

## ASHRAE TC 6.9 – Thermal Storage

### General Meeting Minutes

Monday, January 14, 2019

4:30 – 6:00 PM

Georgia World Congress Center, Building B, Floor 2 - Room B207, Atlanta, GA

#### Attendees

Each person introduced themselves and an attendance sheet was distributed.

Attendees included:

Daniel Pyewell	CM	Secretary/ Webmaster
Chris Mincey	CM	Vice Chair
Richard Brooks	VM	Programs Subcommittee Chair
Guy Frankenfield	VM	
Scott Shaffer	CM	
John Molnar	CM	
Geoff Bares	VM	
Keith Ponitz	G	
Blake Ellis	VM	
Dharam Punwani	CM	
Aaron Tam	G	
Micah Sweeney	PCM	
Dragos Paraschiv	CM	
Mike Filler	CM	
Larry Markel	CM	
Sudhakara Gopireddy	G	
Subhraqit Chakraborty	G	
Ken Fulk	VM	Standards Subcommittee Chair
John Nix	CM	
Farzin Rad	VM	Handbook Subcommittee Chair
John Dunlap	VM	
Amy Van Asselt	CM	
Spencer Dutton	CM	
Henry Becker	CM	
Mark MacCracken	VM	
Paulo Tabares	VM	Research Subcommittee Chair
Michael Deru	CM	
Ryan Lime	CM	
Jason Woods	PCM	
Rebecca Trojanowski	G	
Jon Longtin	G	
Levon Atoyán	G	
Richard Mullen	PCM	
Ivan Thomas	CM	
Philani Hlanze	G	
Diana Hun	G	
Kevin Chou	G	
Steve Rudy	G	
Masoud Khadem	PCM	
Omar Abdelaziz	G	Section 6 Research Liaison
Trent Hunt	VM	
John Lau	VM	Chair

## **Preliminaries**

- Meeting called to order at 4:32 PM by Chairperson, John Lau.
- The TC 6.9 Purpose Statement and Code of Ethics Commitment was read by John Lau.
- The agenda and attendance sheet were circulated.
- Voting Member Roll Call – 10 voting members were present: Mark MacCracken, Farzan Rad, Richard Brooks, Geoff Bares, Blake Ellis, Ken Fulk, Jon Dunlap, Paolo Tabares, Guy Frankenfield, and John Lau. Trent Hunt is not present.
- Based on a total of 10 voting members, a quorum was determined.
- All attendees were given the opportunity to introduce themselves.
- Modifications to the agenda – none

## **Approval of Minutes**

Houston – Summer Meeting 2018. Motion to approve made by Guy Frankenfield and seconded by Geoff Bares. 9 voting members approved with 1 abstain by Blake Ellis (not present in Houston). The minutes were thus approved.

## **Announcements by Chair – John Lau**

Section 6 Breakfast

2018/2019 Awards: Announced George B. Hightower and Service to ASHRAE Research Award recipients.

Subcommittee Chair Training is going on. John encourages those involved in subcommittees to participate.

K.S. Forum proposals due on Feb. 21<sup>st</sup>.

4 seminars were presented at this conference involving Thermal Storage.

One big topic was mentioned – the reorganization of the T.C. structure. Intent is to blow it up and restart with a fresh sheet of paper. Looking for feedback on potential synergies. See long range planning minutes for further details.

## **Liaison Reports**

- Section 6 head Dawen Lu – did not attend. John indicated that he has already conveyed information from the chair breakfast.
- John Nix reported that the Thermal Storage Course was offered for the 3<sup>rd</sup> time. Really good reviews were being received on the course. Mark suggested changing the title to include electric grid and renewables to encourage more participation. The course had at least 20 people today, and appeared to be a younger crowd.
- For Standard 90.1, John Dunlap reported that there was nothing on the agenda that affected us. He mentioned that there have been side discussion on T.C. 6.9 working with renewable energy T.C.s in the future.

## **Handbook – Farzin Rad**

- We are in the 3<sup>rd</sup> year of the 4 year cycle to revise Thermal Storage Chapter 51. The next edition of the Systems and the Equipment Handbook will be published in 2020.
- ASHRAE authoring portal is being used for collaborative work. Portal needs to be worked with MS word, and not the new version (Edge or ver.11). It's still not 100% perfect, as there appears to be security issues that have prevented editing for some members.
- Changes to upcoming editions of Handbook:
  - This edition:
    - Revised the main topics of the chapter to clearly categorize sections as follow: Sensible Thermal Storage, Latent Thermal Storage, and Heat Storage Technology.
    - 1607 Research inclusion – results inserted by Guy Frankenfield - changes have been made in the portal and are ready for review.
  - Upcoming editions:
    - Design guide inclusion
    - Passive thermal storage. John Molnar will provide topics to Farzan Rad and Paulo Tabares for further consideration. Suggestions include precooling and model predictive controls.
    - Heat Storage (Seasonal) – Farzan Rad indicated that the results of this research will not be available for current edition update.
- Assigned reviewers of handbook: Chris Mincey, Brian Silvetti, John Nix, and Daniel Pyewell, to provide comments by March 29<sup>th</sup>. Ken Fulk has agreed to be the Lead Reviewer serving as the focal point on resolution for any comments with ASHRAE.
- Before the next meeting, a vote will be issued to T.C. members by ballot/ email for approval of the updated handbook chapter.

