

ASHRAE TC 6.9 – Thermal Storage
Main Committee Meeting Minutes
Monday, February 10, 2025
4:00 PM – 6:00 PM EDT
Orlando FL

Attendees

In person:

1. Hassan Al Younes, GRFN Global
2. Tim Anderson, Applied Engineering
3. Andreas Antzoulatos, NOES.A.
4. Tom Armstrong, Rebound
5. John Aykroyd, Chem-Aqua
6. Sandra Boetcher, ERAU
7. Mukund Bhaskar, Trane
8. Erin Blackley, CSM
9. David Boone, Rebound
10. Richard Brooks, Florida Power and Light
11. Jesse Buckley, Shift Thermal
12. Jason Cavannaugh, Armstrong World Industries
13. Min Che, Trane
14. Petros Dalavouras, NTUA
15. Mike Dallon, Calvin Eng.
16. Jason DeGraw, ORNL
17. Scott Delo, Trane
18. Vaughn Engler, Michaels Energy
19. Aaron Farha, Purdue
20. Mike Filler, Trane
21. Kate Fisher, Sunamp Ltd
22. Gabriel Flechas CSM
23. Russell Goldfarbaumen, Rebound
24. Tod A Green, Crom
25. Quin Guy, CSM
26. Sarp Hamancioglu, AHRI
27. Steve Harrison QSBR Innovations
28. Rick Heiden, Trane
29. Michale Huylo, UT Austin
30. Emishaw Iffa, ORNL
31. Rich Kooy, GTI Energy
32. Navin Kumar, ORNL
33. Ian LaHiff, USGBC
34. Matthew Lea, KCC Manufacturing
35. Lingnan Lin, UMD
36. Bruce Lindsay, Trane
37. Thomas Manser, NRCAN
38. Pounia Moghimi, Oklahoma State University
39. Deba Maitra, Trane
40. Karlyle Munz, CSM
41. Stan Nabozny, Michaels Energy

42. Eric Nelson, Michaels Energy
43. John Nix, JNix Consulting
44. George Orlanos, NTUA
45. Daniel Pyewell, Tanco Engineering
46. Farzin Rad
47. Albert Rooks, Small Planet Supply
48. Zhenglai Shen, ORNL
49. Som Shrestha, ORNL
50. Ben Simon, Willdan
51. Tom Sottile, Sunamp
52. Paulo Tabares, CSM
53. James Tancabel UMD
54. Ivan Thomas, P2S
55. Reuben Trane, Trane
56. Casey Troxler, ERAU
57. Scott Welo
58. Jared Williams, ERAU
59. Jason Woods, NREL
60. Alexander Zhivor

Attendees online:

61. John Andrepont
62. Hooman Arjmand
63. Geoff Bares
64. Henry Becker
65. Kaushik Biswas
66. Chuck Booten
67. Steve Bourne
68. Stavros Datseris
69. William Davies
70. Parveen Dhillon
71. Reda Djebbar
72. Chuck Dorgan
73. Brent Eubanks
74. Kristen Fletcher
75. Jim MacDonald
76. Larry Markel
77. Chee Ow
78. Abi Ravi
79. Doug Reindl
80. Bill Ryan
81. Behnam Sadri
82. Kanan Sarath
83. Kedar Shete
84. Chang Shu
85. Lingshi Wang
86. Hayes Zirnhelt

Preliminaries

- i. Meeting called to order at 4:02PM by Chair Daniel Pyewell
- ii. Reading of TPS and Ethics statement

- iii. Introductions around the room

Establishment of Quorum

Voting members present (of):

- Daniel Pyewell
- Chuck Booten (online)
- Emishaw Iffa
- Mike Filler
- Hooman Arjmand
- Amy Van Asselt
- Geoff Bares

Voting members not present

1. John Dunlap

A quorum is established with 7 out of 8 voting members present.

Name	Voting Status	Committee Position
Amy Van Asselt	Voting	Member
Charles Booten	Voting	Member
Daniel Pyewell	Voting	Chair/webmaster
Emishaw Iffa	Voting	Vice Chair
Geoffrey Bares	Voting	Member
Hooman Arjmand	Voting	Member
John Dunlap	Voting	Standards Subcommittee Chair
John Filler	Voting	Member

Approval of prior \minutes.

- Minutes were approved by unanimous vote

Daniel updates from chair's breakfast

- New TAC initiative underway to have a mentorship program for YEA members to get involved in TCs
- Center of Excellence for Building Decarbonization, led by Blake Ellis, started July 1st of last year. Includes new Certified Decarbonization Professional Certification, which Bruce Lindsay successfully obtained last summer
- Government affairs reported that there are current threats to building decarbonization and climate change initiatives due to new administration. The message is that current focus/ emphasis is affordability.

