

NYC ENERGY CODE PERFORMANCE PILOT

Phase 2

June 22, 2023

presented by
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AGENDA

- 1. Introduction (DOB)**
- 2. Pilot Overview (PNNL)**
- 3. Q & A Discussion**

BACKGROUND LEGISLATION

■ **LL32 of 2018**

- Requires NYC to adopt Stretch Code
 - 2020 NYCECC (based on 2019 Stretch)
 - 2023 NYCECC (based on 2023 Stretch)
- In 2025, for buildings $\geq 25,000$ sqft, requires NYC to adopt a performance-based code

■ **LL97 of 2019**

- Sets annual GHG limit for buildings $\geq 25,000$ sqft
- Starting in 2024

■ **OneNYC 2050**

- Carbon neutrality and 100% clean electricity by 2050

PILOT STUDY GOALS

- **Testing Approaches to Align Code with Legislation**
 - **LL32:** Performance based option is currently in the code as Appendix CA Section 11 and Appendix G
 - Expensive, time-consuming, simple buildings may not benefit from whole building modeling
 - **LL97:** Align code with GHG emissions limits
 - First step in approaching alignment with code
 - **OneNYC 2050**
 - Flexible pathway to achieve deep energy savings

The logo consists of the letters 'NYC' in a bold, white, sans-serif font. A small 'TM' trademark symbol is located at the top right of the letter 'C'. The background is a blue-tinted photograph of a city street with multi-story brick buildings and fire escapes.

NYCTM

Buildings

nyc.gov/buildings



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NYC Performance Pilot Phase 2

