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DRAFT

TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. TC 2.8 DATE Jan. 22, 2018

TC/TG/MTG/TRG TITLE Building Environmental Impacts and Sustainability

DATE OF MEETING Jan. 21, 2018 LOCATION Palmer House Hilton, Chicago IL

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Ashish Rakheja	2016	Lisa Chen Ng, PhD	2016	Joy Eileen Altwies, PhD
William L Stanton Stafford, PE	2016	Calina Ferraro	2015	James C Bradburn, PE
Kevin R Brown	2016			Paul A Torcellini
Thomas M Lawrence	2016			Michael P Deru, PhD
Fred Betz, PhD	2017			Joanne Choi
J Kevin Cross	2016			Brittany Carl
Abdel Darwich	2017			Svein Morner
David L Grumman, P.E.	2016			Elbert G Phillips
Ng Yong Kong, P.Eng., GBIF	2014			Douglas D Fick, PE
Janice K Means, PE	2016			Amanda Smith, PhD
Francis A Mills	2014			David Evers
Mitchell Swann, PE	2014			Katherine Hammack
John M Swift, Jr	2014			Renee Clair
				Dunstan Macauley
				Alara Wilson
				Ron George
				Ling Luo
				Jose Correa
				Sama Aghmiary

				Panos Bakos
				Peter Alspach
				Zohreh Shaghaghian
				Haleh Maghaddasi
				Nick Smith
				Raphael Amajuoyi
				Yaoyu Li
				Lourdes Gutierrez
				Eric Peterson

DISTRIBUTION: <i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head: Elbert Phillips	SHx@ashrae.net Where x is the section number
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	See ASHRAE email alias list for needed addresses.
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

Note: These draft minutes have not been approved and not the official, approved record until approved by the TC.

TC 2.8 Building Environmental Impacts and Sustainability

Sunday, January 21, 2018, 5:30-7:00 pm

Chicago, IL

1. Roll call and Introductions (Rakheja)

- 1.1. Meeting called to Order at 5:30
- 1.2. Introductions
- 1.3. Roll Call / Quorum – quorum present (11 members)

2. Accept Agenda/Approve Minutes of Previous Meeting (Stafford)

- 2.1. Review Meeting Agenda
- 2.2. Approval of Long Beach Meeting Minutes:
 - 2.2.1. vote to approve additional edits – (8-0-2-CNV)
 - 2.2.2. Vote to approve revised minutes - (8-0-2-CNV)

3. Announcements/Membership (Rakheja)

- 3.1. Ashish mentioned Historical Committee looking for papers, abstracts due in March, to celebrate ASHRAE Centennial
- 3.2. ASHRAE has a new 90.1 portal, plus user guide and addendums available for free trial
- 3.3. CEC updates – 106 slots in Chicago, 115 submitted on 67 presented
- 3.4. Presentations not being submitted on time – problem for CEC
- 3.5. Houston conference – programs due Feb. 9
- 3.6. Atlanta – programs due Aug 10
- 3.7. Mentions on specialty conferences – see ASHRAE web site for upcoming conferences
- 3.8. CLIMA call for papers for 2019 in Bucharest

4. Standing Committee Liaisons TAC/RAC/StdCom/Program/SpecPub/ALI

- 4.1. Bert Philips mentioned the 1650-RP survey. Joy will send out to TC 2.8 Listserv.
- 4.2. (Fick) RAC – met Friday and Saturday, cleared 11 for funding, covering about 80% of budget
 - 4.2.1. Had 41 innovative research proposals, narrowed down to 5 or 6

5. Subcommittee Reports

5.1. GreenGuide (Lawrence)

- 5.1.1. New version is in bookstore – congratulations to Tom and committee
- 5.1.2. Subcommittee didn't meet this meeting, probably won't in June
- 5.1.3. Still hope to create a university textbook version – goal is to have a first version to beta test on students in fall
- 5.1.4. This process is helping bring thoughts for the next edition

5.2. Standards (Lawrence/Fick/Swift)

- 5.2.1. SPC 189.1 Standard for the Design of High-Performance Green Buildings except Low-Rise Residential Buildings (Lawrence/Persily)
 - 5.2.1.1. 2017 version should be officially released soon (it's done)
 - 5.2.1.2. Starting this year, IgCC uses 189.1 as technical basis (must buy through them in North America)
 - 5.2.1.3. Outside US, can still be sold by ASHRAE