- GTIC is working to be an information flow channel to ISO standards internationally
- Technical Papers are being considered to be eliminated. Alternate avenues include conference papers, science & technical journal, and journal papers

Section 6 Head – Doug Reindl

Might spend time in annual meeting on how the TC scope aligns with the 2025-2028 strategic plan.

Training and education Liaison report – John Nix

We'll have an online course on TES scheduled for April 9.

90.1 Liaison report – Amy Van Asselt

In energy credits for 2025 version, it's currently up for a vote on whether both cool and hot storage will be included. Should be up for public comment between March and May.

TES working group of mechanical subcommittee of 90.1

Update on IDEA – International District Energy Agency – John Andrepont

- IDEA has about 3000 members
- Two major conferences in North America each year. One focused on campus, the other on commercial buildings.

USGBC LEED v5 – Ian LaHiff

- The last major update was around 10 years ago
- Adding new credits that have a lot to do with TES. Reducing peak, also grid interactive buildings are being added.
- v5 is likely to be released in late April

Liaison 10.1 and 10.2 – Stan Nabozny

- No updates.

Standards – John Dunlap (handled by Daniel today)

- [time: 4:31]
- SPC 150-2000
 - a. Work is completed.
- SPC 233P
 - a. Committee met yesterday and had a deep discussion on measurement methods for PCMs
- ASME TES-1 & 2
 - a. Second edition of TES-1 was published in Dec 2023.

- b. Committee meets quarterly.
 - c. Next edition is scheduled for 2026
 - d. TES-2 committee is a subordinate committee that reports to the TES Standards Committee, and is working on developing a second standard in the TES series for phase change TES systems. They are starting to meet every other month.
- AHRI 900-2014 – no change since reaffirmed 2020. AHRI looking for members.
 - a. New interest to reinstate these
- ASHRAE 94.x
 - a. John Andrepont notes that in years past, the committee had trouble making 94.2 work (sensible storage).
 - b. Brent notes that it wasn't possible to simply reinstate, it would have been required to start over.
- ANSI/CSA TC 440 (Reda)
 - a. New committee formed. Would like to refer to 94.x series. Latest update from ASHRAE Standards is that they can be referred to without being reinstated.
- TAC looking to evaluate whether guides should be updated
 - a. Cold air system design guide
 - i. Bruce notes that cold air distribution (around 39°F instead of typical high 40s F) is well-suited to ice storage. Bruce volunteers to be chair.

Publications – Alexander Zhivov

Recently published document covers 4 types of large scale storage.

Programs – Bruce Lindsay

- 4:49
- IRA had 30-50% tax credit for TES.
- Previously tax exempt orgs couldn't take advantage, now they can.
- We were among the top rated sessions in several ASHRAE conferences.
- For Orlando, we submitted 3 and 2 were accepted
- Very successful record of programs from last few meetings:
 - a. Orlando, Winter 2025
 - i. 2 seminars on TES
 - b. Indianapolis S24
 - i. 1 Forum
 - ii. 2 Seminars
 - c. Chicago W24
 - i. 3 sessions on TES
 - ii. Had the most attended session in Chicago
 - iii. Tour of Centrio plant
 - d. Tampa S23
 - i. 3 sessions on TES
 - ii. Session attendance was not ranked in Tampa
 - e. Atlanta W23
 - i. 7 sessions on TES
 - ii. Had the three most-attended sessions in Atlanta
- Due date is Feb 28 to submit seminars for Phoenix.
 - a. Stor4Build – Chuck Booten, Spencer Dutton, Jason DeGraw

- b. Refrigerated warehouses – ORNL, NREL, Michaels
 - c. TES for data centers
- For Las Vegas. Water authority has banned wet cooling towers – a great opportunity for TES.
- Article on history of TES – 12,000 words – Hall of Fame was a sidebar in the article – it was last done in 2018. Planning to take another pass for Phoenix. Open for anyone to take the lead.
 - a. John recommends sending a copy of

Honors and Awards – notes from Bruce

- Two longstanding members of TC 6.9 were recognized as ASHRAE Fellows:
 - a. John Andrepont
 - b. Mark MacCracken
- E.K. Campbell award for an outstanding HVAC instructor: Sandra Boetcher ERAU

