Bill Dean seconded that the Bus Dev SubC recommend that Building EQ Committee approve the EEMs as noted in the agenda.

Vote: Motion passed 4-0-0, CV

AI 1: Pratt to request that Stephen Roth update the EEMs in the Portal.

5. Level 1 Audit Narrative Report (File: [Energy Audit Narrative Report Template Draft3.pdf](#))

Bus Dev SubC Motion #2: Esteban Baccini moved and Bill Dean seconded that the subcommittee recommend that Building EQ Committee approve the Narrative Report as noted in the agenda.

Vote: Motion passed 4-0-0, CV

AI 2: Pratt to request a quote from Stephen Roth to implement the Narrative Audit report into the Portal.

6. Review of Report/Portal Pricing
 - a. Pricing approved to date
 - Spreadsheet Audit Report @ \$250
 - Disclosure Report @ \$200
 - Credential Verification fee @ \$25 (non-members), \$15 (members)
 - Narrative Report (new, not yet priced)
 - ASHRAE plaque creation (new, not yet priced)
 - b. Feedback on report pricing (File: [Feedback_Reports_BuildingEQ.docx](#))
 - Feedback received has created some concerns about the current pricing of the reports.
 - Time savings on the spreadsheet report is probably less than one hour.
 - Energy Star statement of energy performance (SEP) which is free also fulfills the disclosure function.
 - c. Review of Potential changes
 - The committee suggests \$50 for the spreadsheet audit report.
 - The committee suggests \$50 for the Disclosure Report.
 - The committee doesn't want to go too low as you can always lower the price again, but cannot raise the price.

- d. Future pricing to consider
 - The committee suggests \$200 for the Audit Narrative report.
 - The committee agrees that \$400 is appropriate for an ASHRAE created plaque.

Bus Dev SubC Motion #3: Jeff Clarke moved and Esteban Baccini seconded that the subcommittee recommend that Building EQ Committee approve the Portal pricing as follows:

- Spreadsheet Audit Report @ \$50
- Disclosure Report @ \$50
- Credential Verification fee @ \$25 (non-members), \$15 (members)
- Narrative Report @ \$200
- ASHRAE plaque creation @ \$400

Vote: Motion passed 5-0-0, CV

7. Outreach to IFMA
 - ASHRAE has an MOU with IFMA which is headquartered in Houston – there was a potential opportunity to engage them at this meeting, but complications arose in trying to make that happen. Follow up will continue in SY 2018-19.
 - IFMA tends to be a lot of owner operated buildings and those that are in the business of operating their buildings. IFMA has both industrial and municipal members. While Building EQ does not fit well with industrial, it does fit well with municipal.
8. Translations Status/Updates
 - French: underway, in progress.
 - Spanish: Not yet started, need to get license agreement signed.
 - Other Languages targeted: The committee might consider using only the six UNEP languages which would limit the society's exposure to infinite language translations.
9. Institutional customers Updates
 - Hydro-Quebec: working on the French translation
 - University Central Florida: 13 energy audits have been completed, six have been submitted, two more ready to submit. There are plans to rate every building on campus.
 - City of Orlando: first wave of benchmarks is coming due. Hopefully, BEQ will get used for buildings requiring energy audits. Orlando Utilities Commission (OUC) is tasked with implementing the regulations.
 - Miami-Dade County: They are at least another 18 months from the first draft on their regulations.
 - Brevard Public Schools: They are worried that ENERGY STAR is going to get cut and are looking to Building EQ as a repository for that data. They are not currently in a position to unilaterally to complete projects for all their schools. But, John Constantinide is working with them to identify a solution.
 - Carleton University and USF are also interested in doing Building EQ on their buildings.
 - The education board in Ontario looking to do all their buildings.
 - Department of Defense military branches energy offices: John Constantinide met with them and will be following up with navel offices command. They are looking for a criteria document to help them to include Building EQ in their unified guidelines.
 - City of Los Angeles wants to put forth an ordinance that would require retro commissioning of buildings. ASHRAE's commissioning guideline committee is looking at whether Building EQ and Standard 202 can be used to meet these ordinances.

AI 3: All committee members to identify and customers who are trying to compile energy information and send those leads to Lilas Pratt for additional follow-up.

