

Technical Committee Meeting Minutes
Technical Committee, TC 6.4 Combined Heat & Power Systems
Tuesday, February 11, 2024: 2:30 PM - 4:00 PM EDT

Location: Hilton Orlando, Room: Lake Louise A (Lobby Level)
Meeting Format: Hybrid

Chairs and Voting Members:

Position	Term	Name	Voting Status	Present
Chair	06/30/2026	Michael Calabrese	VM	Yes
Vice Chair	06/30/2026	Praveen Cheekatamarla	Non-VM	No
Secretary	06/30/2026	Kathryn Hinkelman	Non-VM	Yes
Program Subcommittee Chair	06/30/2024	Gearoid Foley	Non-VM	Yes
Handbook Subcommittee Chair	06/30/2026	Alok Kumar	VM	Yes
Standards Subcommittee Chair	06/30/2026	Dragos Paraschiv	VM	Yes
Research Subcommittee Chair	06/30/2025	Farzin M Rad	VM	Yes
Membership Subcommittee Chair	6/30/2026	Geoffrey Bares	Non-VM	Yes
Webmaster	6/30/2026	Joel Deddens	VM	Yes
Member	06/30/2027	Zhiming Gao	VM	Yes
Member	06/30/2026	Vikas Patnaik	VM	Yes
Member	06/30/2026	William A Ryan	VM	Yes

Guest Attendees: Complete attendance list in Appendix A.

Position	Name	Present
Member/DOE Liaison	Mahabir Bhandari	Yes
Track 6/Government Liaison	Patrick Kelly	Yes
	Doug Reindl	Yes
TC 8.3 Liaison	William A Ryan	Yes

MINUTES

1. The Chair (Michael Calabrese) Called to Order at 2:30 pm
2. Introductions – TC Chair (Michael Calabrese) hosted the virtual and in-person meeting
 - a. Name, organization, and positions on committee. Roll call.
 - b. Quorum has been established with 7 voting members present.
3. The secretary (Kathryn Hinkelman) discussed the Purpose Statement
TC 6.4 is concerned with combined heat and power (CHP) systems, their cycles and components including heat recovery, combustion turbine inlet cooling (CTIC), energy conversion and system integration. The systems provide both electrical/mechanical power and cooling/heating thermal energy and are also known as cogeneration systems; trigeneration systems; and combined cooling heating and power systems.
4. Meeting Minutes from the 2024 (Indianapolis) Summer Meeting
 - a. Copies of the draft minutes of the Indianapolis meeting were distributed to the members.
 - b. Dragos Paraschiv requested note 8.c.ii (re: Chapter 8 revisions per design guide) be removed from the minutes. This was from a previous meeting and is complete.
 - c. Official minutes will be posted with this comment.
 - d. A motion to approve the meeting minutes of the 2024 Summer Meeting.
 - e. **MOTION** by Farzan Rad, second by Zhiming Gao, all Yea, no Nay. **Motion passed unanimously, 7-0-0-CNV.**
5. Subcommittee Reports
 - a. Program: Gearoid Foley (Subcommittee Chair)
 - i. Winter seminar was discussed on thermal storage and CHP to support electric grid resilience (9:45AM Tu, 3 speakers, 60 mins).
 1. ORNL presented on flex CHP.
 2. Jerry Kimble (CM) presented on Organic Rankine Cycle.
 3. Gearoid Foley presented on CHP and electrification.
 - ii. Co-sponsorship for our session and co-sponsoring a session next time was discussed.
 - iii. Gearoid Foley notified the committee that he will be stepping down as SC Chair and rolling back participation.
 1. Mahabir Bhandari agreed to step in, pending due process.
 2. Mike Hulyo (PCM) will continue as SC Vice Chair.
 3. Gearoid Foley reflected on the joint efforts and accomplishments with ASHRAE and the TC and expressed his thanks.
 - iv. **MOTION** - John requested a motion to thank Gearoid for his service and proposed a new chair, motion by Michael Calabrese, second by Farzan Rad, all Yea, no Nay. **Motion passed unanimously, 7-0-0 CNV.**
 - v. Patrick Kelly (Track 6, Government Liaison) discussed a production brief for electrification and electric generation with interest to integrate CHP.
 1. Work by TC 6.2 (DES) on fundamentals for Winter 2026 (Vegas) is suited to integrate with CHP.
 2. Michael Calabrese to follow up with Patrick.
 - vi. A Section 6 track for Summer 2025 (Austin) is forming on “replacing your carbs with water” with strong approvals from 6.1, 6.2,6.5, 6.6, and 7.4.

