



Shaping Tomorrow's
Built Environment Today

TC 7.6 Building Energy Performance

<https://tc0706.ashraetcs.org/>

Virtual ([zoom meeting](#))

Tuesday, Feb. 1, 2022, 1:00-3:30 pm PST

TC/TG/MTG/TRG MINUTES

TC/TG/MTG/TRG No. TC 7.6 DATE 2022-02-01

TC/TG/MTG/TRG TITLE Building Energy Performance

DATE OF MEETING 2022-02-01 @ 1-3:30pm PST LOCATION Virtual

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

Attendees

Summary: Total = 31, VM = 13, CM = 11, PCM = 2, G = 5, YEA = 4

Name	Email	Affiliation	Voting Status	YEA ?	Notes / Comments
Jim Kelsey	kelsey@kw-engineering.com	KW Engineering	VM, Chair	N	Welcome!
Paul Mathew	pamathew@lbl.gov	Lawrence Berkeley National	VM	N	
Scott West	scott.west@hfa-ae.com	HFA	NVM	N	
Nate Boyd	nateboyd.bsme@gmail.com	A. N. Engineering, LLC	VM	N	
Chonghui Liu (CL)	cliu@popligroup.com	Popli Design Group	VM	N	Std Subcommittee, Liaison
Joe Hofstetter	jhofstetter@karpinskieng.com	Karpinski Engineering	VM	N	
Hyojin Kim	hyojin.kim@njit.edu	New Jersey Institute of Tech	VM	N	Research SC Chair
Barry Abramson	barry.abramson@servidyne.com	Servidyne	CM	N	
Curtis Fong	cfong@taylorengineers.com	Taylor Engineers	CM	Y	
Dennis Landsberg	DLandsberg@LS-Energy.com	L&S Energy Services, Inc.	CM	N	
Harrison Kesling	hkesling@wileywilson.com	Wiley Wilson	Guest	Y	
Bruce Hunn	hunnbuildingenergy@gmail.com	Hunn Building Energy	CM	N	
Fredric Goldner	fgoldner@emra.com	Energy Mgmt & Research As	CM	N	
Yingli Lou	yingli.lou@colorado.edu	CU Boulder	Pro CM	N	
David Eldridge	Deldridge@grummanbutkus.com	GBA	VM	SuperY	AEDG Liaison
Nicholas Long	nicholas.long@nrel.gov	NREL	VM	N	BDE Subcommittee Chair
Rafael Pérez-Cortines	rafael.perez.cortines@gmail.com	Daikin Europe NV	ProCM	N	
David Goldwasser	david.goldwasser@nrel.gov	National Renewable Energy	Guest	N	
Annie Smith	smithannelise314@gmail.com	Ross & Baruzzini	VM	Y	Vice Chair
Supriya Goel	supriya.goel@pnsl.gov	Pacific Northwest National L	VM	N	
Aykut Yilmaz	aykut.yilmaz@dc.gov	District Department of Ener	Guest	N	
Adrienne Thomle	athomle@msn.com		CM		
Yeonjin Bae	baey@ornl.gov	ORNL			
Steven Carlson	carlson@xrganalytics.com	XRG Analytics	CM	N	
Alexander Zhivov	Alexander.M.Zhivov@usace.army.mil	ERDC-CERL	VM	N	Federal Buildings WG
Amanda Webb	amanda.webb@uc.edu	University of Cincinnati	VM	N	
Tyler Glesne	tglesne@gmail.com	Control Services Incorporated	CM	N	
eric yang	ericyangcem@gmail.com	Amazon Web Service	VM	N	
Christine Reinders	christinereinders@gmail.com	Iowa State University	CM	N	Program Subcommittee Chair
MJ Ayyampudur	manjhu.123@gmail.com	KW Engineering	Guest	Y	
John Constantine	jmc@mail.ashrae.org	US Space Force	CM	N	

TC 7.6 is concerned with the estimation, measurement, analysis, benchmarking, and management of whole building and building systems energy and water performance. This includes performance and resource management of new and existing buildings.

