



Meeting Agenda

Prepared by Li Song

TC 7.5 General Meeting

6/25/2024

3:30:00 PM– 6:00:00 PM Estern Time (ET)

JW Marriott, White River E (1)

To join virtually click the link below

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Schedule for TC 7.5 Meetings, Summer 2024:

Time in CT

Committee	Date	Start	End	Location	Chair
Enabling Technologies	6/23/2024	1:30 PM	2:15 PM	JW Marriott, 305(3)	Mike Galler
Bldg. Operations & Dynamics	6/23/2024	2:15 PM	3:00 PM		Donghun Kim
Fault Detection & Diagnostics	6/23/2024	3:00 PM	3:45 PM		Liping Wang
Smart Grid	6/23/2024	3:45 PM	4:30 PM		Greg Pavlak
Honors and Awards*	6/23/2024	4:45 PM	5:15 PM		Carol Lomonaco
Handbook	6/23/2024	5:15 PM	6:00 PM		Greg Pavlak
Research	6/24/2024	4:45 PM	6:00 PM	JW Marriott, 203(2)	Joe Zhou
Program	6/24/2024	6:00 PM	6:45 PM		Mike Brambley
Main TC	6/25/2024	3:30 PM	6:00 PM	JW Marriott, White River E(1)	Li Song

*The meeting is not shown on the ASHRAE schedule.

Committee	Link	Password
Enabling Technologies	MS Teams Meeting ID: 263 502 461 362 <u>Click here to join the meeting</u>	qp7Tuz
BOD		
FDD		
Smart Grid		
Honors and Awards		
Handbook		
Program	MS Teams Meeting ID: 251 785 136 666 <u>Click here to join the meeting</u>	3DSFLT
Research		
Main TC	MS Teams Meeting ID: 247 039 653 108 <u>Join the meeting now</u>	2m78Lj

1. Welcome (Li Song).
Signin Sheet:

2. Roll Call and Introductions. Determination of quorum.

- Current voting members (ending month):
Mike Galler (June 2025), Donghun Kim (June 2025), Carol Lomonaco (June 2025), Greg Pavlak (June 2025), Li Song (June 2025), Zheng O’Neill (June 2026), Kristen Cetin (June 2026), Michael Brambley (June 2027), David Yuill (June 2027).

<input type="checkbox"/>	Mike Galler
<input type="checkbox"/>	Donghun Kim
<input type="checkbox"/>	Carol Lomonaco
<input type="checkbox"/>	Greg Pavlak
<input type="checkbox"/>	Li Song

<input type="checkbox"/>	Zheng O’Neill
<input type="checkbox"/>	Kristen Cetin
<input type="checkbox"/>	Mike Brambley
<input type="checkbox"/>	David Yuill

3. Scope

TC 7.5 is concerned with the performance and interactions of smart building systems, the impact of smart systems on the total building performance, methods for achieving more intelligent control and operation of building processes, interactions of smart buildings with utilities, and documentation of the benefits of smart buildings and smart building systems as they relate to energy consumption, cost of operation, maintenance, occupant comfort, building commissioning, operations, and impact of the SBS on utilities and natural resources.

ASHRAE Code of Ethics Commitment – Chair

In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)

4. Changes to Agenda?

5. Discussion/Vote on Standard 207 (2021) – Lab Testing of FDD for Air Economizers

6. Announcements: TBD

7. Liaison Reports:

- Section Head ()
- CEC (Kristen Cetin)
- TC 1.4 (Chariti Young)
- TC 1.5 (Parastoo Delgoshaei)
- TC 7.3 (Josh Gemmel)
- TC7.10 (Zheng O’Neill)
- *MTG EBO* (Patrick Villaume)
- *TC 1.9/1.10* (A new liaison is needed)
- SPC 223 (Parastoo Delgoshaei)

8. Research (Joe Zhou) –)

9. Fault Detection and Diagnosis Subcommittee Report (Liping Wang) –

10. Enabling Technologies Subcommittee (Mike Galler) –

11. Smart Grid Subcommittee (Greg Pavlak) –
12. Buildings Operations Dynamics Subcommittee (Donghun Kim) –
13. Program (Mike Brambley) –
14. Handbook (Greg Pavlak) –
15. Standards (David Yuill) –
16. YEA (Kristen Cetin) –
17. Honors and Awards (Carol Lomonaco) –

