



1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400

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 January 29, 2017

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

DATE OF MEETING January 29, 2017 LOCATION Caesar's Palace, Las Vegas NV

| MEMBERS PRESENT | YEAR APPTD | MEMBERS ABSENT | YEAR APPTD | EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE |
|-----------------------------------|------------|--------------------------|------------|--|
| Mr Ashish Rakheja | 2016 | Mr David E Ellis, PE | 2015 | Dr Joy Eileen Altwies, PhD |
| Mr Kevin R Brown | 2016 | Mr David L Grumman, P.E. | 2016 | Mr James C Bradburn, PE |
| Mr J Kevin Cross | 2016 | | | Mr Abdel Kader Darwich |
| Ms Calina Ferraro | 2015 | | | Mr Michael P Deru, PhD |
| Mr Douglas D Fick, PE | 2016 | | | Ms Kinga Porst Hydras |
| Mr Ng Yong Kong, P.Eng., GBIF | 2014 | | | Mr Thomas J Kelly |
| Dr Thomas M Lawrence | 2016 | | | Ms Dolaana Khovalyg |
| Ms Janice K Means, PE | 2016 | | | Mr Dunstan Laurence Macauley, III |
| Mr Francis A Mills | 2014 | | | Mr Elbert G Phillips |
| Dr Lisa Chen Ng | 2016 | | | Prof Amanda Smith, PhD |
| Mr William L Stanton Stafford, PE | 2016 | | | Dr James F Sweeney Jr |
| Mr Mitchell Swann, PE | 2014 | | | Ms Tania Ullah |
| Mr John M Swift, Jr | 2014 | | | Marios Georgiou |
| Dr Paul A Torcellini | 2014 | | | Gabrielle McMorrow |
| | | | | Joanne Choi |
| | | | | Brittany Carl |
| | | | | Nicole Olaes |
| | | | | Jacquelin Britto |
| | | | | Tim Dwyer |

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|--|--|--|--|----------------------|
| | | | | J. Patrick Carpenter |
| | | | | Leslie Jansson |
| | | | | Svein Morner |
| | | | | Julia Call |
| | | | | Jairam Fenton |

DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*

| | |
|---|---|
| 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 29, 2017, 5:30-7:00 pm

Las Vegas, NV

1. Roll call and Introductions (Rakheja)

- 1.1. Meeting called to Order at 5:30 PM
- 1.2. Roll Call / Quorum – 12 Voting Members Present at meeting start and approval of minutes, 14 Voting Members present after minutes approval
- 1.3. Introductions

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

- 2.1. Review Meeting Agenda
- 2.2. Approval of St. Louis Meeting Minutes:
 - 2.2.1. Motion by Brown
 - 2.2.2. Seconded by Cross
 - 2.2.3. Minutes approved (10-0-2-4, CV)

3. Announcements/Membership (Rakheja)

- 3.1. Review of ASHRAE Code of Ethics.
- 3.2. CEC announcement regarding scheduling programs
- 3.3. New program types – Panel discussion, debates on hot-button issues
- 3.4. Long Beach: deadline is Feb 6th for program proposals
- 3.5. 9 tracks in Long Beach
- 3.6. Chicago due August 29, papers due Aug 9th.
- 3.7. New ASHRAE platform for authoring documents and group review
- 3.8. A new Zero Energy AEDG for Schools
- 3.9. Kishor is chairing new MTG
- 3.10. Restructured TC MOP, after Vegas meeting
- 3.11. RAC is prioritizing research for water heating and lighting in existing homes

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

- 4.1. Tom: TC sponsorship of programs was left out of printed program to reduce size, unintentionally left off digital version N/A
- 4.2. Dunstan: discussed that TAC approached us to sponsor a forum at this meeting – general consensus was that a definition of net zero is needed rather than a new standard
- 4.3. Bert Phillips from TAC stopped by (Section 2 Liaison)

5. Subcommittee Reports

5.1. GreenGuide (Lawrence)

- 5.1.1. Tom is soliciting volunteers from within TC 2.8 to review the new GG, please send note to Ashish of Joy if interested
- 5.1.2. We will vote at next meeting
- 5.1.3. Perhaps could be a supplemental book, Tom will check with Steve Comstock (ASHRAE staff)
- 5.1.4. Minutes of subcommittee meeting are included at the end of these minutes as Appendix A