1. Roll call and Introductions

Kelsey

- Welcome new members and visitors
- [Sign in](#) (note check list for prior meeting info you can cut and paste)
- Agenda is on basecamp (kelsey@kw-engineering.com)

2. ASHRAE Code of Ethics Commitment

Kelsey

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>.)

3. Accept agenda/approve minutes of June Virtual meeting

Kelsey

- TC 76L listserve (170-ish names; Includes most TC 7.6 members + dozens more; is self-managed and not official). Mail to tc76-l@lists.onebuilding.org – or go to www.onebuilding.org to sign up.
- Roster access by TC members (log into My Membership on ASHRAE website)
- Approve minutes of 2021 Virtual Annual meeting
 - **Motion #1:** It was moved (Long) and seconded (Hofstetter) that:
 - 1) Minutes of the TC 7.6 2021 Annual Meeting be approved as drafted
 - **Motion #1 – PASSED** 13-0-0-2 CV (In favor - Against - Abstaining - Not Present)

4. Announcements and Chair Remarks

- Chair Remarks

Kelsey

- Chair would like to (re-)emphasize focus in his term (final year) on:
 - Raise awareness of CO2 as fn(t) and electrification as guiding principles (WIP)
www.ashrae.org/decarb
 - Finalize Development of Best Practices / Green Book Update (WIP)
 - Setting charter for Energy Management Subcommittee (done)
- Glesne noted that ASHRAE Board of Directors passed a motion on decarbonization yesterday pledging to address decarbonization with same urgency as energy efficiency during energy crisis

- Announcements

Kelsey

- Our good friend and longtime contributor Harry Misuriello passed away Jan. 25th.
 - Landsberg noted Harry's important contributions to Std. 90.1 and TC 7.6, role at ACEEE, and work with DOE on the original building performance standard
- US Technical Advisory Group (US TAG) for ISO TC 205 asked ASHRAE to recommend some experts in radiant heating and cooling to join the US TAG.

5. Membership

Smith

- Currently 15 VMs
- John Constantine, Ricson Chude, Alexander M. Zhivov members rolling off 6/31/2022
- VC is Smith, Secretary is Webb – both to advance following June meeting

6. Standing Committee Liaison Reports (TAC/RAC/StdCom/Program/SpecPub/ALI/BuildingEQ)

- Section Head (Satheesh)

Kulankara

- Update from Jamie Bennett (jbennett@cdc.gov), who is representing Satheesh
- **Action Item:** Kelsey to send TC activity form (by COB 2/2/2022) and functional group activity work (by early Feb) group to both Jamie and Satheesh.
- **Action Item:** Smith to complete roster updates (by COB 2/2/2022) at this meeting. Complete and save the roster update form, but do not submit it. Notify Jamie and Satheesh once saved, and they will submit.

- AEDG

Reinders

- Zero energy multifamily building guide scheduled to be published in February 2022
- Reinders rolling off as AEDG liaison and Eldridge is rolling on as new liaison
- Tom Phoenix rolling off as AEDG chair and Chuck Gullledge is rolling on as new chair