- 5.2.2. SPC 189.3P Design, Construction and Operation of High Performance Green Healthcare Facilities (Fick)
 - 5.2.2.1. Is in bookstore (was published)
 - 5.2.2.2. Committee meetings Monday morning
 - 5.2.2.3. 189.1 references this one in the Appendix
 - 5.2.2.4. No longer uses the “P” (now 189.3)
 - 5.2.2.5. Intent of document is an overlay to IgCC to modify certain sections with respect to healthcare facilities
 - 5.2.2.6. 189.1 will need to have any healthcare references removed (will now need to refer to 189.3)

- 5.2.3. SPC 191P Standard for the Efficient Use of Water in Building, Site and Mechanical Systems (Betz/Swift)
 - 5.2.3.1. Still a “P”
 - 5.2.3.2. Public review comments received, will be responded to and put into another public review
 - 5.2.3.3. Hopes to have last public review after Houston meeting
 - 5.2.3.4. Should be done shortly after next winter meeting (about this time in 2019)

5.3. Handbook (Brown)

- 5.3.1. Two chapters were published in 2017
- 5.3.2. Won't ramp up until Houston, not slated for update for 2.5 years

5.4. International (Rakheja / Mills)

- 5.4.1. New region 14 in Europe, including in UK and Ireland
- 5.4.2. Launch in November
- 5.4.3. CRC in August
- 5.4.4. Chairing hot climate guide, and need good international input (Mills)
- 5.4.5. Moving to produce a design guide for NZEB hospitals
- 5.4.6. October REHVA Journal focused on NZEB hospitals
- 5.4.7. Discussion on direction of NZEB – going more mainstream in Europe
- 5.4.8. Report on developing cities conference in Delhi – very successful, plan for another in future (possibly Africa or South America)
 - 5.4.8.1. Delegates need subsidizing, so sponsorships are needed (\$70 to 100k)

5.5. Water-Energy Nexus (Ferraro / Betz)

- 5.5.1. Great turnout at subcommittee meeting (25)
- 5.5.2. Calina and Fred are rolling off, looking for new Chair and Subchair
- 5.5.3. Most of meeting talked about programs – pulling together for Houston
- 5.5.4. 90.1 renewable energy working group also reported

5.6. Research (Altwies)

- 5.6.1. Discussed several research topic ideas, both old and new, at the subcommittee meeting
- 5.6.2. Current active research topic, 1814-TRP, is awaiting release for bidding in spring
- 5.6.3. One RTAR written by Lisa Ng titled “Ventilation – Field Analysis of Low-Emitting Buildings” sponsored by SSPC 62.1 Ventilation Subcommittee was sent to voting members prior to meeting for co-sponsorship consideration
 - 5.6.3.1. Motion to cosponsor: Means; Second: Cross
 - 5.6.3.2. Vote to approve co-sponsorship (10-0-0-CNV)

5.6.4. Full subcommittee meeting minutes attached in Appendix

5.7. Programs (Brown)

5.7.1. 3 programs at Chicago (submitted 7), some will be resubmitted for Houston, some for Atlanta

5.7.2. Programs is a great way to get involved – looking for a new program subcommittee chair

5.7.3. Full subcommittee minutes attached in Appendix

5.8. Existing and Future Building Challenges (Macauley/Brown)

5.8.1. Relatively new subcommittee – originally developed scope document – crosses several TC activities

5.8.2. Will aggregate activities of others

5.8.3. Includes resiliency, mini-track ideas for 2019 annual meeting

5.8.4. Full subcommittee minutes are attached in Appendix

5.9. Website (Ng)

5.9.1. Everything is up to date

6. Related Activities Reports

6.1. ASHRAE Advanced Energy Design Guides Update (Torcellini)

6.1.1. Zero energy K-12 is available in bookstore or on web site

6.1.2. Came from publisher on Friday

6.1.3. Next, doing one for office buildings

6.1.4. All guides going forward will be zero energy

6.1.5. Looking for case studies of office buildings, including zero-energy-ready (low 20's EUI) with measured data (Energy Star of 97-98)