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)
 - 5.2.1.1. New version will be released later this fall
 - 5.2.1.2. Firm timeline
 - 5.2.1.3. Over 50 addenda approved
- 5.2.2. SPC 189.3P Design, Construction and Operation of High Performance Green Healthcare Facilities (Fick)
 - 5.2.2.1. Committee meets Monday 1-30
 - 5.2.2.2. Had 4th public review and responded to comments
 - 5.2.2.3. Hope to vote for publication tomorrow
 - 5.2.2.4. Goal is to be a standard so 189.1 can reference it
- 5.2.3. SPC 191P Standard for the Efficiency Use of Water in Building, Site and Mechanical Systems (Swift)
 - 5.2.3.1. Introducing a performance-based approach for water modeling
 - 5.2.3.2. Hopefully will be used for compliance like Appendix G in future
- 5.3. Handbook (Brown)
 - 5.3.1. Just submitted, no comments yet (chpt. 34 & 35)
- 5.4. International (Rakheja / Mills)
 - 5.4.1. Frank gave a report on planned programs
 - 5.4.2. Minutes of this subcommittee meeting are included at the end of these minutes as Appendix B
- 5.5. Water-Energy Nexus (Ferraro / Betz)
 - 5.5.1. Focus was working on Water-energy nexus track at this meeting
 - 5.5.2. 35 speakers on this topic in Vegas
 - 5.5.3. Discussed status update to std 191, public review in spring
 - 5.5.4. Seminars Sunday were well-attended
 - 5.5.5. Recommend future programs on topic and new research
 - 5.5.6. Call for future input and potential chairs
- 5.6. Research (Altwies)
 - 5.6.1. Summarized the research subcommittee meeting
 - 5.6.2. Minutes of meeting included in these minutes as Appendix C
- 5.7. Programs (Brown)
 - 5.7.1. Everything is due Feb 6th – short time frame
 - 5.7.2. Being a chair or speaker gives a very reduced conference fee
 - 5.7.3. Plan for Long Beach: water-energy nexus, solar marketplace co-sponsor with 6.7- Janice will chair, international seminar, forum on 1627 results at TC level
 - 5.7.4. Tim Dwyer noted we have a seminar on Std 100 on Tuesday
- 5.8. Existing and Future Building Challenges (Macauley)
 - 5.8.1. Working to define some metrics
 - 5.8.2. Kevin met with Std 100
 - 5.8.3. Talked with Jim Sweeney about embodied energy research he's done on a high-performance home
 - 5.8.4. Minutes of this subcommittee meeting are included at the end of these minutes as Appendix D
- 5.9. Website (Ng)
 - 5.9.1. Not sure if we're supposed to post draft minutes – not clear

5.9.2. Abdel noted that SSPC was not supposed to post minutes

6. Related Activities Reports

- 6.1. ASHRAE Advanced Energy Design Guides Update (Torcellini)
 - 6.1.1. AEDG is collaborative effort funded by DOE
 - 6.1.2. Just shy of 600k distribution of these
 - 6.1.3. A steering committee of the organizations develops (project committee)
 - 6.1.4. A review draft (65%) is coming out Feb 6th
 - 6.1.5. Start to finish is about 9 months
 - 6.1.6. It will look different – first of zero energy guides – need feedback
 - 6.1.7. These are not consensus based – comments are discussed but not directly responded to
 - 6.1.8. A 90-95% draft will hopefully be out early June
 - 6.1.9. Hope to be in bookstore in October with companion electronic
 - 6.1.10. NREL did a technical feasibility study of zero energy – showed there wasn't much value in producing a 75% AEDG, but if you reach those targets you might as well add renewables and be net zero – hence jump to zero energy AEDG
 - 6.1.11. Focus now on energy modeling and strategies, rather than pre-calculated solutions which were focus on 30% AEDGs
- 6.2. ASHRAE bEQ: No report
- 6.3. Input from other TCs? – no discussion

7. Old Business

- 7.1. TC 2.8 Proposed Scope Revisions (Rakheja)
 - 7.1.1. Will send out to TC for comments so we have something to vote on between now and Long Beach
- 7.2. MTG.OBB: Occupant Behavior in Buildings – no report
- 7.3. MTG.IAST: Impact of ASHRAE Standards and Technology on Energy Savings/Performance – No report

8. New Business

- 8.1. No items for discussion

9. Adjourn

- 9.1. Motion by Brown
- 9.2. Seconded by Stafford.
- 9.3. Motion approved unanimously (12-0-0-4, CV)
- 9.4. Meeting adjourned at 7 PM.