- AEDG steering committee will focus on: (1) Carbon emissions 2) Existing buildings and residential retrofits 3) Updating 50% guides 4) Delivering information in impactful/more interactive way
- Eldridge notes that AEDG steering committee interested in feedback from TCs on priorities for future guides and information delivery
- **BuildingEQ** **Hunn**
 - Latest portal stats: 1455 users; 1025 projects (7% increase)
 - As-Designed rating has been revised to follow PRM method from 90.1 Appendix G
 - Portal user survey is currently in preparation
 - Article in January ASHRAE Journal documents BuildingEQ case study application to three K-12 schools in Florida
 - Technical developments currently under discussion include: (1) System-level KPIs; (2) Carbon metrics and carbon tracking
- **Guideline 45P** **Kim/Hunn**
 Measurement of Whole Building Performance for Occupied Buildings,
 Except Low-Rise Residential Buildings
 - Update from Kim (Chair)
 - Had first official meeting in November 2021; Meeting every 3 weeks, with 7 subgroups
 - Guideline focus similar to original PMP, but adding occupant-related measurements, including occupant behavior
 - GPC participation so far of ~30 people: 15 Voting Members, plus NVM, liaisons, and guests; Additional participants welcome to join (especially looking for participants in Water subgroup)
 - Target completion date of first draft is June 2023
 - Hunn noted the new guideline retains same three-level of measurement detail structure as original PMP
- **SSPC 90.1 Liaison** **Lui**
 - 90.1-2022 update will be a major update – first to include carbon. Key updates: (1) Efficiency tables, especially VRV, heat recovery chillers, and warm air furnaces; (2) Time of use charts in economic metrics; (3) Added total system performance ratio (TSPR) as a compliance path
- **SSPC 90.2 Liaison**
 - TC 7.6 still looking for a liaison to 90.2
 - Landsberg noted that 90.2 is going to put out new TPS and reframe as a lead standard (similar to 189.1), rather than a floor standard.
- **SSPC 100 Liaison (Wayne Stoppelmoor is 100 Chair)** **Landsberg**
 - Target table update to use 2012 CBECS data is complete
 - Informative annex on developing a “local Standard 100” using local benchmarking data rather than national CBECS data has been approved
 - Discussion on incorporating regional site-to-source factors, rather than a single national factor
- **SSPC 189.1 Liaison (Roger Hedrick, Chair)** **West**
 - Currently a draft addendum out for public review on carbon emissions factors
 - Committee discussion about another draft addendum on future carbon emissions

7. Multi-Disciplinary Task Group Reports

- PMP Working Group → update to guideline **Kim**
 (Discussed above under Guideline 45P)

8. Subcommittee Reports

A. Standing (Functional) Subcommittees

8.1 Research

Kim

- 3 RPs underway: (1) 1836-RP (final report approved by PMS and up for TC vote today); (2) 1771-RP (submitted draft final report to PMS); (3) 1814-RP (submitted for no cost extension; target completion by June 2022)
- 1 WS in progress (1861-WS), and 1 RTAR approved and beginning WS (1822-RTAR)
- Several RTAR ideas discussed; TC 7.6 needs more RTAR ideas, as all 3 current RPs will be complete by June 2022 meeting
- Discussion on 1815-WS in subcommittee; Research subcommittee recommends that TC 7.6 approve co-sponsorship of this project
- RP-1836 update (approval motion later)

Webb

- 1836-RP was summarized in detail during Building Data Exchange subcommittee meeting this morning

8.2 Handbook

Constantinide

Handbook chapter mods are complete and ready for TC vote/approval

- TC 7.6 is responsible for two Handbook chapters: (1) Chapter 37: Energy and Water Use and Management; (2) Chapter 42: Building Energy and Water Monitoring
- Handbook subcommittee provided reviews and comments have already been incorporated into versions up for vote
- Summary of key changes: 1) references updated; 2) residential buildings were included; 3) units were updated or corrected; 4) all errata from Chapter 37 were addressed; 5) survey forms in Chapter 42 were updated
- Approve TC 7.6 Handbook chapters
 - **Motion #2:** It was moved (Constantinide) and seconded (Smith) that:
 - 2) TC 7.6 approve Chapter 37 and Chapter 42 for publication as written
 - **Motion #2 – PASSED** 12-0-0-3 CV (In favor - Against - Abstaining - Not Present)

