

# Meeting Minutes

**TC 7.06 Building Data Exchange Subcommittee**

*Tuesday, January 23, 2024, 10:00 – 12:00 CST*

*McCormick Place West, W179A (1)*

## **ASHRAE Code of Ethics Commitment**

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](#).)

## **Attendees**

42 people in attendance (in person and virtually)

<b>Name</b>	<b>Affiliation</b>	<b>Email</b>	<b>Member (VM, NVM, CM, or Guest)</b>	<b>YEA</b>	<b>Int'l</b>
<b>Amanda Webb</b>	University of Cincinnati	webb2al@ucmail.uc.edu	VC	N	N
<b>Andrew Held</b>	DC Department of Energy & Environment	Andrew.held@dc.gov	Guest	N	N
<b>Annie Smith</b>	Introba	smithannelise314@gmail.com	VM & 211	Y	N
<b>Barry Hooper</b>	SF Gov	barry.e.hooper@sfgov.org	Guest	N	N
<b>Brett Devillier</b>	University of Cincinnati	breanadevillier@gmail.com	Guest	Y	N
<b>Chris Balbach</b>	PSD Consulting	cbalbach@psdconsulting.com	PCM	N	N
<b>Craig Simmons</b>	NREL	craig.simmons@nrel.gov	Guest	N	N
<b>David Eldridge</b>	Grumman Butkus Associates	dse@grummanbutkus.com	VM & 211	N	N
<b>Dennis Landsberg</b>	L & S Energy Services	dlandsberg@ls-energy.com	CM	N	N
<b>Duncan Prael</b>	CUNY Building Performance Lab	dprahl@ccny.cuny.edu	Guest	N	N
<b>Emma Van Fossen</b>	Trane Technologies	emmavanfossen@gmail.com	PCM	Y	N
<b>Felix Wong</b>	University of Edinburgh	felixwong02@yahoo.com.hk	CM	N	Y
<b>Frank Li</b>	ORNL	lif2@ornl.gov	Guest	N	N
<b>Gregory Cmar</b>	Interval Data Systems	gregory.cmar@intdatsys.com	Guest	N	N
<b>Isabel Langlois</b>	NREL	isabel.langlois@nrel.gov	Guest	Y	N

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Name	Affiliation	Email	Member (VM, NVM, CM, or Guest)	YEA	Int'l
<b>Jack Danley</b>	Colorado School of Mines	jdanley@mines.edu	Guest	Y	N
<b>Jie Xiong</b>	NREL	jie.xiong@nrel.gov	Guest	Y	Y
<b>Josh Dean</b>	CA Energy Alliance	Josh.dean@caenergyalliance.org	PCM	N	N
<b>Justin Mezzadri</b>	ALC	justin.mezzadri@carrier.com	Guest	N	N
<b>Lauren Adams</b>	NREL	lauren.adams@nrel.gov	Guest	N	N
<b>Mahabir Bhandari</b>	ORNL	bhandarims@ornl.gov	CM	N	N
<b>Mark Borkum</b>	PNNL	mark.borkum@pnnl.gov	Guest	N	N
<b>Mazen Daher</b>	EPRI	mdaher@epri.com	Guest	N	N
<b>Mingyue Guo</b>	Texas A&M University	mingyue.guo@tamu.edu	PCM	N	Y
<b>Mostafa Saad</b>	Concordia University			N	N
<b>Nicholas Long</b>	NREL	nicholas.long@nrel.gov		N	N
<b>Niraj Kunwar</b>	ORNL	kunwarn1@ornl.gov	CM	Y	N
<b>Rebe Feraldi</b>	PNNL	rebe.feraldi@pnnl.gov	Guest	N	N
<b>Rob Hitchcock</b>	Hitchcock Consulting	rjhitchcock@gmail.com	Guest	N	N
<b>Ron Bernstein</b>	RBCG Consulting	ron@rb-cg.com	Guest	N	N
<b>Sagar Rao</b>	AEI	sagar.rao@outlook.com	CM	N	N
<b>Sam Petty</b>	DOE BTO	samuel.petty@ee.doe.gov	Guest	N	N
<b>Scott Duncan</b>	Georgia Tech	duncan@gatech.edu	Guest	N	N
<b>Scott West</b>	HSA Fort Worth	scott.west@hfa-ae.com	VM TC-7.6	N	N
<b>Siu (Alex) Fung</b>	University College London	fungsiufung@gmail.com	PCM	Y	Y
<b>Stephen Roth</b>	Carmel Software	sroth@carmelsoft.com	CM	N	N
<b>Sungkyun Jung</b>	ORNL	jungs@ornl.gov	PCM	N	N
<b>Supriya Goel</b>	PNNL	Supriya.goel@pnnl.gov	NVM	N	N
<b>Sydney Applegate</b>	DOE ORISE Fellow	sydney.applegate@ee.doe.gov	Guest	Y	N
<b>Thibault Marzullo</b>	NREL	thibault.marzullo@nrel.gov	PCM	Y	N