1. A request for 6.4 CHP to participate was made.
 2. Topic includes production, transportation, and heat transfer in buildings.
 3. Target is 6-7 programs, ~18 presentations, on the track.
 4. Michael Calabrese requested more information.
- vii. William Ryan (TC 8.3 Chair) discussed the co-sponsored track on alternate waste heat and cooling systems (11:00 AM Tu, 4 speakers, 90 mins).
1. U. of Florida presented on ionic liquids in dehumidification.
 2. Elen Makar (Energy Concepts) presented on waste heat.
 3. Energy Concepts also presented on absorption refrigeration.
 4. Michael Garrabrant presented on heat pumps and renewable gas.
- viii. TC 8.3 has a seminar for the next meeting on a related topic – waste heat and engine driven equipment.
1. Presentation topics include absorption heating/cooling with waste heat (Thermax), gas-drive heat pumps (GTI), and absorption-based energy storage (TU Berlin).
- ix. **MOTION** - William Ryan (TC 8.3 Chair) requested co-sponsorship from TC 6.4 and asked for a vote to cosponsor. Motion by Perry, second by Farzan Rad, all Yea, no Nay. **Motion passes unanimously. 7-0-0 CNV.**

b. Research: Farzin Rad (Subcommittee Chair)

- i. Farzin Rad updated the status on research following the research committee breakfast.
- ii. No articles were submitted for RAC this year.
- iii. The budget for 2024/25 is \$3.9M with a limit of 354 submissions each.
- iv. There are currently 37 active projects.
- v. Farzin is drafting the new topic (on nano-grid, micro-CHP, ASHP, TES) before March 15th.
- vi. The topic proposed was on micro-CHP (24KW with small adsorbers) integration with thermal engine chiller – design to support continuous year-round year like data centers.
 1. This is current research at GTI Energy, not yet in the U.S., but emerging.
 2. Aim is to find a thermal match for micro-CHP and optimizing integration with target services like data centers.
 3. Gearoid Foley questioned the novelty for research beyond small scale.
 4. An example was given with ORNL’s work on an 8KW micro-CHP not yet commercialized but demonstrated (gas to power, water storage, heating only).
- vii. Farzin Rad to prepare proposal draft with assistance from Gearoid Foley and Michael Calabrese.
- viii. Matthew Mullen clarified that \$350,000 can go through with RTAR. This limit can be increased if RTAR goes through the board.

c. Handbook: Alok Kumar (Subcommittee Chair)

- i. It was noted that the CHP handbook upgrade is beyond what can be done as unpaid service.

- ii. Matthew Mullen (Section 6 Chair) suggested an ASHRAE publication opportunity to develop a CHP publication, which can feed to handbook.
 - iii. Dragos Paraschiv discussed PTAR on upgrading fuel cells in buildings.
 - 1. Dragos will hold on to the PTAR draft based on feedback from Monday's presentation.
 - 2. The plan is to hold an electronic vote for this submission in March.
 - iv. Alok Kumar updated on Chapter 7, for which some have been providing feedback.
- d. Standards: Dragos Paraschiv (Subcommittee Chair)
- i. Dragos Paraschiv updated the standards subcommittee highlights.
 - ii. A committee is unifying terminologies via a publication.
 - iii. Standards 240 and 242 are in progress now. There are opportunities to identify duplication between standards and overlap with CHP.
 - iv. SBC 204 was discussed on method for testing micro-CHP devices (7 VMs total, Dragos Paraschiv and Joel Deddens from TC 6.4 representing).
 - 1. The Committee is balanced.
 - 2. There is interest to find more users to join as VM.
- e. Membership: Reported by Geoffrey Bares and Joel Deddens
- i. Geoffrey Bares gave an update.
 - ii. Memberships SC is still seeking a chair.
 - iii. Joel Deddens offered to help with this role.
 - iv. Geoffrey Bares and Gearoid Foley will increase recruiting efforts for TC from CHP industry (e.g., Midwest Regional Department, National Associates, GTI) and locally per ASHRAE conferences.
 - v. There is an interest to put together a TAG member call (hybrid, 1 hr).
 - vi. Identifying members was also discussed via Farzan Rad-VM (via GTI), Alok Kumar- VM (buildings with CHP), William Ryan-VM (Midwest Cogen Association), and Michael Huylo (UT Austin, student ASHRAE chapter).
 - vii. Geoffrey Bares can prepare a one-pager for CHP and its role in ASHRAE to recruit members.
 - viii. A discussion was held on bring speakers on CHP to chapter meetings, with Gearoid Foley as a potential speaker in his local chapter.
 - ix. CTTC Chapter technology transfer committee – could be an avenue to get local message out. Gearoid Foley interest to talk at local chapter.
 - x. Joel Deddens will check with CTTC and RTC to understand how to apply as a speaker.