Michael Tillou
Kim Cheslak
PNNL

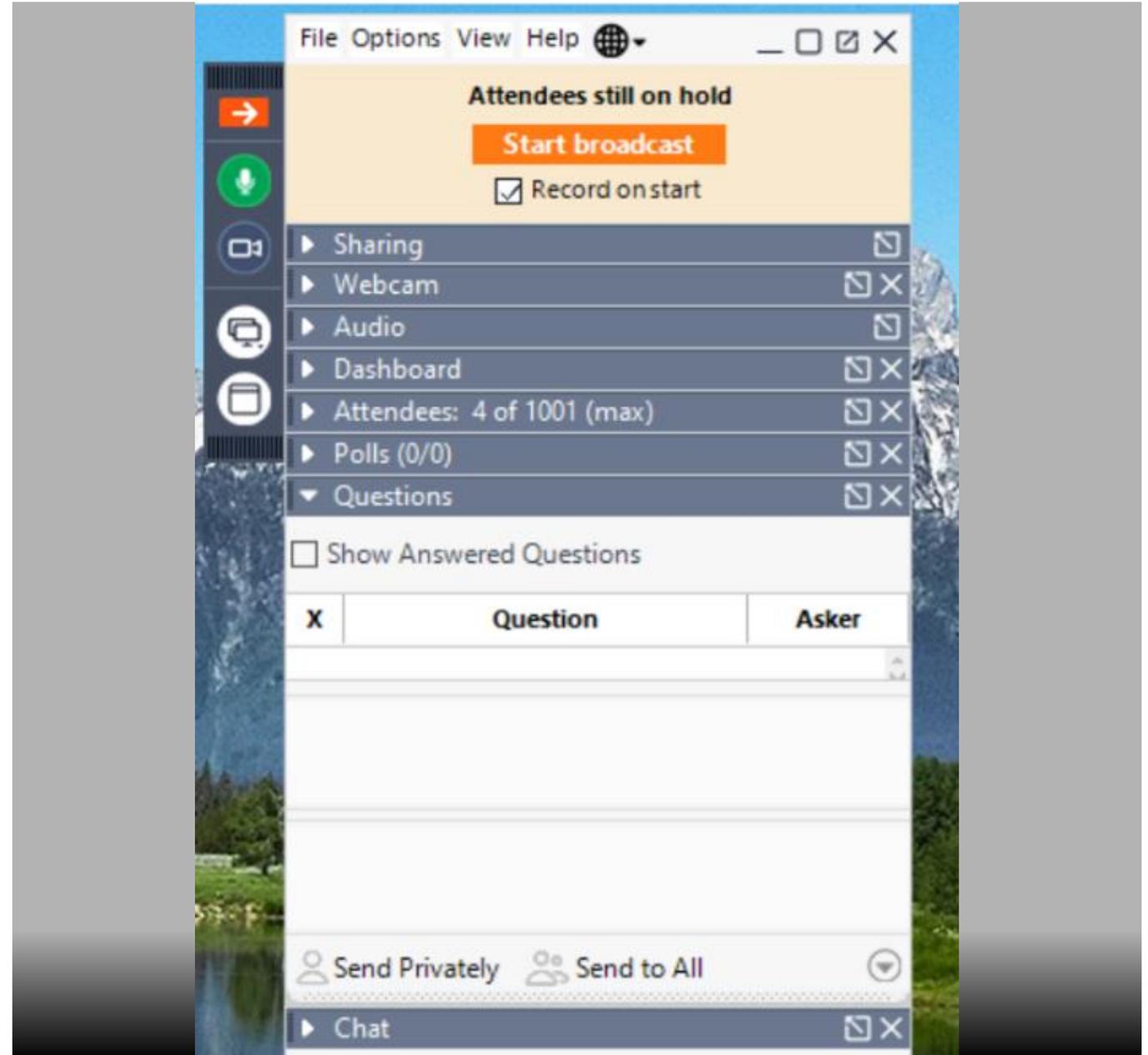
U.S. DEPARTMENT OF
ENERGY **BATTELLE**

PNNL is operated by Battelle for the U.S. Department of Energy



Housekeeping

- Submit **QUESTIONS** by typing them into the questions box or raising your hand so we can unmute you.
- We'll pause for questions a few times during the presentation to go through chat and respond to hands.



The screenshot shows a presentation control interface with a menu on the left and a main control area on the right. The menu includes icons for navigation, audio, video, and chat. The main control area has a status bar at the top, a list of controls, and a questions section.

File Options View Help

Attendees still on hold

Start broadcast

Record on start

- ▶ Sharing
- ▶ Webcam
- ▶ Audio
- ▶ Dashboard
- ▶ Attendees: 4 of 1001 (max)
- ▶ Polls (0/0)
- ▼ Questions

Show Answered Questions

X	Question	Asker

Send Privately Send to All

▶ Chat

Background

- Motivation to Move to Performance-Based Compliance
- Phase 1 Review
- Updates to methodologies

Phase 2

- Goals
- Logistics/Overview

Components of Phase 2

- Total System Performance Ratio (TSPR)
- Appendix G
- Simplified Performance Rating Method (SPRM)
- Building Performance Standards (BPS/LL97)