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Name	Affiliation	Email	Member (VM, NVM, CM, or Guest)	YEA	Int'l
Travis Walter	LBNL	twalter@lbl.gov	Guest	N	N
Yimin Chen	LBNL	YiminChen@lbl.gov	Guest	N	N

## Minutes

10:00 Introductions All

Acknowledgment of previous meeting minutes (<http://tc0706.ashraetcs.org/>)

10:10 Announcements and Remarks Long

10:15 Old Business / Action Items Long

Item	Owner	Due Date	Status
Paper writing on building data exchange	Long	3/15/2024	To discuss
Create draft data.ashrae.org website and post image for review	Long, Adams	2/15/2024	Done

10:30 Round Table on Building Data Exchange Updates

Standards and Schema All

- 229P: Protocols for Evaluating Ruleset Application in Building Performance Models Goel

Rulesets for building models. 4 years in the making. Creating a standard format for standards (e.g., 90.1, Title 24) rules. The standard is being voted for public review this spring. The normative portion includes a schema (Ruleset Evaluation Schema). The level is higher level than something like gbXML. Schema can be used to represent other versions of schemas... agnostic to simulation engine.

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Level 2 audit has building asset data (but not assigned to physical locations), utility data (12 months of meter data for all fuel sources), and ECMs that are being recommended + savings. RES only looks at the building asset data. Need to assign to spaces and zones at some point.

- ~~223P: Semantic Data Model for Analytics and Automation Applications in Buildings~~ Fierro
- SSPC 205-2023: Representation of Performance Data for HVAC&R and Other Facility Equipment Hitchcock

Reconstituted and now a standing standards project. VRF are being added. Moved to JSON as the file format—before it was XML. The standard defines an encryption method with a key to unencrypt with the consumer. Includes terms of use. Still working through the data privacy issue.

- 232P: Common Content and Specifications for Building Data Schemas Roth

TPS and forward – define metaschemas for HVAC&R software. Originated in Std205. The effort is to reduce the burden to define data required in standards. The IBPSA BDE started this effort 3 years ago and published a consensus document. The standard is voted out for public review.

There are several schemas that are being developed. Are they adopting 232P or using the tenets of this standard?

In project 229P, they followed the 205 spec. 205 kept changing over time, so 232 is trying to create a main specification. Does not specify a serialization format.

Take a look at the datetime specification.

- gbXML Roth

BIM to BEM. Revit to gbXML. Approaching the 25<sup>th</sup> anniversary. More than 50 import/export tools. They updated the schema in August 2023 based on the Revit Systems Engine. Further updates on RP-1815: Integrating Building Occupant Data for BEM.

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- 231P: CDL - A Control Description Language  
for Building Environmental Control Sequences West

15 or so attended. Desire to release public review soon. The language is Modelica, and it is logic. CXF is the controls eXchange format... take a modelica model and extends to a controls system. Basis is JSON. Paul Ulrich ... AI – Meet with Scott and team to discuss how the effort can benefit from 232P, 229P RES, etc etc.