6. Announcements by Michael Calabrese (TC Chair)

- a. Michael Calabrese requests to set up a quarterly subcommittee meeting if there are time-sensitive items (e.g., Programs milestone).
- b. At last programs subcommittee meeting, TC decided to not participate in Summer 2025.
- c. Michael Calabrese will check in with SC chairs to prepare written materials and submit on time for Winter 2026 (Vegas).
- d. Michael Calabrese will follow up on VMs to roll off and on.

7. Old Business

- a. Honors & Awards
 - i. Dharam Punwani and TC congratulated John Andrepont on his ASHRAE Fellow recognition from the Winter Conference.
 - ii. Geoffrey Bares reported on honors and awards and discussed interest in nominees for a Distinguished Service Award.
 - iii. Geoff further discussed the criteria (i.e., points) and noted that several in TC 6.4 likely qualify based on their long-established service.
 - iv. Geoff will discuss the process with Mahabir further and support potential nominees with their applications. Geoff to prepare a 1-page description of requirements.
- b. Joel Deddens updated the website with TC number change from 1.10 to 6.4. Broken links remain.
- c. Kathryn Hinkelman to send final approved minutes with comment from today from last meeting to Joel for posting.
- d. A discussion was held on meeting/data/file management in ASHRAE 365 and Microsoft SharePoint. Joel will reach out to communications section for questions and guidance and report back to TC (circa June) before deciding.

8. New Business

- a. John Andrepont gave a report as the Liaison for IDEA.
 - i. IDEA has 3000 members organizationally, including DES, utilities, university/medical personnel, government, students, other members.
 - ii. They have a quarterly magazine “District Energy” and conduct two conferences annually (Campus Energy and Annual Conference).
 - iii. Each conference has a large focus on integrating CHP and TES with DES
 - iv. Further information is at districtenergy.org.

9. Adjourn

- a. Announcement by TC Chair (Michael Calabrese) to close this session at 4:00 pm.
- b. **MOTION** by Dragos Paraschiv, second by Farzin Rad, all Yea, no Nay. **Motion passed unanimously. 7-0-0 CNV.**

Submitted by
Kathryn Hinkelman, Ph.D.
Secretary, TC 6.4.

TC 6.4 COMBINED HEAT AND POWER SYSTEMS
2025 ASHRAE Winter Meeting (February 8-12, 2025); Orlando, FL
TC Website: <https://tpc.ashrae.org/?cmtKey=54cc808d-d44e-40ae-aa06-0b83279413a3>

Subcommittee Meetings

Handbook, Program, Research, Membership Subcommittee
Tuesday, January 17, 2025: 1:00 PM-2:30 PM; Virtual

[Join the meeting now](#)

Meeting ID: 214 820 142 988

Passcode: 93Jd2v6G

Or call in (audio only)

+1 321-414-2369,,242962768#

Phone conference ID: 242 962 768#

TC 6.4 Committee Meeting

Tuesday, February 11, 2025: 2:30 PM-4:00 PM
Hilton Orlando, Lake Louise A (Lobby Level)