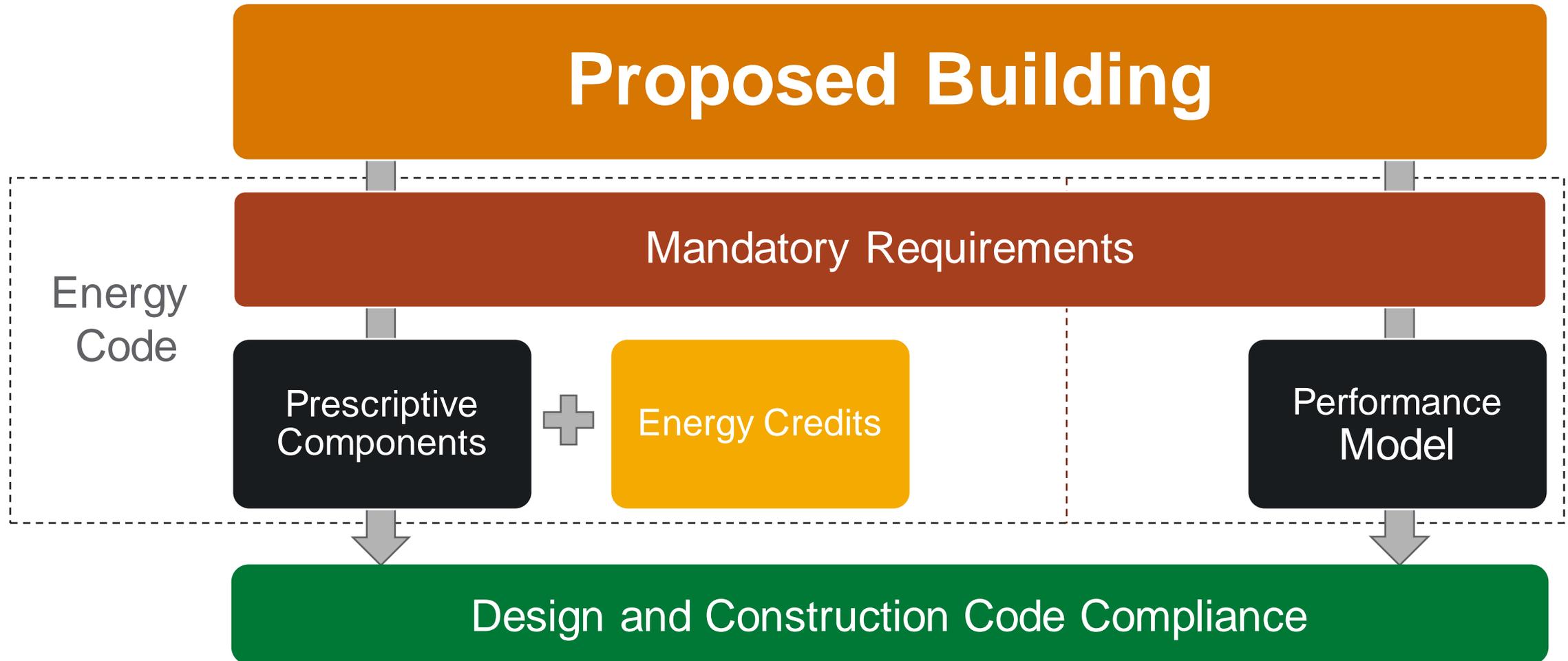
Application and Next Steps

Background

- Vision for 100% Performance Code
- Variation in compliance path performance
- Phase 1 Overview