10. Marketing Ideas for Web Portal

- a. A marketing parking lot is needed to list potential marketing ideas such as videos, training, LEED EBOM points, etc. These ideas can then be prioritized and acted on.
- b. Portal Content Additions
 - South American countries want to be able to do a floor by floor building EQ for Multiple story buildings with multiple tenants.
 - A program for this would need some eligibility criteria such as floors that are separately metered and have independent HVAC systems.
 - This idea has been referred to the Methodology Subcommittee.
- c. Energy audits
 - This is the key to improving the existing building stock and audits improve the building, lower energy costs, lead to better rental rates, etc.
 - The path to this is: create a standard (211), then provide tools (Building EQ) and training (PDC and eLearning) where folks can get certified (BEAP) in this work.
 - THIs provides a revenue stream in multiple places within ASHRAE: standards sales, Building EQ, ALI, and Certification.
- d. Kiosk Live Portal Demo for Atlanta Winter meeting
 - Showcase the Portal and the program with brochures.
 - Looking to approve the concept.
 - Details would need to be worked out.

Bus Dev SubC Motion #4: Esteban Baccini moved and Bill Dean seconded that Bus Dev SubC approve the concept of a kiosk for demonstrating the Portal at the Atlanta meeting.

Discussion: Need to work with CEC and IEC

Vote: Motion passed 4-0-0, CV

11. Licensee Program Business plan

- a. Argentina Green Building Council
 - AGBC would like to use the Building EQ rating program but want to use their own database of buildings to determine the baseline median EUI and use their own site-source ratios.
 - There is a range of complexity depending on exactly what is needed. Further discussions are needed.
 - This was the original concept for the licensee program. The committee needs to know what they want in order to put together a cost and plan to implement it.
 - There has been some discussion with another firm (Scream Enterprise) regarding their software (Screaming Power) to track energy usage. (www.screamingpower.ca)
- b. Alternate label with letter grades
 - Questions regarding dilution of brand – need to get those answered before pursuing this, but this is worth pursuing.

12. Adjourn – Meeting adjourned at 4:04pm CDT.

Attachment D – Marketing Plan Update

From: Walters, Lauren
Sent: Friday, June 1, 2018 3:05 PM
Subject: May 2018 Building EQ Site / Portal Traffic

Hi Lilas,

I would like to provide you with a monthly analytics report as we continue to craft and implement the promotion plan for Building EQ. Please see the attached .PDFs of May 2018 web traffic for both the ASHRAE Building EQ website and the Building EQ Portal. As a refresher, I provided an update to our previously discussed on-going promotion plan below.

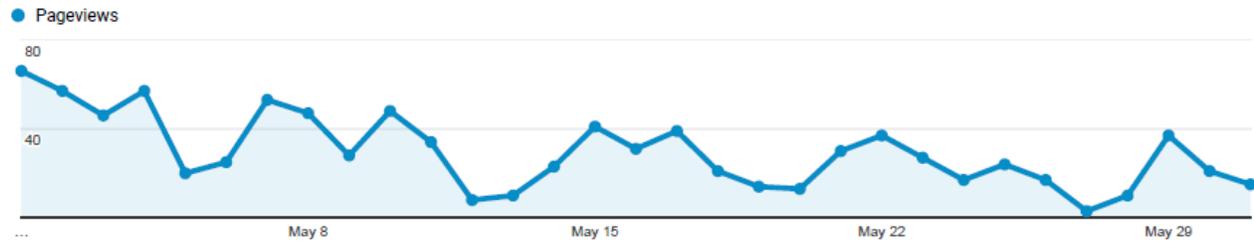
Promotion Plan Update:

- Email series to registered users featuring tips about how best to use Building EQ
 - Lilas is drafting content
- Quarterly social posts on Facebook, LinkedIn, and Twitter – beginning next week
 - ✓ Posts approved
 - Awaiting new graphic from Megan 6/4
- HPB full-page ad for Summer/Winter edition
 - ✓ Ad approved / submitted on May 10th
- Quarterly rotating feature on ashrae.org homepage
 - ✓ Currently on homepage
- Ship brochures to volunteers for AIA in NY 6/21, BOMA in TX 6/24, and IFMA in NC 10/3
 - Do you have a volunteer in mind who is attending AIA?

Please let me know if you have any questions.

