



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 6.9 DATE February 8, 2017

TC/TG/MTG/TRG TITLE Thermal Storage

DATE OF MEETING Monday, January 30, 2017 LOCATION Las Vegas, NV

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Geoff Bares	2015	Mark MacCracken	2013	Brian Silveti - CM
John Lau	2013	Jeff Kane	2014	John Andrepont - CM
Henry Becker	2013			Clarke Story - CM
Chris Mincey	2014			Ryan Lime - CM
Blake Ellis	2015			Ivan Thomas - CM
Ken Fulk	2015			Michael Deru - CM
John Dunlap	2016			John Nix - CM
Dr. Paulo Cesar Tabares	2016			Farzin Rad - CM
Guy Frankenfield	2016			Zidu Ma - CM
				Ayyoub M. Momen - CM
				Houjun Yang - CM
				Verle Williams - CM
				Charles Upshaw - CM
				Trent Hunt - CM
				Keith Ponitz - CM
				Mike Filler - CM
				Scott Shaffer - CM
				Cameron Wise - CM
				Doug Reindl - CM
				Richard Brooks - CM
				Amy Van Asselt - G
				Kris Jorgensen - G
				Michael Christians - G
				Abel Alonso - G
				Dennis Nasuta - G
				Daniel Pyewell - G
				Dolaana Khovalyg - G
				Mikelann Scerbo - G

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

TAC Section Head: Mark Hegberg	SH6@ashrae.net
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	Lynn Werman - Handbook Liaison Dr. Harvey Sachs – Research Liaison Cyrus Nasserri – Standards Liaison
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

**ASHRAE TC 6.9 – Thermal Storage - General Meeting Minutes**  
**Monday, January 30, 2017**  
**4:30 – 6:00 PM**  
**Forum 12, Caesar’s Palace**  
**Las Vegas, NV**

**1. Preliminaries**

- a. The meeting was called to order at 4:30 PM by Geoff Bares, Chair.
- b. The Purpose Statement is posted on the TC 6.9 webpage and was read aloud by the Chair.
- c. Everyone in attendance (including guests) was given the opportunity to introduce themselves.
- d. Roll call was taken and 8 of the 11 voting members were present including the Chair. The Chair clarified for Paulo Tabares that Paulo had become a voting member as of July 1, 2016. Quorum was established.
- e. No modifications to the agenda were suggested.

**2. Approval of Minutes**

- a. Blake Ellis made a motion to approve the St. Louis Summer Meeting 2016 minutes. Henry Becker seconded the motion. The motion was approved unanimously by a vote of 7-0-0-CNV.
- b. John Dunlap joined the meeting after the vote was called. From this point in the meeting forward, 9 of the 11 voting members were present.

**3. Announcements by Chair – Geoff Bares**

- a. The Chair reported on the Section 6 Breakfast Meeting.
  - The ASHRAE Journal is soliciting articles.
  - ASHRAE Insights is also soliciting articles regarding effective local chapter programs.
  - ASHRAE technical reports are now available free to members at: <https://technologyportal.ashrae.org/>.
  - At the breakfast, the Conferences and Expositions Committee (CEC) liaison reported several items:
    - Conference papers have an acceptance rate of 90% whereas all other types of programs have an acceptance rate of less than 50%. Therefore, it may be beneficial to pursue submissions of conference papers as a committee.
    - Technical committees still have the option to present programs within their meeting timeslot.
    - The CEC liaison emphasized that conference presentations must be submitted on time. There is a three-strike rule for not uploading presentations on time.
  - There is an Advanced Energy Design Guide for K-12 School Buildings: 30% Energy Savings that will be available for review. The guide will be out for review from February 6 through February 17, 2017. Comments are due February 19, 2017. The guide can be found at [ashrae.org/freedaedg](http://ashrae.org/freedaedg).
    - Members noted that because the guide provides recommendations for achieving zero energy consumption, then it is worth it for members of the committee to review the guide and submit comments because thermal storage is an effective way to balance loads.
  - Remote participation is encouraged but it is not available for all technical committees, including this meeting. There will be more availability for remote participation in Long Beach, CA, so hopefully remote participation will be available for TC 6.9 by the Summer Meeting.