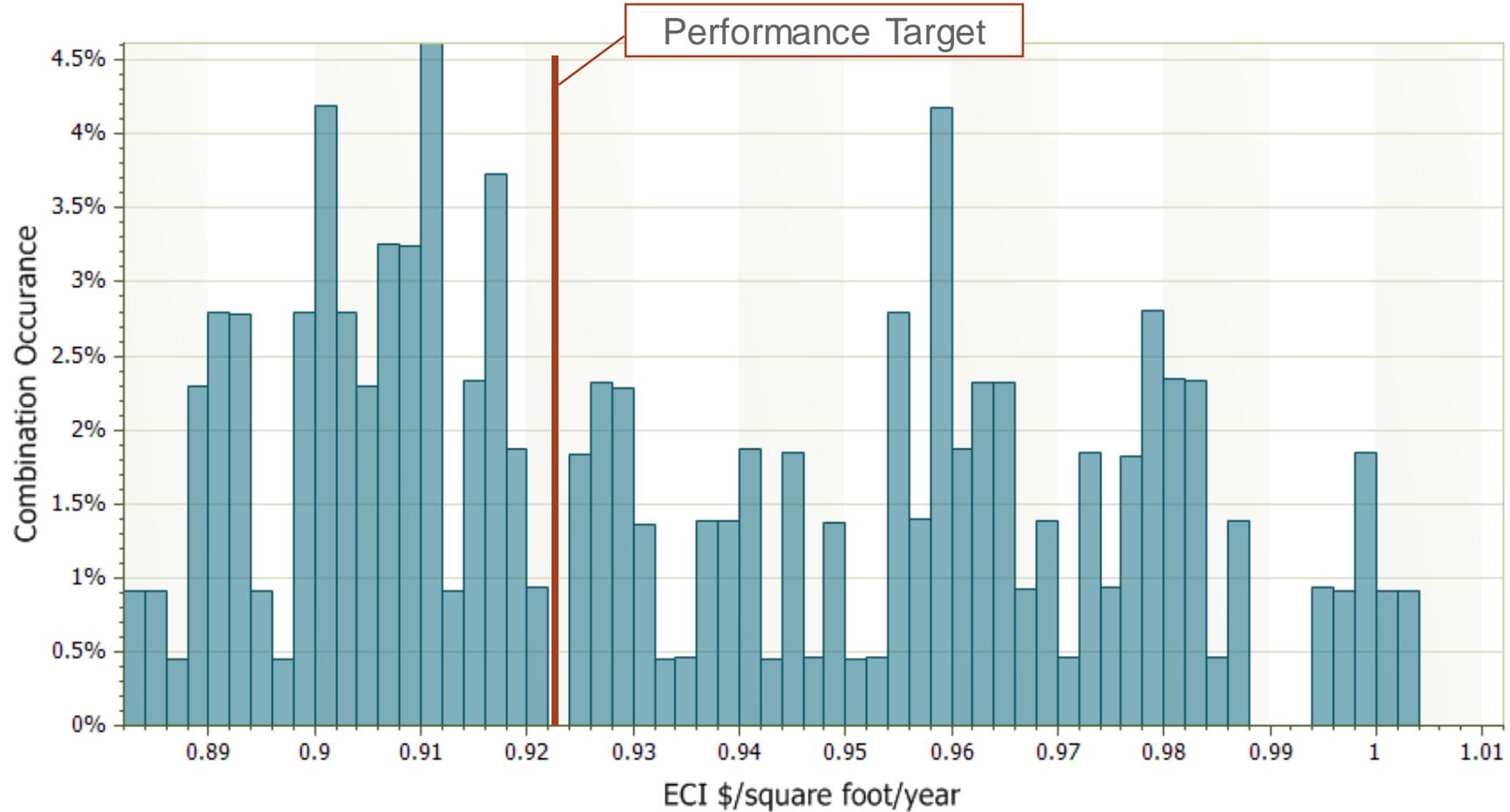


Current Energy Code Compliance

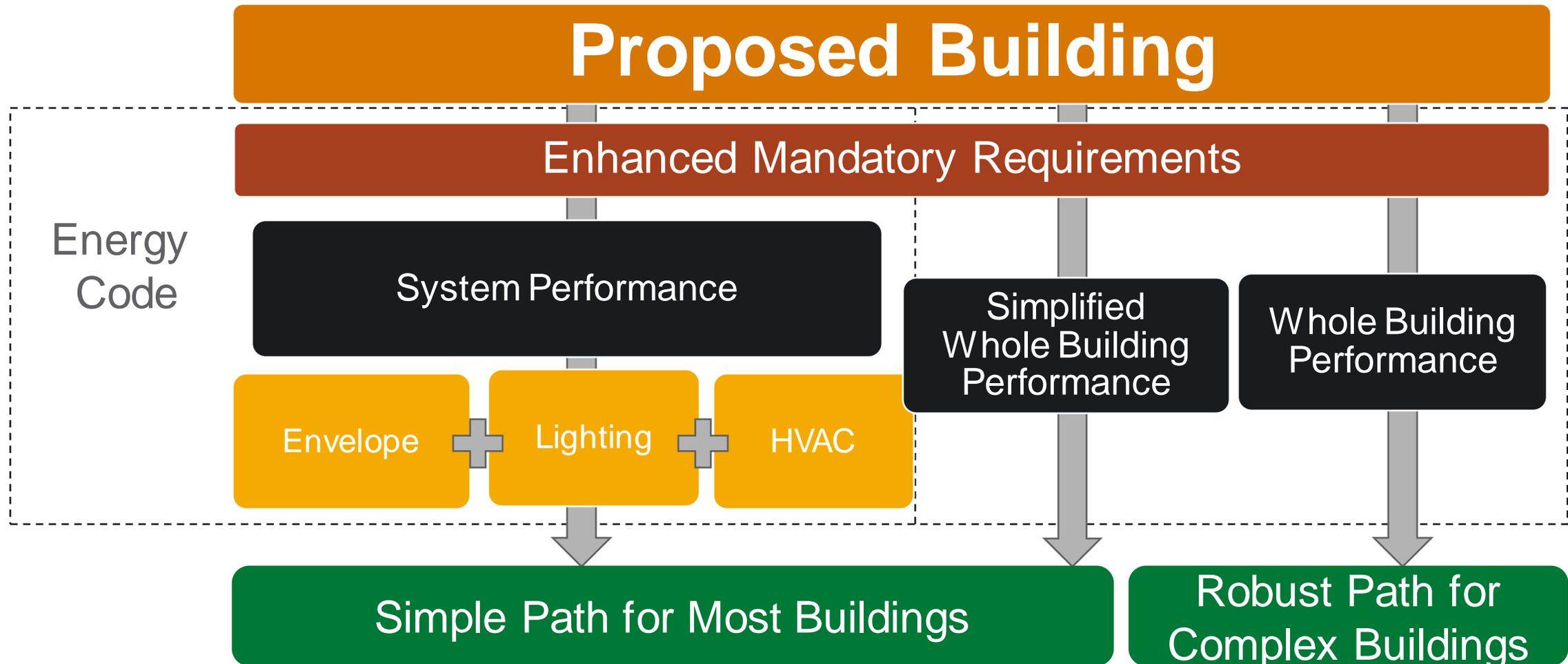


Variation in Prescriptive Outcomes

Medium Office, CZ5A



PNNL Vision of 100% Performance Code



Phase 1 Overview

Goals of Phase 1:

1. Explore other performance options from Appendix G and Section 11 to reduce time and expense where simple buildings may not benefit from whole building modeling
2. Understand GHG emissions of code paths as first step toward LL97 alignment
3. Explore flexible pathways to achieve deeper energy savings.