6.1.6. Seminar on Tuesday PM on this topic

6.1.7. Download often – helps the stats

6.1.8. Joint effort of ASHRAE, AIA, USGBC, others

6.1.9. We have an ALI course on NZEB buildings (Frank teaches)

6.1.10. Notable change – no reference building (doesn't make sense)

6.1.11. Chapter 5 is big list of how-to recommendations, including envelope testing

6.1.12. Looked heavily at market sector – tried to prioritize guides using Costar database (why schools came up first)

6.2. ASHRAE bEQ:

6.2.1. No formal report

7. Old Business

7.1. TC 2.8 Proposed Scope Revisions (Rakheja)

7.1.1. No report

7.2. MTG.OBB: Occupant Behavior in Buildings (Lawrence)

7.2.1. No report (disbanded?)

7.3. MTG.IAST: Impact of ASHRAE Standards and Technology on Energy Savings/Performance

7.3.1. No report

7.4. MTG Hot & Humid Climate Guide (Mills)

7.4.1. Workshop on Wednesday – 8 AM

7.5. MTG Cold Climate Guide (Mills)

7.5.1. Second revision is due later this year

8. New Business

8.1. Net Zero Energy Standard (Emmerich)

8.1.1. (Deru) – More like Std 105 – just measuring

8.1.2. Had a call in December, will have meeting during 7.6 Stds subcommittee meeting Monday

8.1.3. There is interest from TC 2.8 – Stanton, Ashish, and Michael are interested in participating

8.1.4. Rough draft of title, purpose, scope developed

8.1.5. Next step would be to form a committee

8.2. Frank introduced Raphael, winner of ASHRAE CIBSE award winner

9. Adjourn

9.1. Motion passed (10-0-0-CNV)

NEXT MEETING: Sunday, June 24, 2018, Houston, TX

TC 2.8 Web Site
<http://tc0208.ashraetcs.org>

To subscribe or unsubscribe to the list, you can go to the TC 2.8 list web site:
<http://lists.onebuilding.org/listinfo.cgi/tc28-l-onebuilding.org>

This list is only for communications related to ASHRAE TC 2.8 Building Environmental Impacts and Sustainability. Do not distribute messages of any commercial nature.

To send a message to all subscribers to the list, address your message to:
tc28-l@lists.onebuilding.org

Note: ASHRAE does not operate this list. Please do not ask them for help. If you have any questions, please contact: Jason Glazer JGlazer@gard.com

Thanks to Jason and GARD Analytics for hosting this list!

For comments, suggestions, volunteering to help, etc. with anything dealing with TC 2.8, please contact me at:

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Upcoming Conferences:

2018 Annual Conference: Houston, TX
2019 Winter Conference: Atlanta, GA

Information on these ASHRAE Conferences can be found on ASHRAE's website under Events –
www.ashrae.org

APPENDIX TO TC 2.8 Meeting Minutes

TC2.8 Research Subcommittee Minutes

January 21, 2018, Palmer House Hilton Chicago Floor 3, Salon 10
3:00 PM to 4:00 PM

Attendees: Joy Altwies, Vik Patnaik, Brittany Carl, Jim Bradburn, Ron George, David Grumman, Fred Betz, Michael Deru, Janice Means, Kevin Brown, Mark McCracken, Steven Carlson, Stanton Stafford, Mitchell Swann, Helen Stopps, Kevin Cross

1. Introductions
2. Update on status of active TC 2.8 research:
1814-TRP Actual Energy Performance of Buildings Designed to Comply with ASHRAE Standard 90.1-2010
 - Should go out to bid in spring – funding is an issue (actually, the number of TRP’s ready for bid is enough for about 80% of available funding, so they’re having to select which ones go out)
3. Follow up on previous business and research topic ideas.
 - Review of topics in table below
 - Co-sponsor RTAR with SSPC 7.6?
 - Disseminate link to survey for RP-1650 (sustainable O&M training)
 - Should we have a time limit (formal) for leaving research topic ideas on the list without RTAR development?
4. Info from RAC
 - Next deadline for submitting items to RAC: March 15 - they will use 4 dates every year from now on (March May August December, always the 15th)
 - Disposition forms (final results of research) have been a problem. TCs are not turning them in, delaying release of final payments and research results. New rules coming (not sure what yet).
 - There is a searchable database of past research reports. This link allows you to access final information, such as, title, source, contractor, principal investigator, start and end dates, resulting papers, and if final report is available. Find it here:
research.ashrae.org

List of research topic ideas:

Research Topic Idea	Generated by	Update/Status	Next Step
ACTIVE: <i>Training Requirements for Sustainable, High</i>	TC 7.3, Michael Bobker	Kevin Brown (and Lisa Ng) volunteered to attend. They will	Kevin will continue to participate as the liaison.