NEXT MEETING: Sunday, June 25, 2017, Long Beach, CA

TC 2.8 Web Site

<http://tc28.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:

Ashish Rakheja

AEON Consultants

M: +91 98100 55344

E: ashish.rakheja@aeonconsultants.in

Upcoming Conferences:

2017 Annual Conference: Long Beach, CA

2018 Winter Conference: Chicago, IL

2018 Annual Conference: Houston, TX

Information on these ASHRAE Conferences can be found on ASHRAE's website under Events –

www.ashrae.org

APPENDIX A

ASHRAE Green Guide 5th Edition Update Committee 2017 ASHRAE Winter Meeting Agenda Las Vegas, January 29, 2017

Basic agenda followed

1. Introductions and call to order
2. Original schedule for 5th Edition publication
 - a. ~~Initial thoughts on changes to be made June 2015~~
 - b. ~~Initial drafts of each chapter due January 2016~~
 - c. ~~Review and editing January June 2016~~
 - d. Critical review (outside agent?) ~~summer 2016~~ **Spring 2017**
 - e. **June 2017 Annual Meeting, approval by TC 2.8 for publication**
 - f. Release in late 2017, push sales at winter 2018 meeting
3. Review of chapter update status; updates?

The color-coded chapter update was reviewed (attached). All chapters that are not complete yet were discussed and plans in place to have complete by mid-February.

Tom Lawrence will create the critical review PDF version in mid-February and circulate to parties who have expressed interest in reviewing from inside TC 2.8 and external.

4. How to handle the acknowledgements

We will list the contributors to the 5th edition but not those that were listed before for past editions.

5. Procedure for “independent third party review” this spring?

Discussed setting up a new Dropbox folder for those that volunteer to review.

The reviews will be not to make changes directly to the files. More like a standards review public comment process will be used.

Volunteers will be solicited from the TC 2.8 committee.

| GREEN GUIDE V CHAPTER STATUS UPDATE | | | | | Updated: | 1/25/17 |
|-------------------------------------|----------------------------------|---|-------------------------------------|--|--|-------------------------------|
| GGII Chapter number | Title | Corresponding GGIV chapter | Key editor | Current revision date (if 'complete' in green) | Other review/revision date, or notes | Ready for Submittal to ASHRAE |
| Color coding | Complete (basically) | Mostly ready | Still needs work | Red Alert! Need to get going | | |
| Forward | Forward | Forward | Tom | 21-Sep-16 | | |
| Preface | Preface | Preface | Tom | 18-Jan-17 | | |
| Acknowledgments | | | Dave G | | Confirm how these will be done, getting to be a long list. Discuss this in Las Vegas | |
| 1 | Intro, background | 1 | Tom | 16-Nov-16 | initial draft complete | |
| 2 | GB rating systems | 7 | Costas/TL | 20-Nov-16 | Late November updates, need CALGreen input but otherwise good to go. | |
| 3 | Proj. Strategies, early design | 3 + 4 | Abdel | 17-Dec-16 | Revision Complete. Added BEM write-up to BIM here. (Need better quality Figure 3-1) | |
| 4 | Cx | 6 | TL + others | 26-Nov-16 | Outside review complete, ready to go. | |
| 5 | Arch Design, plan | 5 | Janice | 2-Oct-16 | Need to shorten some. Janice working on it and promised completion by LV meetings. | |
| 6 | Concept design | | Abdel, Edna Lorenz | 17-Dec-16 | Revision complete. Figures renumbered and copied | |
| 7 | Sites | 2 | Tom | 28-Sep-16 | Basically set | |
| 8 | IEQ | 9 | Lisa Ng | 14-Jan-17 | | |
| 9 | Energy Conv. Dist | 10 + 11 | Abdel | 6-Oct-16 | Revision almost completed. Major revamp. Only table that will still need update is Table 10-1. It needs to be recreated because it is a picture. | |
| 10 | Energy/Water Res. | 12 | Dunstan/Dave G | 30-May-16 | Dunstan to work on it going to Las Vegas. | |
| 11 | Lighting | 13 | Kevin Brown (incl. SSPC 189.1) | limited starting point, renumbered chapter from GGIV | Kevin Brown taking charge of this. Jennifer Dolin from SSPC 189.1 provided input on 12/23/2016. In process? | |
| 12 | Water Eff. | 14 | Tania Ullah | 13-Jun-16 | SPC 191 will assist | |
| 13 | Smart Bldg Sys. | Evolve from 15 | Stanton, Annie Smith, Kevin Brown | 8-Jan-17 | Hoping to get TC 7.5 for a 'final review' started in Las Vegas. | |
| 14 | Documentation | 16 | Abdel | 13-Jun-16 | Revision Complete | |
| 15 | Construction | 17 | John Swift, Dave E | 17-Dec-16 | Some initial edits, Abdel to take over. | |
| 16 | O&M | 17 | Mitchell, Kevin Brown | limited starting point, renumbered chapter from GGIV | Mitchell has suggested topics that should be included and offered to incorporate. Email 12 January 2017 | |
| 17 | Residential | new | Paul Haydock, Res. Comm. and Costas | 9-Jan-17 | TML did an editorial review, pretty much set. Also the Digging Deeper shortened some. Need Paul's concurrence. | |
| 18 | Specific Building Type GreenTips | Transfer building type Green Tips here "new" to an extent | Tom | 18-Jan-17 | Deleted the Existing Building GreenTip and moved those thoughts to the new Ch. 19. About 1/2 way through review and updates. | |
| 19 | Existing Bldgs | New | Kevin Cross/ Frank Mills | 29-May-16 | Verify that the old Green Tip topics are integrated into the chapter. Chapter basically done? | |
| 20 | Emerging Trends, Epilogue | New | Mark MacCacken | 8-Jan-17 | Draft ready for TC review | |