Phase 1 Ran from August – October 2021

Tested TSPR approaches:

1. Envelope
2. HVAC
3. Lighting

Phase 2

- Goals
- Logistics



Phase 2 Goals

1. Advance options for performance-based compliance for buildings over 25,000 sf
2. Understand variations across different performance-based compliance options
3. Understand compliance alignment between performance-based code and LL97

Component Goals

1. Total System Performance Ratio (TPSR)

- Evaluate TPSR tool that includes purchased heating and perimeter baseboard systems
- Test the ASHRAE 90.1 TPSR that uses MPF factors and aligns with proposed NY Stretch

2. Appendix G

- Evaluate changes for existing buildings, and purchased energy, and use custom BPF values
- Compare the results of Appendix G models against compliance results using Section 11 (if available)

3. Simplified Performance Rating Method (S-PRM)

- Evaluate the ease of use and applicability to a variety of building types
- Collect feedback on the S-PRM workflow
- Compare the results of S-PRM models against other modeling approaches (if applicable)

4. Building Performance Standards

- Explore Code/BPS alignment including likelihood of multiple energy code paths to result in LL97 compliance.

Timeline



Applications

Distributed: June 22, 2023

Due: June 29, 2023

Notification:
June 30, 2023

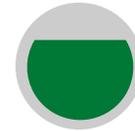


Trainings

Appendix G :
Wednesday,
July 12, 2023 –
1 hour

TSPR : Friday,
July 14, 2023 –
2 hours

SPRM : To be
Scheduled



Office Hours

Weekly
starting July
17th for
each cohort



Results Due

Friday,
August 18,
2023

Participation Requirements

1. Submit Application describing proposed building and project team.
2. Attend Tool Trainings applicable to your selection
 - ✓ Appendix G : Wednesday, July 12 10:00-11:00 ET
 - ✓ TSPR : Friday, July 14 12:00-2:00 ET
 - ✓ SPRM : To be scheduled once applicants selected
3. Model the proposed project using the tools applicable to your selection
4. Submit required pilot project documentation to PNNL and NYC DOB
5. Participate in a de-brief meeting with DOB and PNNL after submitting project materials

Participation Disclaimers and Notices

- Participation is voluntary and participants will not be compensated for their time.
- Participation is independent of any current energy code compliance requirements and will not impact the review process of a project.
- All data will be received and reviewed solely by PNNL and NYC DOB pilot project team and will only be used only for the purpose of identifying how to improve performance-based compliance pathways and tools.

Components of Phase 2

- Time Commitments and Building Characteristics
- Overview and Background on Methodology



Total System Performance Ratio (TSPR)

Number of Participants:

- Target 10 buildings
- No more than 2 buildings/firm or participant
- Up to 20 buildings

Estimated Level of Effort

- 8-16 hours/building

Target Building Characteristics

- Office, Retail, Library, Education, Hotel/motel, or Multifamily buildings
- Over 25,000 sqft
- HVAC system limitations*

* full list can be seen under C403.1.3.2 Excluded Systems in proposal for 2024 IECC published by DOE
https://www.energycodes.gov/sites/default/files/2021-10/HVAC_Total_System_Performance_Ratio.pdf