**4. Liaison Reports**

- a. Section 6 TC Section Head – Mark Hegberg
  - Mark Hegberg was not present.
- b. Professional Development Committee (PDC) – John Nix
  - John Nix joined the meeting during a later agenda item. TC 6.9 circled back to this item when he arrived. John Nix is the liaison and the past Chair of the PDC.

- TC 6.9 submitted a renewed thermal energy storage (TES) four-hour seminar for review by the PDC.
  - The new version includes information on using TES with renewable energy.
  - Doug Reindl is the presenter for the course and three additional members of TC 6.9 were added to support the course.
  - The PDC is looking for a sponsor for this course. John Nix will provide the sponsor information they need to move the application process forward.
  - The goal is for the PDC to review the course by the Long Beach, CA Summer Meeting so that the course can be scheduled for the Chicago, IL Winter 2018 Meeting.
- c. ASME PTC 53 – John Lau
  - ASME PTC 53 was established two years ago with the goal of establishing a performance procedure or code for TES. Since then, the PTC found that the HVAC industry already has its own codes. Therefore, the PTC is not currently focused on HVAC-related codes.
  - The PTC found that the IEEE establishes its own codes for battery storage, so the PTC has recently been focusing on fly-wheels and air-compression storage.
  - Frederick Constantino is no longer leading the PTC. The new lead is Ted Lazar.
  - Members discussed whether TC 6.9 should continue to maintain a liaison for the PTC. Members reached consensus that TC 6.9 should continue to have a liaison to monitor the progress of the PTC in case they begin discussing something relevant to the HVAC industry. In the meantime, TC 6.9 shares its minutes with ASME PTC 53, and vice versa.
- d. MTG.ASEC (Avoided Source Energy Consumption) – Guy Frankenfield
  - The Work Statement (WS) titled “Avoided Source Energy Consumption Due to Waste Heat Recovery and Heat Pump Technologies” was revised and resubmitted in December 2016. The MTG is waiting to hear back from the Research Administration Committee (RAC).

## 5. Handbook – Farzin Rad

- a. The 2016 HVAC Systems & Equipment Handbook revision was completed last year.
- b. The subcommittee collected suggestions for the 2020 edition. The suggestions include:
  - Information from RP-1607 – Design and Utilization of TES to Increase the Ability of Power Systems to Support Renewable Energy Resources
  - Rearrange the structure of Chapter 51
  - Incorporate updates to reflect content from the revised Design Guide For Cool Thermal Storage (if available in time)
  - Use the ASHRAE portal to simplify the revision process
- c. The subcommittee is seeking volunteers to help with the revision.
- d. Members discussed the plan to set goals throughout the revision.
 

**Action: Farzin Rad will determine the due dates for revision and distribute the dates to the subcommittee.**

**Action: At the next meeting, members will bring suggestions for issues to tackle in the Handbook. The subcommittee will assign people to tasks with the due dates for submission of the revision in mind.**

## 6. Programs – Chris Mincey

- a. Review Past Program (St. Louis – Summer 2016)
  - TC 6.9 partnered with TCs 8.3, 6.2, and 9.8 to cosponsor a seminar titled “Heat and Cooling with Woody Biomass for Sustainable and Resilient Buildings and Communities”.
- b. Review Current Program (Las Vegas – Winter 2017)
  - No programs took place at this meeting.
  - TC 6.9 approved TES 101 but the proposal was not accepted.
  - TC 6.9 approved cosponsoring a seminar titled “Enhancing Resiliency in Critical Applications” with TC 6.2, District Energy but TC 6.2 was unable to solicit enough volunteers.
  -
- c. Discuss Future Programs (Long Beach – Summer 2017)