<i>Performance Building Operations (TC 7.3, 1650-RP)</i>		always meet on Tuesdays. RP is on-going and they have sent out a survey for building operator info. We will send out to the ListServ.	
ACTIVE: <i>A Guideline for Calculating the Avoided Source Energy Consumption (ASEC) Due to Waste Heat Recovery (WHR) and Heat Pump (HP) Technologies (MTG.ASEC 1804-WS)</i>	MTG.ASEC	Kevin Brown is TC 2.8's representative. As of RAC's winter 2017 meeting, WS was Returned with comments.	Kevin said they are having difficulty getting the work statement revised and through RAC.
RECENT ADDITION: Review of What Makes Water Reuse Systems Work (or Not Work) from an O&M Perspective	Michael Bobker (7.3, 3.6)- Energy-Water Nexus	New topic added June 2017. Idea is somewhat of a "lessons learned", perhaps start with a forum at a meeting.	Kevin Brown and Michael are still working on this one.
RECENT ADDITION: Ventilation – Field Analysis of Low-Emitting Buildings (Study of Contaminants – Update an VR Table in 62.1, Area-Based)	Lisa Ng. 62.1 Ventilation Subcommittee	New topic added June 2017. Lisa has written an RTAR, will bring to TC 2.8 for co-sponsorship vote	Fred noted it should reference standard test methods for VOCs. (This is referenced in 189.1). Full TC 2.8 voted to cosponsor at main meeting.
NEEDS STATUS UPDATE: Water Use Metrics and Patterns in Residential	Bing Dong, Fred Betz	This was added at the Jan 2017 meeting, for co-sponsorship with MTG.	Fred and Bing plan to do this one. 191 would likely co-sponsor. Will aim for March 15 th – Joy will follow up half-way to that date.
NEEDS STATUS UPDATE: Net Zero Energy Hospitals	Frank Mills	This was added at the Jan 2017 main TC 2.8 meeting. REHVA is looking for ASHRAE to publish a design guide on this. They are working on funding. Frank will work on an RTAR –	Joy will send form to Frank.

ON HOLD: Do buildings built to Standard 189.1 perform as expected?	Kevin Cross, Joy Altwies, Tom Lawrence	Kevin Cross and Brent Stephens developed an early stage RTAR.	Keep on list, pending research from 1814. Will keep this one as “special” long-term idea since it would be a follow-on in the same format as previous successful research projects.
ON HOLD: Embodied energy of building systems & equipment – how much more efficient does it need to be to outweigh its embodied energy?	Kevin Cross & Dunstan Macauley, Jim Sweeney	Dunstan was not present for the previous discussion, so we are keeping on the list for now. Jim will follow up with him.	Jim is working on an RTAR – it is tentatively titled “A simplified approach to evaluate the life cycle energy of building components and equipment.” Joy will follow up on a deadline.
ON HOLD: Comparing high-performance homes to code-built homes	Dunstan Macauley	Dunstan was not present for previous discussion, so we are keeping on the list for now. Joy will follow up with Dunstan.	Keep on list or drop?
ON HOLD: Geothermal technologies in hot climates – international	Ashish Rakheja	Keeping on the list for now.	Ashish will work to find someone to write the RTAR. Aiming for May 15 th deadline.
ON HOLD: Grid impacts – can buildings be an energy storage mechanism that shifts efficiency strategy?	Mark MacCracken	Mark was not present for the previous discussion, so leaving on the list for now. Joy will follow up with Mark.	Mark will plan to write this RTAR with plan to meet August 15 th deadline. Joy will follow up in May for reminder.
New Research Topic Idea	Generated by	Update/Status	Next Step
Sustainability in Mixed-Used Communities?			