| GREEN GUIDE V CHAPTER STATUS UPDATE | | | | | Updated: |
|-------------------------------------|--------------------------------|---|-----------------------------------|--|--|
| GGII Chapter number | Title | Corresponding GGIV chapter | Key editor | Initial revision date (if 'complete' in green) | Other review/revision date, or notes |
| Forward | Forward | Forward | Tom | | Keep these as original, or create new?? |
| Preface | Preface | Preface | Tom | 29-May-16 | update for any new GreenTips created |
| Acknowledgments | | | Dave G | | Confirm how these will be done, getting to be a long list. |
| 1 | Intro, background | 1 | Tom | | |
| 2 | GB rating systems | 7 | Costas/TL | 29-May-16 | Needs updated for LEED V4, only the initial starting point from GGIV is included so far |
| 3 | Proj. Strategies, early design | 3 + 4 | Abdel | 13-Jun-16 | Revision Complete |
| 4 | Cx | 6 | TL + others | 9-May-15 | initial reorder of chapter done |
| 5 | Arch Design, plan | 5 | Janice | 29-May-16 | Took the building type GreenTips out of this chapter, ready for detailed editing. Need to set target for chapter length and let Janice know. |
| 6 | Concept design | | Abdel, Edna Lorenz | 13-Jun-16 | Revision Complete unless we want to include the BIM/BEM new evolutio and not in chapter 20. |
| 7 | Sites | 2 | Tom | 23-Jan-16 | Costas had a few comments |
| 8 | IEQ | 9 | Lisa Ng | 16-Jun-16 | Work started, EHC review complete, having challenge getting Image Release from published textbooks and websites (such as EPA). Lan Chi (vice-chair of EHC) will work to get TC 1.12 input on this for chapter. |
| 9 | Energy Conv. Dist | 10 + 11 | Abdel | 23-Jan-16 | Working draft combining both chapters ready for edit |
| 10 | Energy/Water Res. | 12 | Dunstan/Dave G | 30-May-16 | Energy/water nexus added, not much else revised yet? |
| 11 | Lighting | 13 | Kevin Brown (incl. SSPC 189.1) | limited starting point, renumbered chapter from GGIV | Kevin Brown will take charge of this. TML will then get SSPCE 189.1 additional input. |
| 12 | Water Eff. | 14 | Tania Ullah | In process | SPC 191 will assist |
| 13 | Smart Bldg Sys. | Evolve from 15 | Stanton, Annie Smith, Kevin Brown | limited starting point, renumbered chapter from GGIV | |
| 14 | Documentation | 16 | Abdel | 13-Jun-16 | Revision Complete |
| 15 | Construction | 17 | John Swift, Dave E | 17-Jan-16 | Some initial edits |
| 16 | O&M | 17 | Mitchel, Kevin Brown | limited starting point, renumbered chapter from GGIV | Mitch had some specific ideas to add to this |
| 17 | Residential | new | Paul Haydock, Res. Comm. | 20-Jun-16 | |
| 18 | Building Type Specifics | Transfer building type Green Tips here "new" to an extent | Tom | 29-May-16 | GreenTips moved from Ch 5, but need to review each one and update as appropriate. Deleted the Existing Building GreenTip and moved those thoughts to the new Ch. 19. |
| 19 | Existing Bldgs | New | Kevin Cross/ Frank Mills | 29-May-16 | Verify that the old Green Tip topics are integrated into the chapter. Chapter basically done? |
| 20 | Emerging Trends, Epilogue | New | Mark MacCacken | | Mark MacCracken volunteered to begin an initial start on this that we will then build from. Also suggestion to include mention the "smart technology" additions to buildings beyond what is normally discussed, such as embedding sensors in walls to determine if condensation exists or can exist. |