18. Web Page (Mike Galler) –

19. Membership (Li Song) –

20. Old Business

21. New Business

22. Adjournment

ASHRAE TC 7.5: Smart Building Systems Research Subcommittee Meeting
Monday, 06/24/2024

4:45 PM– 6:00PM (EDT) JW Marriott Indianapolis, 203 (2)

Virtual Meeting Link (Microsoft Teams):

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Meeting Agenda

1. Roll Call and Introduction 4:45– 4:50
Sign in sheet:
2. Announcements/recap of the research subcommittee chair meeting (Joe Z.) 4:50 – 4:55
3. Current TC 7.5 research project updates 4:55 – 5:25
 - 3.1 Ongoing research projects updates
 - a) 1934-TRP: A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings. PMS Chair: José Candanedo
 - 3.2 Active work statements updates
 - a) WS-1809: Updating Reference Guide for Dynamic Models of HVAC Equipment. Primary Author: Heejin Cho.
 - b) WS-1875: Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications. Primary author: Li Song.
 - c) WS-1927: HVAC Equipment Health KPIs. Primary author: Ian Bonadeo.
 - d) WS-1964: Warmup and Setback Research. Primary author: Hwakong Cheng.
 - 3.3 Active RTARs updates
 - a) RTAR-1942 Evaluation of the Usability of ASHRAE Standard 207.
 - b) Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings. Primary author: Rich Hackner.
 - c) How does remote work environment impact on residential building load profiles and HVAC operations? Primary author: Li Song.
 - d) Development of models for better peak load predictions for building clusters/neighborhood/city. Primary author: Michael Bobker.
 - e) Occupant-Centric Demand-Side Management for Residential Buildings. M Primary author: Mohamed Ouf;
 - f) Assessment of energy savings of “smart” web-based connected thermostats in new and existing single and multi-family dwellings for inclusion in SSPC90.2. Primary author: Li Song.
4. TC 7.5 research new ideas and topics 5:25– 5:55

5. New Business

5:55– 6:00

6. Adjourn

6:00



Meeting Note

TC 7.5 Building Operations Dynamics 2:15 PM - 3:00 PM EDT, 6/23/2024 JW Marriott: 305 (3)

Prepared by Donghun Kim

Subcommittee Scope: The Building Operations Dynamics Subcommittee of TC 7.5 is concerned with the dynamic characteristics and interactions of comfort conditions, the active components of HVAC systems, the passive components of HVAC systems, control systems and operation strategies and the building. The committee is concerned with the methods of building system operation which minimize energy used through the consideration of dynamics and interactions. It is also concerned with methods which consider dynamic and interactive characteristics in the design or comfort conditioning systems.

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Meeting ID: 251 785 136 666	
Passcode: L6Nuwp	

Sign in sheet: <http://bit.ly/42ZILT4>

Agenda

5 min	Call to Order	
	Self-introduction, announce the subcommittee scope and other announcements.	
15 min	Program	
	Current meeting status and new ideas proposals	See below for more information
10 min	Update/Discussion of Active project/RTARs/Work Statement	See below for more information
15 min	New ideas and discussions	

Meeting Summary

Program Discussion (15 min)

- 3 seminar submitted, 2 accepted, 1 will be re-submitted
- 2 program ideas are under development

Program	Title	Lead	Previous talks
New	Optimal Control Beyond HVAC	Donghun (Joe)	Tampa: General optimization for more than HVAC for DR and carbon emission? Resilience integration? Beyond HVAC (other DRs) <ul style="list-style-type: none"> - DOE's vision - DOE sponsored demo projects After Chicago Chicago: Targeting Orland (2025 winter) Potential speakers: Joe - Lighting + etc Mike - water heater, Li Song - Donghun - EV+ PV+ HVAC
New	Resource-efficient future: Indoor Agricultural Control	Linping	Chicago :Plant and animal environment

<https://www.ashrae.org/conferences/2024-annual-conference-indianapolis/2024-annual-conference-technical-program>

Research Proposals Discussions (10 min)