- A conference paper for RP-1607 is accepted. CEC is making comments on the paper. Amy Van Asselt from the University of Wisconsin will distribute the conference paper to the rest of TC 6.9. She is required to submit a technical paper when the conference paper is complete.
- Members discussed several possible ideas:
  - A hot water TES project regarding case studies in St. Paul or in Stanford
  - Presentation on the new Handbook including sizing TES systems
  - Thermal storage versus electrical storage
    - Microgrids often only consider the electric battery rather than also considering thermal storage. Yet batteries cost an order of magnitude more than thermal storage. States and utilities could be missing out on significant energy and cost savings.
    - This idea could be coupled with findings from RP-1607.
    - A recommendation was made to invite a battery company representative to this kind of presentation.
    - This presentation would be helpful to clarify misinformation about all of the costs of electric batteries versus thermal storage.
- d. Discuss Future Programs (Chicago – Winter 2018)
  - Farzin Rad volunteered to present a seminar and submit a conference paper on ground hot water thermal storage. Geoff Bares volunteered to Chair this program. Chris Mincey motioned for TC 6.9 to submit a seminar and conference paper on ground hot water thermal storage. The motion was seconded by John Dunlap and approved unanimously by a vote of 8-0-0-CNV.
  - Henry Becker also volunteered to submit a conference paper on chemical treatment for chilled water systems with Thermal Storage.
  - Abstracts for conference papers are due to CEC by March 1, 2017.
  - Seminar applications are due August 1, 2017.
  - Members discussed a few possible ideas:
    - Enwave Chicago or McCormick place for their TES systems
    - Presentation on seasonal thermal storage
- e. Discuss Future Programs (Houston – Summer 2018)
  - There will be a cogeneration track. Geoff Bares recommended creating a paper relating TES to cogeneration.

## **7. Standards – Ken Fulk**

- a. Status Update:
  - SPC 150
    - The subcommittee discussed the possibility of creating a guideline for Standard 150 that would allow more flexibility for how the testing can be completed.
    - The goal is for the standard to be submitted for TC approval by the Summer Meeting. The document will proceed to public review after this.
    - Conference calls will be planned about once per month.
    - The subcommittee is over halfway complete with revising the standard.
  - Standard 100
    - In the past, there was concern that Standard 100 was penalizing district cooling systems unfairly, and cogeneration in particular. However, the Standard 100 committee has incorporated an addition to the annex that should help address this concern. The committee was unable to discuss the addition presently because Standard 100 is in the middle of public review. The subject will be revisited by the Standard 100 committee after public review.
    - Currently, Rich Sweetser from Exergy Partners is the contact for Standard 100. There is no liaison presently from TC 6.9.
  - The paperwork to complete the withdrawal of Standard 94.2, Method of Testing Thermal Storage Devices with Electrical Input and Thermal Output Based on Thermal Performance, is in progress.

## **8. Research – Brian Silvetti**

- a. Status Update:

- RP-1607 – Utilization of TES / Renewable Energy Resources
  - Amy Van Asselt, the research lead from the University of Wisconsin who is advised by Doug Reindl, presented a status update on this project. The update was delivered in a Powerpoint presentation via email to members of TC 6.9
  - Some clarifications and questions raised after the presentation include:
    - Amy clarified that the solar and wind profiles were analyzed separately.
    - The report includes an overview of the assumptions and logic used throughout the analysis.
    - Conclusions reached thus far:
      - As expected, cooling thermal storage allows the system to use a greater fraction of the renewable energy produced. When the correct controls strategy is in place, thermal storage can allow the chiller to use significantly more renewable energy.
      - Because thermal storage can enable utilities to use more available renewable energy that would otherwise go unused, these findings can help influence policy decisions to incentivize thermal storage use.
  - This project is still in-progress. The report is expected to be finalized by the 2017 Summer Meeting. Once the report is available, TC 6.9 will need to determine how to spread the word as widely as possible to share the report with the rest of ASHRAE and beyond.
- RTAR-1762 – Design Guide for CTIC Systems – Co-Sponsoring
  - This project received conditional approval with minor comments from RAC. Comments are being addressed with the research liaison and the project should go out for bid this spring.

## **9. Long Range Planning/Website – Geoff Bares**

- Geoff Bares reported that for long range planning, the committee should be thinking about distributing the terms of voting members on the committee to avoid mass departures in any given year.
- Members are encouraged to share articles that they have written or that others have written related to TES that could be shared on the TC 6.9 website in order to increase the amount of technical content on the website.