- BEDES and Mapping Manager Walter

BEDES is a large data dictionary when translating language from different data sources. More terms are added to the dictionary when they happen. Common translations are provided, e.g., ESPM, BuildingSync.

- HPXML Balbach

Current version is 4.0. HPXML is the building performance institute. New efforts to model the interaction of solar, battery, and loads. How to model individual apartments in multifamily. Federal efforts to use HPXML for reporting. More info contact Noel Market at NREL.

TBD on the modeling of common space for multifamily. ComStock mashes up the units in HPXML and the common space in OpenStudio. Still not sure on how to handle.

- BuildingSync / Building Analysis Assessment Schema Marzullo

Schema for sharing building audit data. 2.5 was released this year with new water conservation measures and emission fields.

For the standard, either creating a new standard or putting the schema as an annex to std211.

What are the advantages of creating BuildingSync as an ANSI standard? 1) leave it – needs to find a “standard” home to gather more consensus and adoption. 2) Standards route removes the schema from the ivory tower. 3) there are some programs that are using it, SEED, BuildingEQ, COMcheck, SCEP RLF, that are leveraging (and requiring) BuildingSync. If under Std 211, then it would have to be normative.

There are quite a few fields that are defined in multiple schemas (e.g., RES), so the plan is to focus on measures, utility data, and high-level characteristics.

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DOE's goal is to encourage adoption. Sam (DOE) will continue to fund the transition and continued support after publishing. They want to have a long-term path forward and invested. There is concern that this will just be a hand off to a bunch of volunteers. The list of proposed members are already busy and involved with similar efforts.

Energy audit reporting and life cycle reporting (LCA). Person from PNNL is developing schemas and dataset. In gist, there are other data that might want to be involved.

From IBPSA - Consensus documents allow for faster development and the challenges of the ANSI process. Does having it a standard slow down the nimbleness?

Is there a barrier to adoption due to it not being standard? From a city perspective, the issue is not the standard—it is the technical barriers of the jurisdiction. Some users have had issues with keeping the software up to date... even when trying not to introduce breaking changes.

Some users have wanted to update the schema structure, which could create a full fork. Having consensus based could provide better adoption. The versioning is a challenge! E.g., ESPM updating their GHG calculations.

The problem for the other end is that we generate 20,000,000,000 records a day. Is anyone collecting the data and what to do with the data? Audit Template exports to BuildingSync. NYC has made this data available to users. NYSERDA has been doing analytics. Jurisdictions are still figuring out how to use it. States are requiring data to be reported in BuildingSync format. ASHRAE is not focusing on the legacy systems (after occupancy). Yimin Chen, LBNL, EMS to IPBD???. How to use these data for fault detection, dealing with missing data, erroneous data, etc. Data ownership challenge.

With LCA we are collecting utility of data along with the info for LCA. Lots of data and tools being created. How to handle the declarations of products and the existing world of energy audits?

Number of applications that use BuildingSync ... 6 applications public. Private is unknown.

Controls & Optimization

All

- BRICK, Haystack, etc.

Pritoni

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No update

Design & Construction

All

- IBPSA BDE

Rao

BDE protocols on BEM Output. Formats, data, and units. Mapping schema protocol... is a follow up project. Not part of the original scope. Difficult to get BEM pathways to align. This should be a unifying schema that BEM tools can write to.

Does Ruleset Evaluation Schema integrate with this format?

- BuildingSync Gem

Marzullo

BuildingSync Gem now runs on OpenStudio 3.4.0. This year includes maintenance tasks and fixing some gems.

Public Agency Programs, Organizational  
Updates, Compliance, and Reporting

All

- DOE Updates

Applegate



- ASHRAE Building EQ

Roth

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Building EQ supports data exchange through BuildingSync. New updates for an API to send data to GBI (not sure the acronym here). Technical subcommittee to add support for decarb assessments (level 1). Need to determine what data points

- Asset Score Goel

No support of data exchange. API endpoints exist for QBAT, but no data exchange.