- 1 RP was completed and the report is available
- 1 WS on hold
- 1 WS was bid and on the selection stage
- 2 RTAR development

Research	Title	Lead	Previous talks (~ Feb/2020, Orlando)
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WS (Work Statement)	WS-1809: Updating reference guide for dynamic models of HVAC equipment	Heejin Cho	<p>Send out to RAC before the RTAR rules changed PTAR (Publication TAR). Co-Sponsored by 1.4 Has been reviewed by all voting members. 1/15/2019 – Approved by all. RAC provided comments back to the author Orlando: no updates from Heejin Cho. Zheng will follow up with Heejin Li and Zheng iterated with Heejin and Virtual Conf (Austin): Zheng will follow up with Heejin. Chicago: WS was revised and waiting for response Phoenix: revision was completed. Vote on the main meeting this Wed. Las Vegas: Submitted last year (Aug), received feedback from RAC. Toronto: RAC asked to move to PTAR. contacted the Heejin, no response yet Atlanta: no response yet from Heejin</p> <ol style="list-style-type: none"> 1. Does the old version (1998) still contain valid and useful information? 2. Are updates necessary? 3. Can TC 7.5 support? <p>Joe will contact Heejin Tampa: Joe will follow up Heejin for Converting to PTAR Chicago : no update</p>
WS-1934 1934-TRP	A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings	Jin, Zheng, Helia, Joe	<p>Vote (Aug 15, 2021): 6-0-0-5 (CNV) Submitted in Aug 2021. Working on the WS with a goal to submit the WS by March 15th. Atlanta: WS was submitted to RAC after Toronto meeting Tampa: RAC conditionally approved. Asked for revision. Revision was submitted, and will get updated. Chicago: bidded, and PES is finalizing a winner</p>

RTAR ¹	Title	Lead	Previous talks (~ Feb/2020, Orlando)
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¹ Research Topic Acceptance Request

1	Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings	Zheng/Li	<p>Vote (06-25, 2019): 6-0-0-5 (CNV) MTGOBB (12 approve, 0 against, 5 absent, voted on June 22 2021) Submitted in June 2021 Inquiring the status</p> <p>Waiting for RAC response Atlanta: No discussion Tampa: No discussion Chicago: TBD, needs discussion on research need</p>
New idea	How to manage diverse DERs (EV station, on-site PV,) in buildings	Donghun/Joe	<p>Chicago</p> <ul style="list-style-type: none"> - Needs additional expertise in electrical systems - There are technical problems with controlling EV charging stations. Need to understand the problems - Similar RTAR in Smart Grid Subcommittee

Ideas on Hold

Program	Title	Lead	Previous talks
1	What to do with optimal control?	Peter Armstrong/ Joe	<p>Orlando: Peter is not in the meeting. No discussions. Virtual Conf (Austin): Peter is not in the meeting. Park this idea Chicago: Zheng will reach out to Peter for this item Phoenix: David will reach out to Peter for this item Las Vegas: Zheng will reach out to Peter Atlanta: no discussion Tampa: move to Parking</p> <ul style="list-style-type: none"> - Joe proposing a topic: optimal control focused on other applications not just HVAC - Li Song proposing a topic focus on field testing/real applications

RTAR	Title	Lead	Previous talks (~ Feb/2020, Orlando)
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1	How IoT impacts operators	Joe Carol Liping Wang Scott Hackel	<p>Carol working on an outline. How to quantify impact – Li Song Dovetailing with enabling technologies. Update the title Orlando: Carol: No updates Li: should include Residential application. We will need to have another idea/RTAR and Zheng will help Li Carol: Does the new idea include homes or multi-family homes? Need to consider privacy, multi-stories,etc. Virtual Conf (Austin): Carol, Joe and Li will have the following meeting. Chicago: Park this idea Phoenix: No discussion Las Vegas: No discussion Toronto: No discussion Atlanta: park the idea</p>
2	Link the productivity with occupancy-based control; Occupant in the loop controls	Ivo Martinac	<p>Ivo Martinac – professor developing idea. The idea but needs to develop the team. Park this idea at this time Orlando: No updates. Park this idea, Zheng will follow up with Ivo. Virtual Conf (Austin): No updates. Park this idea. Chicago: Zheng will follow up with Ivo. Las Vegas: No discussion Toronto: No discussion Atlanta: park this idea</p>