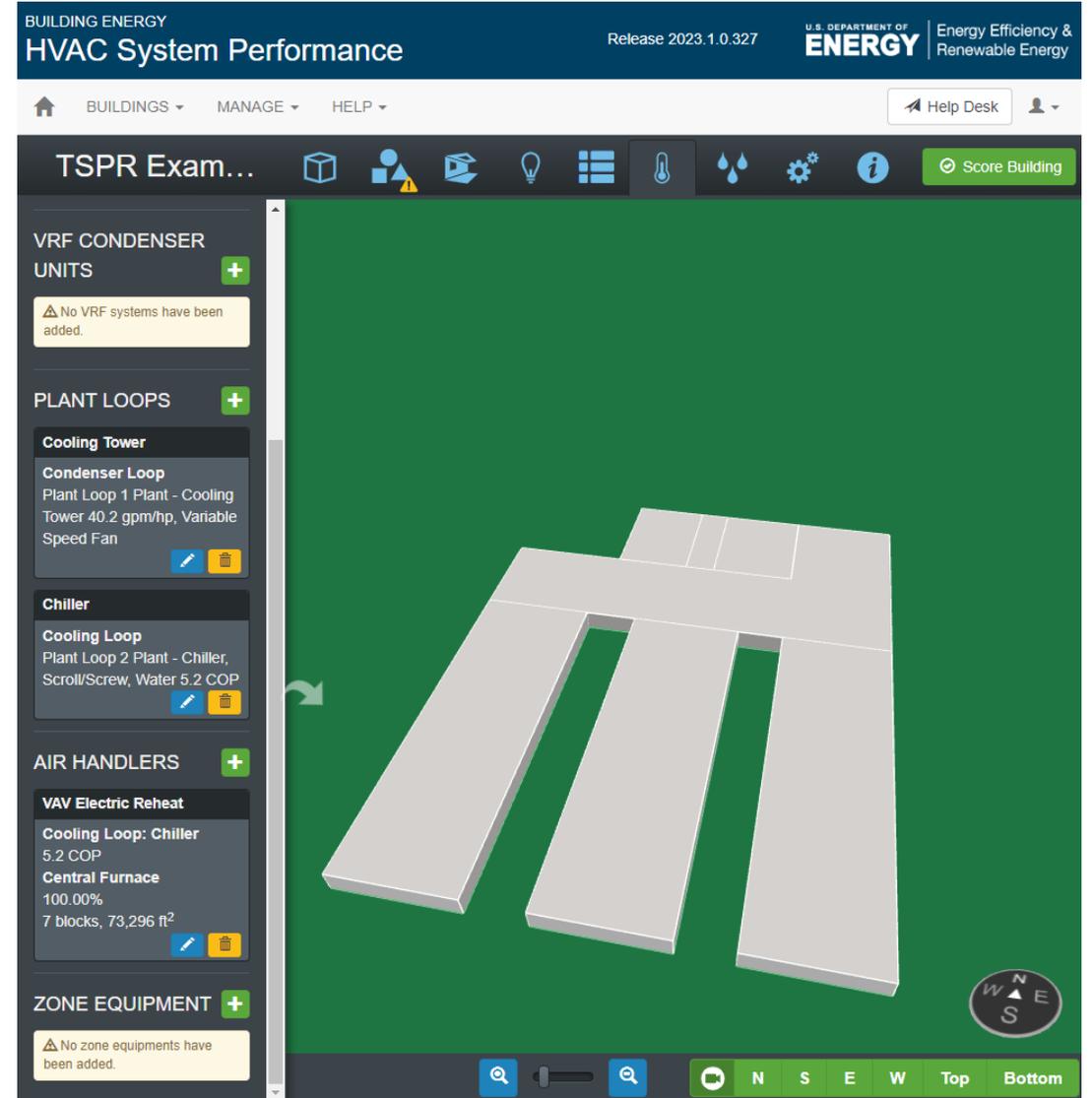
TSPR Tests and Feedback

Using TSPR Tool, create building and generate TSPR report

- ✓ Would the building have complied if it used TSPR?
- ✓ Compare to the proposed NYStretch requirements?

Feedback

- ✓ Provide feedback to help improve TSPR
- ✓ Given the option of using TSPR instead of the prescriptive path, which one would be preferable?



BUILDING ENERGY
HVAC System Performance

Release 2023.1.0.327 U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy

BUILDINGS MANAGE HELP Help Desk

TSPR Exam... Score Building

VRF CONDENSER UNITS +
⚠ No VRF systems have been added.

PLANT LOOPS +
Cooling Tower
Condenser Loop
Plant Loop 1 Plant - Cooling Tower 40.2 gpm/hp, Variable Speed Fan
Chiller
Cooling Loop
Plant Loop 2 Plant - Chiller, Scroll/Screw, Water 5.2 COP

AIR HANDLERS +
VAV Electric Reheat
Cooling Loop: Chiller 5.2 COP
Central Furnace 100.00%
7 blocks, 73,296 ft²

ZONE EQUIPMENT +
⚠ No zone equipments have been added.