For more information, visit ASHRAE’s research web site here: ashrae.org/research

Anyone interested in pursuing research topics (including those who generated ideas above) are asked to take a look at the RTAR form to start fleshing out their ideas. You may need to **copy the links and paste into your browser address bar**:

- The latest RTAR template form can be accessed here:
https://www.ashrae.org/File%Library/docLib/Research/RTARs/RTAR-Form-Template_2015.08.28.r1.docx
- and an example RTAR is shown here:
<https://www.ashrae.org/File%20Library/docLib/Research/RTARs/EXAMPLE-RTAR.pdf>

For reference: Current (extended through 2018) ASHRAE Strategic Research Plan Goals. Ideally, research topics should address one of these goals:

1. Maximize the actual operational energy performance of buildings and facilities
2. Progress toward Advanced Energy Design Guide (AEDG) and cost-effective net-zero-energy (NZE) buildings
3. To reduce significantly the energy consumption for HVAC&R, water heating and lighting in existing homes
4. Significantly advance our understanding of the impact of indoor environmental quality (IEQ) on work performance, health symptoms and perceived environmental quality in offices, providing a basis for improvements in ASHRAE standards, guidelines, HVAC&R designs and operation practices
5. Support the development of ASHRAE energy standards and reduce effort required to demonstrate compliance
6. Building Information Modeling (BIM) of energy efficient, high-performing buildings
7. Support development of tools, procedures and methods suitable for designing low energy buildings
8. Facilitate use of natural and low global warming potential (GWP) synthetic refrigerants and seek methods to reduce refrigerant charge
9. Support the development of improved HVAC&R components ranging from residential through commercial to provide improved system efficiency, affordability, reliability and safety
10. Significantly increase the understanding of energy efficiency, environmental quality and the design of buildings in engineering and architectural education
11. Understand influences of HVAC&R on airborne pathogen transmission in public spaces and develop effective control strategies

The full ASHRAE document explaining these goals in detail can be found here (copy/paste into browser address bar):

<https://www.ashrae.org/File%20Library/docLib/Research/StrategicPlan/ASHRAE-RSP-10-18-Brochure-v3.pdf>

TC 2.8 Program Subcommittee Minutes

2018 ASHRAE Winter Meeting; Palmer House Hilton Floor 3: Salon 10
Chicago, IL
4:30pm – 5:00pm

I. Sign in

II. Chicago Programs

Monday, 1:00 PM – 2:30 PM

AHR Expo Session 3 (Intermediate)
Real-World Experience Providing Residential Energy Excellence

McCormick Room: S101A

Monday, 2:15 PM – 3:45 PM

Seminar 32 (Intermediate)
The Art and Science of Delivering Healthy, Productive and Effective Buildings

Room: Adams

Tuesday, 1:30 PM – 3:00 PM

Seminar 49 (Intermediate)
The Process for Zero Energy K-12 Schools: The Next Series of ASHRAE Advanced Energy Design Guides

Room: Red Lacquer

III. Call for New Seminar/Forum/Workshop Ideas for Houston, 2018

- *Standing Seminar:* from Subcommittee Water- Energy Nexus: Blue is the New Green: Need topic, chair and speakers. Dunstan and Kevin, Calina and Fred
 - Blue is the New Green: Technical presentation, Ashish Rakheja (may merge the two seminars into one)
 - See if we can dust off and re-use the Chicago presentation and John's prior presentation
- Comparing Green Building Rating systems As-Designed vs. Actual Performance – Frank Mills, Janice Means, NYK – probably

needs a paper as foundation (Ashish, Costas, Means, Lawrence)
7.2 would co-sponsor (need timeline from Janice, maybe Chicago 2018)... somewhat related = MTG proposal to investigate impact on All ASHRAE Standards and the built environment

- The Solar Marketplace: Paul to coordinate additional speakers, build off of Renewable Myths. Co-Sponsor TC 6.7 - Chair = Janice
- Forum/Workshop: Add output from Research Subcommittee on successful use of 30% AEDG... look at Long Beach for Programs, add similar research – Chair = Kevin. Need to reach out to Dennis. Is he ready to speak at this level?
- Paul T – What do ASHRAE members do in their own houses? Actual data, Case Studies on actual residences. Kevin Brown. TC 6.7 Net Plus house. Co w/ Residential Buildings Committee RBC– Standing Committee (Chair = Jim Sweeney) Target Future
 - From Paul “ASHRAE members make decisions professionally everyday related to clients purchasing decisions and energy efficiency. When given the opportunity, how do ASHRAE engineers make decisions for their own homes and offices? This series of papers looks at case studies of ASHRAE member’s homes and the measured energy performance of these homes. Papers are requested that describes the technologies used, how the decisions were made to use certain technologies, and the measured energy performance of the homes.”
- Forum – ASHISH = Chair (Look back at Orlando minutes) How can ASHRAE help provide affordable high performance residential buildings in countries with developing economies? Neil to assist.
- ASHISH – thought of building a track around ALI intro for all the extra ASHRAE outreach and 4 hour deep courses... extra attention spent on impact in developing countries.
- 1/21/2018: Myths and Realities for Solar Design... 6.7 Co-Sponsor. Include UL code for fire break requirement on rooftop

solar installations. Talk to Paul about design factors that should be considered for solar installations.