Agenda - TC 7.5 Enabling Technology Chair Mike Galler

6/23/2024 1:30 PM to 2:15 PM Indianapolis- JW Marriott Rm 305



Scan for meeting link

[\(Online meeting link\)](#)

Subcommittee Scope: • The Enabling Technologies Subcommittee of TC 7.5: Smart Building Systems aims at exploring and developing technologies which will enable the development, implementation and commercialization of smart building applications such as fault detection and diagnostics, model-predictive control and optimization, and smart grid applications such as automated demand response. Three focal points of this subcommittee are **i) smart transducers**, such as sensors and actuators which provide diagnostic information, **ii) communications**, such as wireless devices and protocols enabling greater data exchange, and **iii) embedded metadata**, such as embedded equipment and system information to enable smart building applications. On these topics, the scope of this subcommittee includes identifying and sponsoring research projects, evaluating existing technologies, providing recommendations to building operators and practicing engineers, developing supporting tools for researchers in these areas, and organizing programs to disseminate research findings and advancements among ASHRAE members.

Agenda:

5 min	Call to Order- Introductions; Agenda, Chair Discussion
30 min	Program- Current meeting status and new idea proposals due for Orlando: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due August 2. Next Annual: Phoenix, AZ June 21-25 2025
10 min	Update/Discussion of Active Project/RTARs/Work Statement- as needed.

Program: New Ideas Open Discussion

- ChatGPT/AI: how can it be used at each stage of the building lifecycle? New developments?
- Cybersecurity, what is needed by ASHRAE and members?
- Electrification of buildings: how will this affect smart buildings? New vs retrofit?
- Refurbishing old buildings with new tech (energy, cyber): limitations, benefits, opportunities?
- Smart Transducers (sensors and actuators) update?
- Communications
- Embedded Metadata
- Open discussion on other topics

Next meeting conference tracks:

<ul style="list-style-type: none"> • Fundamentals and Applications • HVAC&R Systems and Equipment • Refrigeration & Refrigerants • Energy Storage and Grid Resiliency • Pathways to Building Decarbonization 	<ul style="list-style-type: none"> • Artificial Intelligence • Industrialized Construction: Opportunities and Challenges • Ventilation and Indoor Environmental Quality • Future-Proofing the Built Environment
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Program: Previous Meetings:

Optimizing Thermal Energy Storage Integrated with HVAC (2023 Winter, Chair Kyle Gluesenkamp)
Standardized Building Datasets for Benchmarking Control Algorithms, Energy Efficiency, Modeling and Decarbonization (2023 Winter, Chair Farhad Omar)
How Common are Residential HVAC Installation Faults, and How Can We Detect Them? Results from the DOE Building America Program (2023 Winter, Chair David Yuill)
Managing the Complexities of Cybersecurity (2023 Winter, Chair Carol Lomonaco)
SPIRE, WELL, Building EQ: New Certifications for Smart, Healthy and Efficient Buildings (2023 Winter, Chair David Yuill)
What Happened to our Hospitals after the COVID-19 Fiasco? HVAC Design, Control and Operation (Toronto co-sponsor with 1.4, Chair Frank Shadpour)
Developing an ASHRAE Standard/Guideline to Assess the Performance of Occupancy Sensor Systems in Buildings (Toronto, Chair Kristen Cetin)
Smart Buildings as a Transactive Energy Hub: Decarbonizing by Enhancing Building-to-Grid Interactions (Toronto, Chair Ron Bernstein)
The Importance of O&M to Energy Efficiency, Comfort, IAQ and Energy System Decarbonization (Toronto co-sponsor with 7.3, Chair Mike Brambley)