**TC 2.8 : International Sub-committee
Minutes of Meeting**

Present:

| | |
|------------------|--|
| Ashish Rakheja | Ashish.rakheja@aeonconsultants.in |
| Calina Ferraro | cferraro@randalllamb.com |
| Dunstan Macauley | dlmacauley@gmail.com |
| Walt Vernon | walterve@mazzeti.com |
| Frank Mills | famills@hotmail.co.uk |
| Kevin brown | kevin.brown@abm.com |
| Paul Torcellini | paul.torcellini@nrel.gov |
| Stanton Stafford | sstafford@integralgroup.com |

- 1 Programs organized/ sponsored regularly since inception of this sub-committee.
- 2 Due to its International stature, the sub-committee to look at participating in ASHRAE Specialty Conferences across Globe by evolving a track with following topics:
 - ASHRAE Green Guide
 - Energy Water Nexus
 - Commissioning Practices
 - Standard 189.1
 - Zero Energy Building Approach

Ashish Rakheja, Dunstan and Tom Lawrence to finalize the Track topic.

A letter to be sent to CEC offering the same.
3. Hot Climate Design Guide being written by MTG chaired by Frank Mills. Open Session to be planned at Developing Economies Conference in Delhi to garner ideas/comments on content.
4. Developing Economies Conference coming up in Delhi on November 10 & 11, 2017. The Sub-committee members will be active participant on it.
5. Seminars planned in future on following:
 - Voluntary efforts for Green Rating and Sustainable Practices around the world.
 - Learnings from Past.
 - Engineer's role in designing Sustainable master-planning of projects.
 - Case Studies of Zero Energy Building around the world.
6. Article contributed by sub-committee in past edition of ASHRAE Journal.
 - Sub Committee will target an article on Air Quality & Thermal Comfort perspective in Developing Countries. Asian experts to be identified by Ashish Rakheja. For South America, approach Roberto and Ross Montgomery.
7. The sub-committee provides comments on Green Guide from experts around the world and seek their inputs.
 - Ashish Rakheja to circulate the chapter on IEQ to the experts in Developing Countries and get comments
- 7 Residential focus for TC 2.8
 - Forum/Workshop on Low Energy Residential buildings from the globe
 - Standards for Residential Buildings
 - Case Studies for Low Energy Buildings.
 - Building Envelope materials for Residential Buildings.

APPENDIX C

TC2.8 Research Subcommittee Minutes

January 29, 2017, Caesar's Palace Las Vegas: Pool Level Forum 11
3:30 PM to 4:00 PM

Attendees: Joy Altwies, Kevin Cross, Charles Upshaw, Tania Ullah, Tom Kelly, James Sweeney, Michael Slater, Janice K. Means, Lisa Ng, Michael Deru, Bing Dong, Stanton Stafford, Calina Ferraro, Pawel Wargocki (S2 RAC liaison), Paul Torcellini, Brittany Carl

1. Introductions

2. Update on status of active or recently completed research:

1627-RP An Evaluation of the Actual Energy Performance of Small Office and K-12 School Buildings Designed in Accordance with the 30% ASHRAE *Advanced Energy Design Guide*

- After the St. Louis meeting, MORTS indicated that the contractor needed to complete the final Journal paper requirement to finalize the project.
- Contractor submitted the paper, and committee voted to approve with edits in October 2016.
- Final Disposition of Research form was completed and contractor was paid final payment.
- Research is now complete.