## **Programs – Richard Brooks**

### **Past programs:**

- 2 seminars were conducted in Houston over last summer:
  - Chris Mincey chaired “Thermal Energy Storage at the Small Scale: Technologies and Applications for Residential and Small Commercial Buildings”. Presenters were Paulo Tabares, Stephen Bourne, Sajith Wijesuriya, and Charles Upshaw.
  - Geoff Bares chaired “The Future of Thermal Energy Storage Supporting Resilient District Energy, CHP Systems, and Microgrids”. The seminar was put together with TC 6.2 District Energy and TC 1.0 CHP. The presenters were Doug Reindl, Steve Swinson, and Mark MacCracken.
  - TC 6.9 also co-sponsored 3 other seminars titled:
    - The Future of CHP: Packaged Systems

- Resilience and Microgrids Using District Energy to Survive a Storm: Case Studies in Disaster Preparedness
- The Future of Thermal Cooling to Support Resilient CHP Systems
- A 3 hr. course on Thermal Energy Storage was conducted. Doug Reindl was the instructor for the course.

**Current programs:**

- T.C. 6.9 sponsored Seminars in this conference, including:
  - Seminar #22 on Sunday, January 13<sup>th</sup> at 3:15pm – 4:45 pm entitled “Building Energy Storage: The Future of the Smart Grid” in Program Track “Renewables and Natural Systems”. Chris Mincey chaired the seminar. Speakers included Mark MacCracken, Guy Frankenfield, and Ram Narayanamurthy. Seminar was very well attended, with a headcount of over 300 people.
  - Seminar #4 on Sunday, January 13<sup>th</sup> at 8:00am – 9:00 am entitled “Thermal Energy Storage in the Cold Chain” in Program Track “HVAC&R Fundamentals and Applications”. Eric House chaired the seminar. Speakers included Collin Coker and John Lerch.
  - Seminar #65 on Wednesday, January 16<sup>th</sup> at 8:00am – 9:30 am entitled “The Role of Energy Storage for Buildings Integrated with Renewable Energy Systems” in Program Track “Renewables and Natural Systems”. Paulo Tabares chaired the seminar. Speakers included Karl Heine, Mohammad Hassan Fathollohzadeh, and Marcel Christians.
  - TES Course listed as “Thermal Energy Storage Systems for Air Conditioning” was conducted on Monday morning, January 14<sup>th</sup>. Cost was \$139 for ASHRAE members. Over 20 people were noted in attendance.

**Future programs:**

- T.C. 6.9 is planning the following for upcoming conferences:
  - Kansas City - A presentation on Standard 150 to be placed into Track 4 “Commissioning New & Existing Buildings” with title as per John Nix suggestion of “What it is, how to apply it, and why to apply it.” It was also mentioned that this may be a good way to recruit for the upcoming guideline committee. Suggestion on presenters including: John Nix, Lucas Hyman, John Andrepont, and Chuck Dorgan. Motion to approve submittal was made by Ken Fulk, which was seconded by Farzan Rad. All ten voting member unanimously approved.
  - Additional suggestions were made on comparing batteries with thermal energy, or with coupling wind/ solar (renewables) with thermal energy. Guy suggests that Amy Van Asselt discuss research on renewables and thermal storage, and with how they should operate under different rate structures.
  - Geoff Bares mentioned that T.C. 6.2 will be requesting T.C. 6.9 to co-sponsor (in K.C.) a proposed seminar for Orlando to fit into Track #4, entitled something like “Thermal Storage coupled with District Energy to match grid demands”. T.C. 6.2 has already nominated 2 speakers, and is looking for a 3<sup>rd</sup>. If anyone has suggestions, please follow up with the committee during next meeting.

### **Additional programs/ etc:**

- The History of TES abstract has been accepted. Geoff Bares is the coordinator/ editor in charge of this effort, and will be sharing more information with the T.C. as it becomes available. Participants in the abstract to include Chuck Dorgan, John Andrepont, Larry Markel, Mark MacCracken, and Earl Williams.
- Suggestions for tours at future conferences were provided, and include the following: Chicago - Enwave. Austin - Austin Energy and UT Austin. Phoenix – NRG Thermal for ballpark and inner loop.

### **Standards – Ken Fulk**

#### **SPC-150 update:**

- Update draft went out for public review in early November for 45 days, with no comments. As no comments were received, the update did not have to go to the board for a vote. The updated standard is now in the pipeline to be published soon, and Ken will let us know when this is done and it is in the bookstore.
- Next step is to develop a guideline (separate document) for SPC-150. Stayed tune for additional information on this. Will have to submit title, purpose, and scope to ASHRAE to get approved. Ken is going to find out what form is needed for this. Will take standard, and where mandatory, designate some options for the test (as best practices). If any is interested in getting involved with the guideline, please let Ken know.
- Ken recognized Guy Frankenfield, Geoff Bares, John Nix, Brian Silveti, and Chuck Dorgan, whom have helped tremendously with the SPC-150 update.