Impacts on Occupants' Experience in Grid-Interactive Efficient Building Operations (Toronto, Chair Li Song)
Cybersecurity, Securing Building Control Systems: Are We Meeting Industry's Needs? (Toronto, co-sponsor with 1.4, Chair Ron Bernstein)
Fundamentals of Division 25: Integrated Controls and Cyber Security (Toronto, co-sponsor with 2.10, Chair Beth Tomlinson)
Using Building Automation to Safely Return to Classrooms after COVID-19 (Toronto, co-sponsor with 1.4, Chair Frank Shadpour)
Can Connected Buildings Save the Grid? (Toronto, co-sponsor with 1.9, Chair Randall Higa)
Gas sensing technologies – Zach Siefker, Kristen Cetin. Seminar 10 Building-Integrated Indoor Air Quality Sensors, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
Technology for Cybersecurity- supporting need for more seminars on topic.
Building-Smart Grid Interface- Glenn Remington Seminar 12 Renewables and the Smart Grid, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
New Sensing Technology- Chair: Carol Lomonaco
Impact of IoT on building control & monitoring (2021 Annual, Chair: Carol Lomonaco)

Research: Update/Discussion of Active Project/RTARs/Work Statement

List of current RTARs:

Warmup/Setback

Occupant-Centric DR

WS-1875 Virtual Sensors

WS-1934 Data Drive MPC

WS-1812 Detection and Diagnosis of Circulating Fluid Leakage from Hydronic Systems

Next Meeting Time- Orlando, same time? Do we need a virtual meeting between conferences?

Adjourn Meeting



Agenda

TC 7.5 Fault Detection and Diagnostics

Sunday, 06/23/2024 @ 3:00 PM– 3:45 PM CST
JW Marriott, 305 (3)

Prepared by Liping Wang

Subcommittee Scope: explore and develop technologies to detect and diagnose common faults in both commercial and residential buildings. The scope of this subcommittee includes (a) identifying and sponsoring research projects to develop new FDD technologies, evaluate existing FDD technologies; provide recommendations to building operators and practical engineers, and develop supporting tools for researchers in FDD areas, and b) organizing programs to disseminate research findings and advancements in FDD areas among ASHRAE members.

Agenda:

0:00	Call to Order	
	Self-introduction, announce the subcommittee scope.	
5 mins	Sessions at the current ASHRAE conference	
	<p>Sunday, June 23 8:00 AM – 9:00 AM EDT Workshop 1: Machine Learning Foundations: Intro to Data Science Tools for Building Industry Professionals (Greg Pavlak, Penn State University)</p> <p>Monday, June 24, 2:15 PM- 3:15 PM EDT CIDCO Seminar 4: Real-Time Monitoring and Predictive Analysis (Clemson University's Center for Energy Visualization and Analytics,)</p> <p>Tuesday, June 25, 11:00 AM – 12:30 PM EDT conference Paper Session 14: VRF and Smart Thermostat Performance (Mahroo Eftekhari, Loughborough University)</p>	
	<p>2025 ASHRAE annual conference seminar ideas</p> <ol style="list-style-type: none"> 1. Fundamentals and Applications 2. HVAC&R Systems and Equipment 3. Refrigeration & Refrigerants 4. Energy Storage and Grid Resiliency 5. Pathways to Building Decarbonization 6. Artificial Intelligence 7. Industrialized Construction: Opportunities and Challenges 8. Ventilation and Indoor Environmental Quality 9. Future-Proofing the Built Environment <p>August 2, 2024: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due</p>	