Handbook – Navin

- [time 5:05 PM]
- July 21, 2027 is the due date to submit handbook chapter to Handbook Committee
- Need to establish a handbook review committee by this summer
- Need to revise by Feb 1, 2026. Finish by July 1, 2026.
- Navin has received edits from 3 different organizations
- All edits should be made in the ASHRAE Authoring Portal
- Handbook review committee needs to be established by a vote of the TC 6.9

Research – Jason Woods

- [time: 5:10 PM]
- Currently no active research projects
- Currently there is ample funding with ASHRAE for research
- 1st step is to submit an RTAR (can be submitted March, May, Aug, Sept). 2nd is WS work statement. 3rd is funding and monitoring the work.
- Previously Mike Filler was considering a possible RTAR on a procedure to calculate emissions savings for TES. At this time, thinking we don't need a Research project for it.
 - a. Might consider a PTAR
- Out of SPC233, an RTAR could be developed to test out the methods proposed in SPC233
- There was an RTAR that has been changed by TC6.8, so it would require re-voting to submit it, "evaluation of GSHP with diurnal TES"
- Steve: CSA evaluated gaps in standards related to TES
- Can hold an email vote once there is a work statement
- Stan: a research project to be aware of: refrigeration TC, has a project related to supermarkets, RTAR was submitted, working on SOW.

Long Range Planning / Website

- Stan Nabozny has volunteered to become Webmaster. Post meeting, he has additionally accepted the position as Secretary, to take effect after this summer's meeting.
- We've added 26 new PCMs since the last meeting
- VMs: we have 4 VMs rolling off after summer meeting.
 - a. Volunteers to become VM: Sandra Boetcher, Ivan Thomas, Farzin Rad, Jason Woods, and Stan Nabozny (post meeting)
 - b. John notes that having 8 VMs requires a quorum of 5, and having 9 VMS also requires a quorum of 5.
- Stan and Daniel: potential for collaboration between TC 6.9 and ASME industrial TES committee

Honors and Awards – Blake Ellis

- Fellows from this TC: John Andrepont, Mark MacCracken, Trent Hunt, Kevin Mercer
- Campbell award: Sandra Boetcher
- Reminder that an updated ASHRAE bio is essential
- Hightower award – given for last 4 years of TC activity, due by Sept 1. Form is submitted by TC chair.
- Most other awards are due one of the two dates:
 - o **May 1** due date for some awards, including DSA and ESA, Hall of Fame (posthumous), Distinguished Public Service
 - o **Dec 1** due date for some awards, including DSA, ESA, Bogg award, Fellow nominations

Old business

- No new update on Energy Plus. Jason DeGraw can give update in Phoenix.
- Standalone publication about IRA – will plan to wait to see how tax interpretations settle with the new administration
- Brief status update about Stor4Build energy storage consortium: annual meeting was held at ORNL in August, 2024. A 2025 meeting is being planned for late 2025 at LBNL. Date TBA.
- 48E tax credits: Mike Filler: IRA had huge implications. Now part of ITC investment tax credit. the clean electricity investment tax credit 48(e) is calculated the same way, base rate of 6%, bonus that can get up to 50 or 60%. Final Guidance document came out last month. It's available at least through 2032. It could be available shorter than that if there is an act of congress to change things. The guidance document is 428 pages, most of which is commentary. The most relevant parts are near the end, last 10% of the pages. There was guidance issued Dec 12, as well as in January.
- Bruce reached out to CEDB – planning Building Decarbonization Conference October 20-22, proposed abstract for panels and seminars are due Feb 14.
- Bruce: one of the highest attended seminars was DOE national lab researchers, would like to do one with international scope
- Stan: utilities are concerned about load growth AEP – Association of Energy Professionals – utilities across north America. Stand and gave standing room only presentation, 2nd highest attended at the conference, they later recorded it for their library. Utilities are not familiar with ice storage – the more comfortable they become with our technology, the better. March conference in Phoenix coming up.
- Stan: PLMA 54,000 members, doing a lot in residential, some in commercial, not a lot in TES. There represents opportunity for this committee to present.

New business

- TAC asked about proposed EU-US batteries project. It includes industrial process storage. Daniel is seeking more clarification from TAC.
- Mike moved and Geoff seconded to continue as a TC. Unanimous vote.
- Som notes that only 1/3 of programs were accepted
- Ben notes that utilities are using backup generators in a lot of facilities, which could be an opportunity for incentive programs for TES.
- Stan: TES can shift more duration than the typical 4 hour Li-ion batteries being used by utilities
- Stan: Bloomberg NEF published a study of all BTM long duration batteries in March of last year. TES was ranked the lowest cost, compared against batteries, CAES, etc. It was their inaugural study, and they will do it again this March.

Meeting adjourned at 5:57 PM