N S E W Top Bottom

Simplified Performance Rating Method (SPRM)

Number of Participants:

- Target 2-3 buildings
- Up to 5 buildings
- Seeking experienced energy modelers

Estimated Level of Effort

- 24-30 hours/building
- Regular check in calls with PNNL

Target Building Characteristics

- Office, Retail, Education, or Multifamily buildings
- Over 25,000 sqft
- Single-zone HVAC systems

SPRM Tests and Feedback

Create an S-PRM model of the building design

- ✓ Targeting projects that have already been modeled
- ✓ Compare the results against the existing model
- ✓ Would the buildings have complied if they had used S-PRM?

Feedback

- ✓ Provide feedback on the ruleset
- ✓ What are some of the limitations of S-PRM?
- ✓ Given the option of using S-PRM instead of the prescriptive path, which one would be preferable?

Appendix G

Number of Participants:

- Target 10 buildings
- No more than 2 buildings/firm or participant
- Up to 12 buildings

Estimated Level of Effort

- 8 hours/building

Target Building Characteristics

- Existing Appendix G or Section 11 model
- Any building type
- Over 25,000 sqft
- Any HVAC system type

Appendix G Tests

For buildings with an existing Appendix G model

- ✓ Re-run Appendix G models with updated BPFs and new rules
- ✓ Compare compliance outcomes against existing model
- ✓ Projects with purchased energy get updated based on new requirements and reevaluate compliance outcomes.
- ✓ Evaluate whether compliance outcomes would be different.

For buildings that used Section 11 compliance

- ✓ Create an Appendix G Baseline model of the same building design and determine code compliance outcome using proposed App G modifications.
- ✓ Do the Appendix G changes bring compliance outcomes in line with Section 11 compliance outcomes?

Building Performance Standards

Number of Participants:

- Target use of all App G and SPRM participants (12-15)
- Additional participants as part of stakeholder input on methods and analysis inputs

Estimated Level of Effort

- up to 8 hours

Target Building Characteristics

- Building types matching with other components
- Over 25,000 sqft
- HVAC matching with other components

BPS/LL97 Tests

Backwards Looking

- ✓ Gather benchmarking data for buildings constructed to 2016 and 2020 (as available) NYC Code
- ✓ Compare compliance estimated from data with 3 rounds of LL97 compliance

Phase 2 Appendix G and SPRM Samples

- ✓ Use energy use data from App G and SPRM runs under multiple conditions of other analysis runs
- ✓ Gather additional information from participants on building occupancy categories to calculate LL97 targets
- ✓ Compare compliance estimated from data with 3 rounds of LL97 compliance

Simulation Future Looking

- ✓ Review next NYC Code (including NYStretch and Electrification measures) for components that would impact simulation runs of modeled compliance
- ✓ Review matrix of solutions with industry stakeholders
- ✓ Complete simulation runs of matrix components
- ✓ Compare compliance estimated from data with 3 rounds of LL97 compliance



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Application and Next Steps



Application

- Online form for sign up will be distributed to email outreach list from this meeting

<https://www.energycodes.gov/nyc-performance-pilot>

- If you received this information from another colleague/party and were not on the initial distribution, please send us an email directly so we can add you to the application outreach



Phase 2 of the pilot will be evaluating TSPR, Appendix G and SPRM, please indicate a Main Pilot Contact and additional contact information for any others that will have a primary responsibility for one of the pilot activities.

Main Pilot Contact *

Name *

Company *

Email *

Phone *

Pilot Participation Interest *

- Simplified Performance Rating Method (S-PRM) Appendix G Updates
 TSPR Updates

TSPR Buildings

Proposed Building Information

Building Name

Total Number of Above-Grade Floors

Total Gross Floor Area

Enter the total gross floor area in square feet

Project Status

- Existing Building Under Construction Being Designed

Pilot Component*

- TSPR Updates

Building Occupancy

Primary Occupancy Type*

Select the occupancy types and corresponding floor areas for this building. Please note that only the buildings with the occupancy types shown can be analyzed with TSPR.

Primary Occupancy Floor Area

Enter the total gross floor area in square feet

Secondary Occupancy Type

Building HVAC Systems

Primary HVAC System Type*

Secondary HVAC System Type



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Thank you

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