10 mins	Potential Seminar Ideas for 2024 ASHRAE Winter	
	Automated Alarm Management: DDC alarms used for FDD? Segment the alarm information into useful pieces. The building operator has to go through all the alarms. Make a presentation to collect information to make an RTAR is a goal. TC1.4: program will be the co-host. Carol already has two speakers. (submitted to Chicago 2024 and will resubmit for Orlando, FL 2025)	Carol Lomonaco (Chair), Kim Barker, Jason, Chirag
	Assessment of FDD in Guideline 36 Target for 2025	Joe Zhou (Chair), Steve Taylor
	Open-source FDD (software) platform Submitted 2024 Annual	Anthony Demattos, Chirag Parikh (Chair), Natasha Milesi-Ferretti, Yan Chen
	Data-driven based FDD (Annex 81) Plan to submit this program to Indianapolis, IL 2024	Zheng O'Neill, Jin Wen (Chair)
	Use smart thermostat data for FDD in residential buildings	Li Song, Lian Zhang, Burak Gunay, Donghun Kim
	A2L Refrigerant Leak Detection	Li Song (Chair), Srinivas Katipamula
	New program ideas?	
	Update/Discussion of Active project/RTARs/Work Statement	
	Evaluation of the Usability of ASHRAE Standard 207 Co-sponsor TC 7.9, Maybe TC 1.4 Revised based on comments from REC and Liaison. Look for volunteers to respond to the comments David Yuill, Srinivas Katipamula, Liping Wang Accepted RTAR, ready to move to work statement, looking for a champion to lead the work statement and submit the work statement in May, 2024.	Led by John House David Shipley
	RTAR in the draft: Evaluating the impacts of faults from microgrids and buildings on grid and building system performance at community scales.	Liping Wang
	Research Ideas	
	User's experiences with FDD? How do users respond to the alarms, correct or false?	Austin Rodgers, PNNL Laura Towsley (laura.towsley@rycom.com). Scott West Eric Yang
	FDD for low global warming potential (GWP) heat pumps: evaluate existing FDD methods for heat pumps/variable speed compressors Li Song plans to chair a seminar for	Donghun Kim, David Yuill

	FDD for variable refrigerant flow (VRF) systems	Donghun Kim, Yifeng Hu
	New ideas and discussions	

TC 7.5 Handbook Subcommittee Meeting Agenda - Chicago

June 23, 2024 (Sunday) 5:15 PM to 6:00 PM EDT

Hybrid Meeting

Meeting Room: JW Marriott, 305 (3)

Web meeting info:

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1. **Call to order / Introductions** (3 min)
2. **Report from TC 7.5 handbook Chair (Greg Pavlak)** (10 min)
 - 2.1. Progress since last ASHRAE meeting
 - Reviewer/Reviser Status: [Link to Google Sheet](#)

2.2. Schedule for the next version:

2027 HVAC Applications		2023			2024			2025			2026			2027					
		Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul
Review	Current HB received (June 1)		June 1																
	TC selects HB subcom and chair					Feb 1													
Revise	Review current HB for changes						Jul 1												
	Decide extent of and outline revisions							Jul 1											
Approve	Seek and appoint reviser(s)								Feb 1										
	Revise chapter(s)												Feb 1						
Produce	Send revised chapter to TC for review																		
	TC approves chapter																	Jul 31	
	Send chapter to HBC liaison																	Jul 31	
Edit & Produce	HQ sends chpt. proof to TC contact																	Mar 15	
	HB sent to printer (April 1)																	Apr 1	
	HB mailed (May 15)																	M 15	

- Ch 43 – revisions and approvals due to Society staff no later than **3/1/2026**.
- Ch 63 – revisions and approvals due to Society staff no later than **7/31/2026**.

2.3. Handbook Online

- Keep in mind that online version can also contain additional materials (spreadsheets, calculators, graphics, etc.) that supplement and enhance the handbook content
- Updates to handbook online can be brought forward at any time. Follows similar process to normal cycle. TC must approve changes via vote.
- ASHRAE publication timeline may vary depending on work load from normal cycle.

3. Review Previous List of Edits and Discuss Revision Scope/Timeline (~15 min)

4. Continue Discussion: Potential New Chapters (time permitting)

4.1. Control-oriented modeling (Andreas A.)

- New chapter or guide on thermal RC networks?
- Potentially put case studies in Chapter 63 or Chapter 43?
- New MPC chapter?
- Fundamentals on link between design and operations (co-design)
- Outline key objectives and decided how to package
- MTG on designing with controls in mind
- Presentation slides and draft document for preliminary discussion and feedback attached:

4.2. Chapter (or subsection) smart building control platform (Joe Z.)

Move/integrate with Multi-TC chapter on Optimization.
Still needed to address multi-energy/component system

4.3. Multi-TC chapter on Optimization and Controls (Peter A.)

- TC 1.13 is more on the algorithms, but already working on chapter (outline approved)
- Would it be focused on theory or HVAC controls?
- Material beyond HVAC controls is needed?
- Are the algorithms suitable for controls/operations/smart-buildings?