- Audit Template Borkum

Structured data collection for energy audits. New format for Jurisdictional Configurable Templates (JCT). Working with several new jurisdictions – HUD, Brisbane, Philly, etc.

- UBID Borkum

Free and open-source project by PNNL to identify objects on earth. Can cross reference UBIDs easily. EPA will be added to ESPM.

Have the UBID folks interacted with the CBECS. Sydney will reach out.

AI – Amanda will check with the attendees at the Subcommittee on Monitoring and Building Performance.

- CTS / FEMP Brauch
- SEED Platform Long

11:30 New Business

BuildingSync Data Standard / Guideline  
Updates to data.ashrae.org Marzullo

New Action Items

Item	Owner	Due Date	Status
Paper writing on building data exchange	Long	3/15/2024	On-going
Add City Scale Building Formats to next agenda, find someone to discuss	Long	4/30/2024	



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Discuss UBID and CBECS	Webb	3/31/2024	
Std231 and BDE to discuss how the effort can benefit from 232P, 229P, RES, etc.	West, Long	5/15/2024	

<b>APPLICATIONS</b> 	<b>Standard 211:</b> ASRHAE Commercial Building Energy Audits To establish consistent practices for conducting and reporting energy audits for commercial buildings.	<b>IBPSA:</b> Compliance and Certification Reporting
<b>RULESETS AND "QUERYING"</b> 	<b>Schematron:</b> A rule-based validation language Used for validation, data reporting, and QA, QC, and filtration	<b>BuildingSync Asset Extractor (BAE):</b> Python package that allows users to process a BuildingSync file to extract asset information that can then be imported into the SEED Platform
<b>OBJECT MODELS AND ONTOLOGIES</b> 	<b>Standard 229P:</b> Protocols for Evaluating Ruleset Implementation in Building Performance Modeling Software This standard establishes tests and acceptance criteria for implementation of rulesets (e.g., modeling rules) and related reporting in building performance modeling software.	<b>Standard 223P:</b> Designation and Classification of Semantic Tags for Building Data To provide a dictionary of uniform semantic tags. These tags enable interoperable use of descriptive information on building data.
<b>SCHEMAS</b> 	<b>BRICK, Haystack:</b> Standardized semantic metadata about a building To improve the understanding and management of building data	<b>BuildingSync-gem:</b> A repository of helpers for reading and writing BuildingSync XML files For using that data to drive energy simulations of the subject building
<b>DATA DICTIONARIES</b> 	<b>HPXML:</b> High Performance XML Creates a common language for the industry's transactions, making it easier and less expensive to collect and exchange information among contractors, program administrators, implementers, government, evaluation consultants, and other information trading partners.	<b>Standard 205P:</b> Representation of Performance Data for HVAC&R and Other Facility Equipment To facilitate automated sharing of equipment performance characteristics by defining data models and data serialization formats.
<b>PROTOCOLS AND SPECIFICATIONS</b> 	<b>BEDES:</b> Building Energy Data Exchange Specification A dictionary of terms and definitions commonly used in tools and activities that facilitate the exchange of information on building characteristics and energy use	<b>ASHRAE Terminology:</b> Comprehensive online glossary of the built environment
	<b>Data Models Specification / Standard 232P:</b> Schema-Based Building Data Model Protocols Define building data structures and conventions for data exchange among building performance models	<b>Guideline 20:</b> Documenting HVAC&R Work Processes and Data Exchange Requirements To define a systematic procedure for documenting work processes (Use Cases) and data exchange requirements for specific HVAC&R activities.
	<b>IPBSA:</b> - Data Models Working Group Specification - Climate Data Model Specification	<b>JSONSchema:</b> Vocabulary that allows you to annotate and validate JSON documents  <b>XSD:</b> XML Schema Definition

Created by Marjorie Schott / NREL for ASHRAE TC 7.6 Subcommittee of BDE

ASHRAE & IBPSA BDE Committee Partnership

TBD

11:58

Adjourned