Thank you,
Lauren Walters

Explorer



This data was filtered with the following filter expression: /technical-resources/building-eq

Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	919 % of Total: 0.24% (377,563)	738 % of Total: 0.25% (300,277)	00:02:23 Avg for View: 00:01:42 (40.94%)	357 % of Total: 0.22% (163,331)	56.86% Avg for View: 58.30% (-2.46%)	47.33% Avg for View: 43.26% (9.42%)	\$0.00 % of Total: 0.00% (\$0.00)
1. /technical-resources/building-eq	759 (82.59%)	598 (81.03%)	00:02:05	303 (84.87%)	52.15%	43.35%	\$0.00 (0.00%)
2. /technical-resources/building-eq/building-eq-portal	159 (17.30%)	139 (18.83%)	00:04:52	54 (15.13%)	83.33%	66.67%	\$0.00 (0.00%)
3. /technical-resources/building-eq/YnVpbGRpbm	1 (0.11%)	1 (0.14%)	00:00:01	0 (0.00%)	0.00%	0.00%	\$0.00 (0.00%)

Explorer

Pageviews



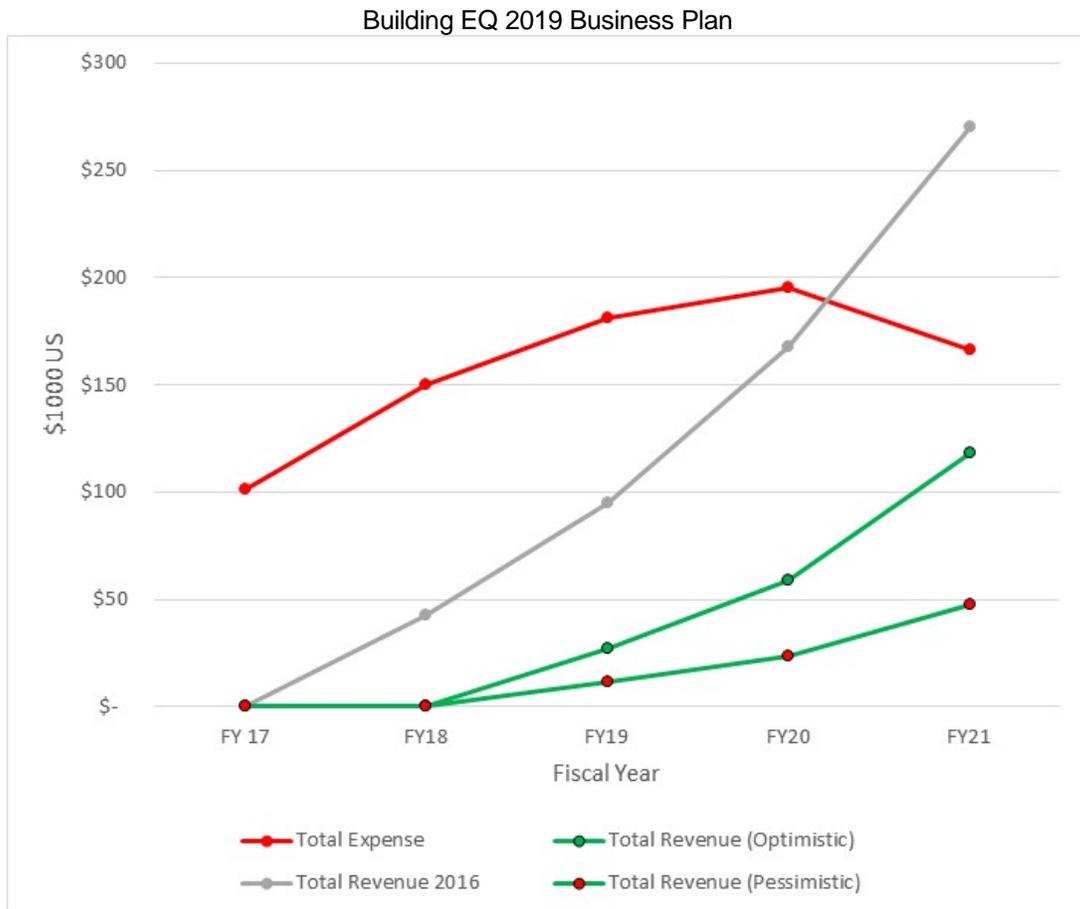
Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	1,493 % of Total: 100.00% (1,493)	694 % of Total: 100.00% (694)	00:01:27 Avg for View: 00:01:27 (0.00%)	153 % of Total: 100.00% (153)	9.15% Avg for View: 9.15% (0.00%)	10.25% Avg for View: 10.25% (0.00%)	\$0.00 % of Total: 0.00% (\$0.00)
1. /project/manageProjects	307 (20.56%)	124 (17.87%)	00:00:50	25 (16.34%)	8.00%	9.77%	\$0.00 (0.00%)
2. /user/dashboard	165 (11.05%)	89 (12.82%)	00:00:36	66 (43.14%)	6.06%	7.27%	\$0.00 (0.00%)
3. /user/manageUsers	73 (4.89%)	51 (7.35%)	00:01:03	20 (13.07%)	0.00%	8.22%	\$0.00 (0.00%)
4. /account/manageAccounts	63 (4.22%)	22 (3.17%)	00:00:51	0 (0.00%)	0.00%	3.17%	\$0.00 (0.00%)
5. /project/manageloRating/1229	63 (4.22%)	13 (1.87%)	00:04:26	7 (4.58%)	28.57%	11.11%	\$0.00 (0.00%)
6. /user/profile	62 (4.15%)	29 (4.18%)	00:00:40	23 (15.03%)	13.04%	11.29%	\$0.00 (0.00%)
7. /project/manageloRating/1048	44 (2.95%)	4 (0.58%)	00:01:40	0 (0.00%)	0.00%	6.82%	\$0.00 (0.00%)
8. /project/manageloRating/1226	40 (2.68%)	5 (0.72%)	00:03:58	1 (0.65%)	0.00%	5.00%	\$0.00 (0.00%)
9. /project/manageloRating/1263	31 (2.08%)	1 (0.14%)	00:01:17	0 (0.00%)	0.00%	3.23%	\$0.00 (0.00%)
10. /project/manageloRating/1222	29 (1.94%)	16 (2.31%)	00:02:41	3 (1.96%)	66.67%	34.48%	\$0.00 (0.00%)