5. Open Comments and Discussion (time permitting)

6. Next handbook subcommittee meeting (2 min)

2025 ASHRAE Winter Meeting (Orlando)

7. Adjourn



Meeting Agenda

TC 7.5 Smart Grid Subcommittee (Hybrid)

Sunday, June 23, 2024 | 3:45 pm - 4:30 pm EDT

Meeting Room: JW Marriott, 305 (3)

Virtual Meeting Info:

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Subcommittee Scope: This subcommittee will explore and develop ideas and research work statements to improve the building and utility interactions (and more specifically the electric grid). The research will focus on developing enabling technologies for seamless interaction of smart building components and utilities and other building services. An important aspect of this work is to identify the information that is necessary to support smart building technologies, and to identify the requirements of communication protocols to support the exchange of this information between different building services buildings and utilities, between multiple buildings, with outside service providers.

The importance of a stable and reliable electric power grid to life and the economy in the 21st century has been underscored by two major events over the last decade: a major black out on the east coast of North America and wildly varying electricity prices in California during an attempt at restructuring the electricity marketplace. In response to these events many organizations have started research activities to find ways to modernize the grid. However, there are significant gaps in the research activities, especially as they relate to buildings. Since buildings consume over 70% of the electric in the U.S., they have to part of the solution to modernize the grid. ASHRAE has traditionally developed technologies, standards, and guidelines for buildings. Therefore, this subcommittee can play a major role in continuing this effort.

Agenda:

0:00	Call to Order	
5 min	Introductions, announce the subcommittee scope	
20 min	RTAR Ideas and Updates	
5 min	Relevant sessions at current ASHRAE conference	
15 min	Annual ASHRAE conference seminar ideas	
Adjourn		

Detailed Agenda

Call to Order

- Read scope
- New members – name – affiliation, new member
- Sign In Sheet:

Update/Discussion of RTARs/Work Statement ideas

Grid-Interactive Building Control Sequences: Program, Session, PTAR, RTAR? Current guidance is so high-level that it is not implementable.

- We don't have any sequences for the strategies that we are talking about (re: buildings/smart grid)
- Practitioners will be looking for that kind of guidance.
- Collaborate with 1.4?
- Still need to solve communication and integration problems first
- How do we actually do this?
- Research project needed to gather sequences? Goal: gather pieces needed to go from guide to guideline. [Greg will lead]
 - o Could start with modeling or survey of existing projects?
 - o Diverse teams that include battery manufacturers, EV's, etc.
 - o Important to consider scope of grid services for desired sequences
 - o Load shapes are a big driver (narrow down to specific building types)
 - o Availability of data streams as inputs to sequences
 - o Sequences should be practically adaptive (e.g., trim and respond)
 - o TC 6.7 support PV system topics

Guidance on smart building equipment / IoT – **Carol Lomonaco, Scott Hackel**

- what are you getting, functionality, products?
- what program functions are necessary to work in different environments?
- Carol – can reach out to one of the consultants that works in this area, has a good feel of this (has looked at some of this already) some people say won't allow the use of IoT because of lack of security/authentication, but maybe this isn't the case, seems to be a wide range; people don't understand these features/components – what are the deficiencies?
- Scott - also interested and had ideas on this topic
- **Kristen & Carol can discuss**
- (No report in Toronto)
- Focus on selection?
- (Indianapolis or Orlando PTAR, Herve also contribute.)

Linking building modeling to grid modeling (Donghun K)

- Some existing efforts
- End user of this work would be policy recommendations for ISOs
- How to validate models?
- Tampa Discussion:
 - o difficult to connect topic to ASHRAE users
 - o Was a seminar in Atlanta on the topic.
 - o Building response is important for the grid.
 - o Connected communities might be hook for getting ASHRAE to think about modeling buildings and grid.
 - o Forum or debate to understand tools?