TC 6.4 Sponsored Seminars

Track 4: Energy Storage and Grid Resiliency

Seminar : Alternative Fuel or Waste Heat Driven Heat Pump or Cooling Systems

Tuesday, February 11 10:00 AM – 11:00 AM

Hilton Orlando, Lake Louise, Orange B

Co-Sponsoring: TC 8.3 Absorption and Heat Operated Machines

Track 4: Energy Storage and Grid Resiliency

Seminar 43: Alternative Fuel or Waste Heat Driven Heat Pump or Cooling Systems

Tuesday, February 11 11:00 AM – 12:30 PM

Hilton Orlando, Lake Louise, Orlando V

AGENDA

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|--|------------------------------|
| 1. Welcome | Chair, Michael Calabrese |
| 2. Roll Call / Introductions | Chair / All |
| 3. Introduction of ASHRAE Liaisons on Arrival | Chair |
| 4. Establishment of Quorum | Secretary, Kathryn Hinkelman |
| 5. TC6.4 Purpose Statement | Secretary |
| 6. Minutes of the 2024 Summer Meeting (Indianapolis) | Secretary |
| 7. Subcommittee Reports | |
| a. Program | Gearoid Foley, Mike Huylo |
| b. Research | Farzin Rad |
| c. Handbook | Alok Kumar |
| d. Standards | Dragos Paraschiv |
| e. Membership | Geoff Bares, Joel Deddens |
| f. TC Website | Joel Deddens |
| g. Honors & Awards | Chair, Geoff Bares |
| 8. Chairman's Overview and Report | Chair |
| 9. Old Business | Chair |
| 10. New Business | All |
| 11. Next Subcommittee and Committee Meetings | Chair |
| 12. Adjourn | All |

Attachment 1: Mission Statement:

“TC 6.4 is concerned with combined heat and power (CHP) systems, their cycles and components including heat recovery, combustion turbine inlet cooling (CTIC), energy conversion and system integration. The systems provide both electrical/mechanical power and cooling/heating thermal energy and are also known as cogeneration systems; trigeneration systems; and combined cooling heating and power systems.”

Appendix A: Attendees

In-person attendees:

		JOB <u>TC 6.4 CHP COMMITTEE MEETING</u> OF JOB NO. <u>2025 WINTER MEETING</u> NO. _____ DATE <u>2/11/25</u> CALCULATED BY _____ DATE _____ CHECKED BY _____ TLC ADDRESS <u>ORLANDO, FL AND TEAMS (HYBRID)</u>		
NAME & EMAIL	TC ROLE/MEMBER	VOTING	YEA MEMBER	
			YES	NO
MICHAEL CALABRESE Michael.calabrese@telega	CHAIR	YES		NO
ALOK KUMAR AKUMAR@NIKASOLUTIONS.COM	HANDBOOK SUB C CHAIR	YES		NO
Joel Deddens JDeddens@KCCMFG.COM	Webmaster			Yes
KATHRYN HINKELMAN Kathryn.hinkelman@um.edu	SECRETARY, CM	NO		NO
Farzin Rad frad@gti.energy	VM, Research_Sub	NO		NO
Geoff Bares geoff.bares@centriaenergy.com	CM, Membership	NO		NO
Blake Ellis blake.ellis@icm.com	CM	No		NO
PATRICK VILLAVINE PATRICK.VILLAVINE@SPR-K	PCM	N		N
Doug Reindl dreindl@fawc.edu	Guest	N		N
MICHAEL PATTON mpatton886@MSN.COM	CM	N		N
VIKAS PATNAYK VPATNAYK99@GMAIL.COM	VM	Y		N
OK KIM okim@grundfos.com	Guest	N		N

Michael Huylo PCM N N

DAVID Bowman PCM N N

Virtual attendees:

-  Kathryn Hinkelman (she/her) 
 -  Bhandari, Mahabir (Unverifi...) 
 -  Bill Ryan (Unverified) 
 -  **Calabrese, Mich... (External)**
Organizer 
 -  Dharam Punwani (External) 
 -  Dragos Paraschiv (External) 
 -  Gao, Zhiming (Unverified) 
 -  Geoff Bares (External) 
 -  Haefke, Clifford Paul (Unveri...) 
 -  Joel Deddens (Unverified) 
 -  John Andrepont (Unverified) 
-
-  Patrick Villaume (Unverified) 