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Attachment E – Building EQ Business Plan

The graph below compares the original revenue forecast from the 2016 Business plan (gray line) to the updated forecasted revenue (both best case and worst case scenarios) and to the updated forecasted expenses. Some observations:

- Expenses are from the budget and represent the next three years.
- Expenses include the software depreciation
- The revenue start is late due to the later than expected portal launch.
- The smaller revenue sources have morphed from the 2016 plan but are about the same value.
- The main source of potential revenue is the licensee program which is unproven. The difference between the best and worst case scenarios is whether the licensee program flies.
- There is a parking lot of other revenue sources that have not been included in the plan as they have not yet been vetted.



Energy Audit Strategy



Training



Energy Audits Lead to Better Buildings



Tools



Methodology

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Attachment F – Budget Update

BUILDING EQ BUDGET

Updated June 12, 2018

	Last Year	Current Year		Future Years			Comments ↓
	Actual 16-17	Jul-May 17-18	Budget 17-18	Proposed 18-19	Proposed 19-20	Proposed 20-21	
Expenses ↓ Revenue →	\$300	\$700	\$43,000	\$10,000	\$30,000	\$60,000	
Salaries	\$45,000	\$49,200	\$42,200	\$45,200	\$47,400	\$48,400	Based on Salary allocation
Payroll Taxes & Benefits	\$11,800	\$13,800	\$10,000	\$13,400	\$14,200	\$14,600	Based on Salary allocation
Promotion	\$27,900	\$3,900	\$15,000	\$10,000	\$10,000	\$10,200	Brochures and other publicity efforts
Travel Members*	\$15,100	\$10,100	\$12,800	\$15,000	\$15,000	\$15,000	
Travel for Promotion of bEQ				\$6,000			Travel to support/promote Building EQ program.
Travel Staff	\$1,000	\$200	\$0	\$500	\$500	\$500	
Telephone & Communications**	\$400	\$200	\$1,600	\$500	\$500	\$500	Committee using GoToMeeting
Development	\$0	\$0	\$10,000	\$14,000	\$30,000	\$30,600	Covers adjustments/enhancements to Portal
Outside Services	\$0	\$12,400	\$10,000	\$11,600	\$12,800	\$14,000	Est. Portal hosting = \$600/yr Est. Portal maintenance = \$10,500/yr
Opportunity Funds	\$0	\$0	\$0	\$0	\$0	\$0	
Depreciation Expense	\$0	\$0	\$48,800	\$65,000	\$65,000	\$65,000	Portal capital expenditure
Totals	\$101,200	\$89,800	\$150,400	\$181,200	\$195,400	\$198,800	

*NOTE: Current updates to the Portal are included in the outside services bucket.

**NOTE: \$8000 cost for french translation work is not included in current year expenditures

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