RTAR/PTAR Parking Lot:

Development of models for better peak load predictions (some discussion at research subcommittee already) – James McNeil

- City-scale model validation for predicting demand response - some models exist
- Need an evaluation of the state of the art, perhaps useful for new city planning
- Need some more research on demand response capacity prediction
- Existing software – GridLabD – developed to designing rate cases
- (No report in Toronto)
- (No report in Atlanta)
- Discussion in Tampa: Good idea, but maybe outside of ASHRAE research scope/abilities

Related: Energy demand prediction of multiple building scale

Instantaneous voltage and current load from buildings

- Specifically related to embedding DR in control sequences
- Inverter-based equipment / power quality / two-way power flow
- Direct DC wiring with AC in comb.
- May be more of an IEEE topic than ASHRAE

WS 1885 ASHRAE Design and Integration of PV in the Built Environment Guide - **Costa Kapsis, Jim Liedel**- leidel@oakland.edu; costa.kapsis@uwaterloo.ca (from winter 2021)

- Draft is posted in Basecamp
- Looking for people to review and provide comments
- Comments:
 - o careful with “guide vs guideline”, suggestion to talk to research liason for Section 7
 - o Glenn – interested in reviewing
 - o PTAR process created after
 - o seeking co-sponsorship (TC 6.7 initial sponsor)
- (No report in Toronto)
- (No report in Atlanta)
- Tampa discussion: No lead, put in parking lot

Relevant Sessions at current ASHARE conference

ASHRAE Seminar Ideas

- Deadlines & Tracks
- Previous/Current Ideas
 - o Donghun K. – “California Flex Hub”: technologies for load flex.
 - Chicago: Submitted for Indianapolis?
 - o Panel discussion on grid interactive buildings (Joe Zhou organize for Annual 2024)
 - Needs panelists for discussion “Grid-Interactive Efficient Buildings: Are we there yet?”
 - o Hydro Quebec/Concordia Flexibility Index (Nouanegue Herve Frank)

- Submitted for Orlando?
- Connected buildings for decarbonization – **Srinivas K. (lead)**,
 - There are 10 connected community projects (just getting started)
 - Chicago: No report.
- Study impact of building and transportation electrification (EV chargers) – (Helia Z. lead)
 - Chicago: No report.
- Cybersecurity & Smart Grid - **Carol Lomonaco** (from Summer 2021)
 - Please email Carol if interested in contributing - carol.lomonaco@jci.com
 - **Zheng O'Neill / Jin Wen** – can help, can discuss – have DOE project on this area
 - Present literature review results. Focused on GEB.
 - Present simulation framework/HIL testbed for cyber-attack evaluation.
 - **Eric Yang** – help connect with Ron Bernstein at TC 1.4 - has good amount of work on this and info in guide spec (primary author) – more at system level
 - *(from previous meeting)* **Glenn Remington** – has contacts who could speak
 - potential collaboration with TC 1.5
 - David Holmberg/Ron Bernstein/Doe GWAC as speakers
 - New chapter in G13 on cybersecurity (timely for Atlanta)
 - OpenADR 2.0
 - (Tampa update) Carol still interested.
 - (Chicago update) Carol still interested.
- Other topics/ideas
 - Smart products for residential and commercial buildings (Li Song)
 - talk with residential TC – net zero building committee
 - Smart grid and building envelope interaction (from 4.4) - as an energy storage feature – (Jami L. will lead)
 - How building envelope can impact or interplay with smart grid contributions from buildings
 - Dynamic facades
 - Suggestion to follow up with NBI
 - TC 6.7 – Veronique Delisle
 - Utility Grid Battery Control Strategies and Impacts on O&M & LCA (From Atlanta 2019) – Future meeting
 - Webinar on NAESCO on battery storage in ESPC project. Could look for speakers.
 - Large scale batteries

New Ideas Proposed in Chicago:

- Open ADR 3.0 (Joe can contact one)
- Advanced load management program including EV charging integrated with building load and others (Li S.)
 - Case study?
- Advanced/optimal controls: What is available today? Seminar or forum (Donghun)
- Building-to-Grid Integration for resiliency during heat waves/winter storms (Zheng O'Neill)
 - Prof. Scott Bucking as potential speaker
- Program in GEB implementation for decarbonization (Scott H.)

- Carbon signals, sources, etc.
- Regional differences

Seminar/Program Ideas Parking Lot:

- Follow up seminar/panel to *Grid-interactive buildings, what's impact on efficiency?* (from *Summer 2021* by Mike Brambley) – **Eric Yang** (Chicago: move to parking lot)
 - Suggestion to plan for a follow up seminar or panel on this topic.
 - Eric will follow up with Mike
 - Potential series related to GEB