1814-RTAR Actual Energy Performance of Buildings Designed to Comply with ASHRAE Standard 90.1-2010

- After the St. Louis meeting, Kevin Cross developed a new RTAR and the committee voted to approve it for submission to RAC for review by their December 2016 deadline.
- Pawel indicated that this RTAR was accepted with comments, and we will be receiving a formal letter with the detailed comments.
- He noted it's very important that we address each comment in the development of the Work Statement.

3. Info from RAC

- 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**
- Next deadline for submitting items to RAC: May 15th
- RAC has created a training program for PMS Chairs (those leading the Project Monitoring Subcommittees of active research projects.) This training will be available after February 2017.

4. Follow up on previous business and research topic ideas.

- MTG.ASEC – Avoided Source Energy Consumption Due to Waste Heat Recovery and Heat Pump Technologies

Kevin Brown is TC 2.8's representative.

Last known status: Work statement was submitted to RAC in May 2016.

UPDATES: Joy checked on this at RAC breakfast on Monday 1-30. She was unable to get information, as the list of updates provided to TC 2.8 is limited to Section 2 committee research, and this MTG must be under another section. Will attempt to find out more, possibly from section 6.

List of research topic ideas:

| Past Research Topic Idea | Generated by | Update/Status | Next Step |
|---|--|---|--|
| Training Requirements for Sustainable, High Performance Building Operations (TC 7.3, 1650-RP) | TC 7.3, from Michael Bobker | Recent (Jan 2017) correspondence from Davidge Warfield of TC 7.3 regarding participation on PMS | Kevin Brown (and Lisa Ng) volunteered to attend a meeting on Tuesday 1/31/17 |
| 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 | We are keeping this topic on the list with expectation of further development in the future. Kevin will follow up with Tom on whether he has any updates on how many buildings have been built to 189 at this point. |
| Embodied energy of building systems & equipment – how much more efficient does it need to be to outweigh its embodied energy? | Kevin Cross & Dunstan, Jim Sweeney | Dunstan has planned to set up a conference call with Jim to get more details on his similar study in the residential sector. | Dunstan was not present for the discussion, so we are keeping on the list for now. Jim will follow up with him. |
| Comparing high-performance homes to code-built homes | Dunstan | This was posed as a way to provide some research/data in regard to potential rollback/delay of code update cycles (due to pushback from homebuilders on costs.) | Dunstan was not present for the discussion, so we are keeping on the list for now. Dunstan had planned to follow up with Grassroots Government Activity committee at the St. Louis meeting. |
| Geothermal technologies in | Ashish | Discussed need | Keeping on the list for now. |

| | | | |
|--|---------------------|---|---|
| hot climates – international | Rakheja | to change name from geoexchange to geothermal | |
| Grid impacts – can buildings be an energy storage mechanism that shifts efficiency strategy? | Mark MacCracken | This was added at the June 2016 meeting | Mark was not present for discussion, so leaving on the list for now. |
| New Research Topic Idea | Generated by | Update/Status | Next Step |
| Combined Water and Energy Audits – How They’re Different and Establishing Benchmarks | Calina Ferraro | New topic idea generated from Water-Energy Nexus subcommittee | Development of RTAR? |
| Energy Consumption from On-Site Water Systems | Calina Ferraro | New topic idea generated from Water-Energy Nexus subcommittee | Development of RTAR? |
| Water Use Metrics and Patterns in Residential | Bing Dong | New topic idea for co-sponsorship with MTG | Development of RTAR? |
| Net Zero Energy Hospitals | Frank Mills | New topic idea generated at main meeting | REHVA already has a design guide and may have funding available if we can develop an RTAR |

4:05 Adjourn (next meeting in this room: **TC 2.8 Handbook**)

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%20Library/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):

http://ashrae.org/File%20Library/docLib/Public/20100621_strategicnavigationbrochure.pdf

APPENDIX D

ASHRAE Winter Conference – Las Vegas

January 29, 2017

Caesars Palace – Forum 11

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.
2. Areas of focus for the subcommittee:
 - a. How to improve the indoor health of buildings:
 - i. *Dunstan Macauley and Kevin Brown to assist with the effort. We are soliciting a chair for this effort.*
 - b. 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*
3. Embodied Energy
 - a. Jim Sweeney with Texas A&M is currently conducting a research project on Embodied Energy.
4. Large building portfolio (existing building stock/ building archetypes/typology) - Costas Balaras

End of Minutes