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

- a. The following TC 6.9 members received the award of Fellow at this conference:
  - John Dunlap, Voting Member
  - Phillip Trafton, Corresponding Member
 The Fellow nomination deadline is December 1.
- b. Blake reminded the committee that an updated ASHRAE bio is important as it is reviewed with any award submission.
- c. The Hightower Award is given to people for service over the last four years on technical activities.
  - TC chair and members of TAC & Tech Council are not eligible.
  - TC chair submits the form to the TC section head on September 1.
- d. The following awards have deadlines on May 1:
  - Louise and Bill Holladay Distinguished Fellow Award
  - Andrew T. Boggs Service Award (given to someone who has already achieved the Exceptional Service Award)
  - Exceptional Service Award (self nominating)
  - Distinguished Service Award (self nominating)

## **11. Old Business**

- a. Members discussed that although ASHRAE is encouraging subcommittee meetings to be held over teleconference, TC 6.9 finds great value in holding in-person subcommittee

meetings. In the past, the subcommittee meetings were even longer. Therefore, the subcommittee meeting times have been cut down already and the in-person meetings generate lots of progress. TC 6.9 will continue to hold in-person subcommittee meetings.

## 12. New Business

- a. Members noted that the ASHRAE Summer 2017 Meeting is scheduled for June 24-28, 2017 and it directly conflicts with the International District Energy Association meeting scheduled from June 26-29, 2017. The conflicting conference may impact quorum.
  - Chris Mincey cannot attend the ASHRAE Summer Meeting due to the conflict.
- b. Geoff Bares announced the new roster and he will submit the new roster to ASHRAE. There was a recent resignation from TC 6.9, so Geoff Bares will submit an emergency roster change in order to ensure quorum is not affected for the Summer 2017 Meeting. The current and future rosters and each member's roles are as follows:

<b>Current Voting Members as of Winter Meeting 2017</b>	<b>Roll Off Date</b>	<b>Role</b>
Henry Becker	6/30/17	
Mark MacCracken	6/30/17	
John Lau	6/30/17	
Jeff Kane	6/30/17	
Chris Mincey	6/30/18	Programs
Geoff Bares	6/30/19	Chair
Blake Ellis	6/30/19	
Ken Fulk	6/30/19	Standards
John Dunlap	6/30/20	Vice Chair
Dr. Paulo Cesar Tabares Tabares	6/30/20	
Guy Frankenfield	6/30/20	

<b>Future Voting Members as of 6/30/17</b>	<b>Role</b>
Brian Silvetti	
Farzin Rad	Handbook
Trent Hunt	
Chris Mincey	Vice Chair
Geoff Bares	
Blake Ellis	
Ken Fulk	Standards
John Dunlap	Chair
Dr. Paulo Cesar Tabares Tabares	Research
Guy Frankenfield	

- There will be an opening for Programs Chair as of the end of the Summer 2017 Meeting. Members are encouraged to volunteer for Programs Chair.
- Dan Pyewell will take on the role of webmaster.

## 13. Executive Session

- a. TRP-1719 – Design Guide for Cool Thermal Storage – Revision
  - For Executive Session, only members of TC 6.9 remained with the exception of John Dunlap since he was involved in one of the bids for the research project.

- Brian Silvetti presented the information reviewed by the Project Evaluation Subcommittee. He reminded the group that the recommended contractor must be kept confidential until approved by the RAC.
- Four proposals were received for this research project. One bid lacked information in their proposal and was not particularly responsive. The other three bids were quite impressive. The score is based on five factors:
  - Level of understanding of TES applications including with renewable energy
  - Coherence and logical organization
  - Capability to develop the project
  - Past research experience
  - Ability to meet completion date
- The timeframe expected to complete the research project is about one year.
- A motion was made by Blake Ellis to endorse the PES's recommended bidder to complete TRP-1719. Ken Fulk seconded the motion. The motion was approved unanimously by a vote of 7-0-0-CNV.
- Members suggested that as a courtesy, Brian Silvetti reach out to the other two impressive proposals that were not successful in achieving the bid to thank them for their work.

#### **14. Adjourn**

- a. Paulo Tabares made a motion to adjourn the meeting. Ken Fulk seconded the motion. The meeting was adjourned at 6:09 PM.