8.3 Standards

Liu

- Std 90.1
- Std 100 – Continuous Maintenance
- Std. 105-2014 Revision (Continuous Maintenance?)
 - Update from Hunn
 - Revision has been published; latest version is now Std. 105-2021
- Gdl. 14-2014 Revision
 - Draft revision complete and in the process of being reviewed by the committee; should go out for public review in the next few months.
- Std. 211 – Update re prior plan
 - Committee does not currently exist and has not yet reconstituted.
 - Kelsey is looking for a Chair for a Std. 211 revision; Kelsey will support as co-chair or member
 - Potential areas for revision: (1) reporting carbon savings; (2) alternate approach to audits using strategic energy assessments
 - Goel notes that cities who have adopted Std. 211 are very happy with it as-is
 - **Action Item:** Kelsey will assemble working group to explore Std. 211 re-constitution and revisions; Ayyampudur, Landsberg, Goldner, Abramson, Goel, and Long will join.
- Prop Std 228 on net-zero energy buildings (w/TC 2.8)

West

Landsberg

Carpenter

Landsberg

Kelsey

Landsberg

- Currently out for public review; has sections on carbon emissions that may be of interest to TC 7.6 members

8.4 Programs

Reinders

Conference Paper Sessions

- TC 7.6 sponsored/co-sponsored Seminar 12 and Seminar 44 at the Las Vegas conference
- 2022 ASHRAE Annual Conference in Toronto; 2023 Winter Conference in Atlanta
- Topical conference on ventilation will be held just prior to the 2022 Annual Conference in Toronto at the same venue
- Several ideas for potential programs at Toronto and Atlanta conferences (see Program subcommittee minutes)
- New tracks for 2022 Annual Conference: Connected Buildings, Connected Communities; Cold Climate Building System Design, Operation and Resilience; IAQ, Energy Use, Comfort and Health of Sustainable Buildings; Professional Development and Education; Buildings in the Aftermath of COVID-19

Atlanta 2023 Deadlines

Topical Conference – Ventilation 2022 – Presentation Proposals Due February 11, 2022

Toronto Annual Conference Deadlines 2022 – June 25 – 29, 2022

Thursday, February 17, 2022: Extended Abstract Paper Due

Thursday, February 17, 2022: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due

Friday, February 18, 2022: Conference and Technical Paper Final Accept/Reject Notifications

Friday, March 18, 2022: Extended Abstracts Accept/Reject Notifications

Friday, April 01, 2022: Debate, Panel, Seminar, Forum, Workshop Accept/Reject Notifications

8.5 Web Site

Bae

(Send your agenda's and minutes if not already on basecamp)

B. Topical Subcommittees

8.6 Monitoring & Energy Performance

Webb

- Roundup of the state of government policy, data, and tools
- Highlights:
 - Six more jurisdictions passed benchmarking ordinances in 2021, bringing nationwide total to 43 jurisdictions with benchmarking ordinances
 - 4 jurisdictions passed building performance standards (BPS) in 2021, bringing nationwide total to 8 jurisdictions with BPS
 - National BPS coalition partnership between White House and 33 state and local governments

8.7 Energy Management

Yang

- Updates completed to ALI course on energy management
- Currently developing ideas for research on water/energy nexus and trend data

8.8 Commercial Building Audits

Hofstetter

- Reviewed process for updating the Green Book
- Currently meeting regularly to editing the main body text of the updated Green Book; goal is to complete as soon as possible

8.9 Federal Buildings

Zhivov

- Completed several guides for energy master planning and thermal systems design:
 - Guide for Resilient Thermal Energy Systems Design in Cold and Arctic Climates - ASHRAE publication
 - Energy Master Planning toward Net Zero Energy Resilient Public Communities Guide https://annex73.iea-ebc.org/Data/publications/EMP_GUIDE_20211026.pdf
 - Energy Master Planning for Resilient Public Communities – Case Studies <https://annex73.iea-ebc.org/Data/publications/Annex73-Book-of-Case-Studies-HR.pdf>
 - Energy Master Planning toward Netzero Energy Resilient Public Community Guide
- Ongoing effort on Guide for Resilient Thermal Energy Systems in Hot and Humid climate