Review Timeline for Future Meetings

2018 ASHRAE Annual Conference in Houston, TX:

<http://www.ashrae.org/houston>

- a. Conference Paper Abstracts due Monday, August 28, 2017
- b. Conference Papers due Friday, December 8, 2017
- c. Seminar, Forum, Panel, Debate and Workshop proposals are due Friday, February 9, 2018
- d. Web site opens for presentation uploads Monday, April 30, 2018
- e. All presentations due online Friday, June 1, 2018

• **Track 1: HVAC&R Systems and Equipment:**

Track Chair: Frank Schambach Email: frankschambach@mindspring.com

• **Track 2: Fundamentals and Applications:**

Track Chair: Dennis Alejandro Email: denzjac@yahoo.com

• **Track 3: District Energy and Cogeneration Plants:**

Track Chair: Kimberly Pierson Email: kdpwildcat@gmail.com

• **Track 4: Safeguarding your HVAC&R System:**

Track Chair: Rich Rose Email: richr@mticontrols.com

• **Track 5: Residential – Modern buildings in Hot and Humid Climates:**

Track Chair: Dimitris Charalambopoulos Email: dimitris@ashrae.gr

• **Track 6: Commissioning– Optimizing New & Existing Buildings and their Operation:**

Track Chair: Kevin Marple Email: kmarple@benzco.com

• **Track 7: Research Summit:**

Track Chair: Melanie Derby Email: derbym@ksu.edu

• **Track 8: HVAC&R Control Freaks:**

Track Chair: Gary Debes Email: gcdebes@verizon.net

• **Track 9: HVAC&R Analytics (Mini-Track)**

Track Chair: Vikrant Aute Email: Vikrant@umd.edu

Future Winter and Annual Conferences

Annual 2018 – Houston, TX Jun 23-27, 2018

Winter 2019 – Atlanta, GA Jan 12-16, 2019

Annual 2019 – Kansas City, MO June 22-26, 2019

Winter 2020 – Orlando, FL Feb 1-5, 2020

Annual 2020 – Austin, TX Jun 27-Jul 1, 2020

Please feel free to contact me if you have any questions or need assistance; kevin.brown@abm.com mobile: 404-825-0716

ASHRAE Winter Conference – Chicago
January 21, 2018
Palmer House Hilton – Forum 10
TC 2.8 Existing and Future Building Challenges

1. The scope of the sub-committee currently crosses over several topics in ASHRAE that are currently covered by other TC's.
 - a. D. Macauley to take the lead to develop the scope for the sub-committee.

2. Areas of focus for the subcommittee:
 - a. Embodied Energy
 - i. Jim Sweeney with Texas A&M is currently conducting a research project on Embodied Energy.
 - b. Resiliency
 - i. ASHRAE is looking at articles on RESILENCY for the Journal.
 1. D. Macauley to author an article.
 - ii. Investigate options for mini track on resiliency for the 2019 Annual meeting.
 - iii. Develop a program track for the 2018 Annual Conference.
 1. D. Macauley, J. Bradburn, and R. Karim to work with the Programs for the Annual Meeting in Houston.
 2. Potential topics are:
 - a. Incorporating Resiliency in /Existing Building Retrofits
 - b. Presentation on USGBC's Resiliency Rating System
 - c. Rockefeller Foundation 100 Resiliency Cities program (potential to invite an officer from one of the cities participating in the program)
 - c. Adaptive Cities
 - i. Reconnect with CIBSE to present CIBSE programs at one of the ASHRAE conferences.

3. Other Areas of Focus:
 - a. Develop programs to sell / teach payback analysis to promote more life cycle costing in determining different approaches to building equipment retrofits:
 - i. Kevin Brown, Stanton Stafford, Dunstan Macauley, Aru Sau
 - ii. *Send out doodle poll to set up time for conference call*
 - iii. *Kevin Brown had a preliminary discussion with SSPC 100. SSPC 100 is interested in partnering with TC2.8*
 - b. Large building portfolio (existing building stock/ building archetypes/typology) - Costas Balaras

End of Minutes