#### **Standards update:**

- SPC-94.2 – vote went out in email to close. Mike Fuller checked, and it appears to be done. It is still available to purchase, so is not completely dead. Mike will send out letter ballot to members to reply to comment to withdraw.
- ANSI AHRI 900 – replacement for 94 series. Ken may eventually be asking for help on reviewing this update.
- ASME TES-2-200X – Ken spoke with ASME, and got the impression that they have bigger fish to fry, so there is nothing for us to do at this time.
- SPC-150 Guideline Committee - Ken to send out an email to ask if there are any volunteers. Guy Frankenfield would like to serve on this committee but prefers not to be chair.

### **Research –Paulo Cesar Tabares Velasco**

#### Status Update:

- Omar Abdelaziz – Section 6 Research Liaison attended the meeting, and advised that 1716 RTAR is completed, and the appropriate form need form just needs to be filled out. Paulo will follow up with this (email and contact info on roster).

- John Harrigash (**confirm name**) mentioned an effort into bio-mass heat plant explanation, to be combined with a consideration for renewable heat/ renewable cooling. From what he explained, the intent is for evaluating older buildings, with replacing older roof top equipment with some form of heat exchanger, for either hot or cold water. He is putting this in front of a total of 5 T.C.s., and plans on getting something in writing and will provide us more information on this effort.

1716 Design Guideline was successfully finished by Jason Glazier, and the T.C. is happy with final product. The guideline was approved 11-0 by T.C. 6.9 voting members on December 6<sup>th</sup>. Paulo has to complete one more form to close out the project (as previously noted by Omar). The form is different as Paulo noted, that instead of an RTAR, it is a PTAR form for procedure/ guideline instead of using one for research.

- Paulo mentioned that of 17 research proposals submitted to ASHRAE, only 4 passed.
- RTAR-1762 – Design Guide for CTIC Systems – committee members are still needing to review, and the committee is looking to grant a no-cost extension until June. Geoff Bares made a motion to grant a no-cost extension, which was seconded by Guy Frankenfield. All 10 T.C. voting members approved 6 month no-cost extension unanimously.
- For new ideas, the following were suggested:
  - Amy Van Asselt to conduct further research into model predictive control with rate structures. It was suggested that any testing along with the research would be ideal to do and to write a paper about. If any interest in this, please contact and work with Paulo.
  - Hot water storage and PCM based systems with using Solar (P.V.) thermal heat to drive PCM thermal storage, particularly wall mounted units. Additional suggestion was made to develop control schemes for Hot Water/ PCM thermal storage. If any interest in this, please contact and work with Paulo.
  - Additional suggestions include TES benefit to energy code compliance.

### **Long Range Planning/Website – John Lau/Daniel Pyewell**

- John noted that the T.C. roster is visible on the website, and is being kept up-to-date.
- Daniel has been keeping our website up-to-date.
- Guy Frankenfield mentioned that he has been collecting articles comparing TES to batteries. He mentioned that he can send out a pdf of the articles he has.
- John mentioned the big topic from the chair breakfast on restructuring the T.C.s. Evidently, a survey of T.C.s was taken which found a lot of problems. The current count is over 110 T.C.s and the goal is to reorganize this down to about 31 T.C.s, and ASHRAE is requesting that the T.C.s come up with ideas of how to organize. ASHRAE indicated that they want to do this in the next 2 months (60 days). Suggested synergies with other T.C.s include 6.2 District Energy, 1.10 CHP (CTIC), and 1.9 Electrical Systems. (Utilities and Rates).

The intent conveyed by ASHRAE is that they are looking to have fewer meeting rooms reserved, and have each T.C. composed of roughly 75 – 125 members.

John will be sending out a form for feedback to all T.C. members. Feedback will go back to John (due in 60 days), whom will compile a feedback response on behalf of the entire T.C.

Some of the feedback requested includes:

- Input on potential synergies.
- If functional group were to reform with one or two other groups – which other T.C.s? Which ones align with current scope?
- I'm excited about?
- I would like to propose?
- I think we will have difficulty with?
- Any other comments?

John requests simple responses, nothing too complicated.

#### **Honors and Awards – Blake Ellis**

- Dharam Punwani – is now awarded and recognized as an ASHRAE fellow.
- There are 5 award nominations due on May 1<sup>st</sup> including distinguished service and exceptional service award which can be self-nominated.
- Blake encourages members to go see how many points they have in order to obtain awards.

#### **Old Business**

None.

#### **New Business**

- Voting Members – rolling off – John Lau, Ken Fulk, and Blake Ellis
- Rolling on Daniel Pyewell, John Nix, and Henry Becker. John suggests if anyone else wants to be a voting member, to follow up with him.

#### **Adjourn**

- Motion by Geoff Bares to adjourn, seconded by John Dunlap, and unanimously approved. Meeting adjourned at 5:39 p.m.