8.10 Building Data Exchange

Long

- Standard 232 on data exchange protocols is currently looking for members
- Eight cities have implemented BPS; discussion on potential role of data exchange in new BPS coalition and target decision-making
- Water was a component in Energy Act of 2022, and water conservation measures are being added to some data exchange tools (e.g., BuildingSync)
- 1836-RP provided a detailed report; Presentation slides are on basecamp and in subcommittee minutes
- Potential industry coalition on building data exchange discussed; goal is to make data exchange more attractive to people in industry

9. Other Topics

-

10. Old Business

- Status of Technical FAQs for review and revision - none

Kelsey

11. New Business

- RP 1836 – is complete and ready for TC vote/approval **Kelsey**
 - Final report was approved by PMS in December 2021
 - Hunn noted that Lilas Pratt should be notified about 1836-RP future work implementing RP results into BuildingEQ
 - **Motion #3:** It was moved (Mathew) and seconded (Long) that:
 - 3) 1836-RP be approved as complete
 - **Motion #3 – PASSED** 12-0-1-2 CV (In favor - Against – Abstaining - Not Present)
 - Webb abstained from vote due to conflict of interest as PI
- Request to Co-sponsor RP 1815 **Kelsey**
(RTAR in your email)
 - 1815-WS was discussed in the Research subcommittee meeting; recommends that TC 7.6 co-sponsor this project
 - As co-sponsor, TC 7.6 must provide PMS member(s). Jeff Haberl volunteered to participate.
 - **Motion #4:** It was moved (Constantinide) and seconded (Kim) that:
 - 4) TC 7.6 co-sponsor 1815-RP

▪ **Motion #4 – PASSED** 12-0-1-2 CV (In favor - Against – Abstaining - Not Present)

- Evaporative cooler new regs in NV **Landsberg**
 - Landsberg noted his interested in developing a whitepaper on this topic; looking for reviewers; Haberl and Eldridge volunteered to review.
- TC 7.6 Position Documents **Thomle**
 - Position documents are published on ASHRAE website and used by Government Affairs; document represents an official position by ASHRAE on a topic.
 - DRC (Document Review Committee) need decisions about TC 7.6 position documents by July 2022.
 - Thomle noted that full TC needs to vote to approve any position documents.
 - TC 7.6 currently has one position document completed: Energy Efficiency in Buildings. It was published in 2019 and is due for revision by November 2022.
 - https://www.ashrae.org/file%20library/about/position%20documents/pd_energyefficiencyinbuildings_2020.pdf
 - TC needs to assemble a working group to revise and update Energy Efficiency in Buildings document. Chair needs to be assigned by May 2022 and revision needs to be complete by November 2022.
 - **Action Item:** Kelsey will Chair working group to revise Energy Efficiency in Buildings position document; Hunn, Eldridge, Abramson will join.
 - TC 7.6 has two other position documents that were proposed, but never written: (1) Sustainable energy sources for buildings; (2) Onsite energy generation. Can write these, withdraw them, or suggest that another TC write them.
 - **Action Item:** TC 7.6 to decide next steps for proposed position documents

12. Adjourn

Seminar 44: Upgrading Existing Building Control Systems for High Performance Operation

Chair: Gregory Cmar

Wednesday, February 2 1:00 PM – 2:30 PM CST

Caesars Palace Las Vegas, (E), Augustus III/IV

Seminar 12: Renewables and the Smart Grid

Sunday, January 30 11:00 AM – 12:30 PM PST

Caesars Palace Las Vegas, (P), Neopolitan I/II

Summary:

Renewable energy resources are nearly 20% of the U.S. generation mix, growing rapidly through advanced technology and state policy changes. Matching these accelerations in the energy markets are the emerging developments at the distribution level, also known as the “Smart Grid”. While electric customers are now both consuming and generating electricity, the Smart Grid and buildings will both need to dynamically respond to manage resources, loads and reliability. This session presents a variety of approaches used to optimize and integrate renewables and the Smart Grid.