

# **NYStretch 2018 Energy Code Advisory Meeting**

**December 1, 2017 | 9:00 am – 1:00 pm**

## **Locations:**

**New York City:** NYSERDA Office, 1359 Broadway – Brooklyn Boardroom, 19<sup>th</sup> Floor

**Albany:** NYSERDA Office, 17 Columbia Circle – Parker B Mathusa Boardroom

**Remote:** WebEx webinar connection link.

## **PARTICIPANTS**

**In Albany:** Joe Hill, Joe Hitt, Bing Liu, Maria Karpman, Steve Rocklin, Jodi Smits-Anderson, Lou Vogel, Priscilla Richards, Jim Edelson, Jeffrey Domanski

**In NYC:** Gina Bocra, Katrin Klingenberg, John Lee, Patrick Love, Emily Hoffman, Don Winston, Zachary Zill, Marilyn Dare

**Remote:** Steve Bluestone, Pasquale Strocchia, Mark Lyles, Sean Denniston, David Heslam, Jian Zhang, Harry Gordon, Kevin Stack, Joe Dolengo, Richard Bumstead, John Spillman,

**Absent:** John Addario, Dave Abrey, Lois Arena, Ian Graham, Rebecca Ruscito, Christopher Sgroi, Tom Eisele, Jack Bailey, John Barrow, John Ciavacco, BJ Gettel, Laurie Kerr, Kerry-Jane King, Tony Lisanti, Tony McDonald, Bill Nowak, Lou Petrucci, Kevin Stack, Michelle Tinner

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## **AGENDA**

- 9:00 - 9:10 am Roll call and introductions – Jeff Domanski, IBTS  
Recap of Stretch Code progress and schedule - Jim Edelson, NBI and Priscilla Richards, NYSERDA
- 9:10 - 11:10 am Overview of Commercial Modeling Methodology – Bing Liu and Jian Zhang, PNNL
- a. Innovative Multifamily Approach
  - b. Matrix of base measures, additional efficiency packages and bundles
  - c. Savings assessment relative to project goals - Jim Edelson and Bing Liu
  - d. Proposed structure of commercial code requirements - Jim Edelson and Mark Lyles, NBI
  - e. Existing Buildings approach – Jim Edelson
- 11:10 - 11:25 am Break
- 11:25 - 11:40 am Parking Lot Issues – Jim Edelson and Priscilla Richards
- a. Site/Source values
  - b. Multifamily Performance Targets
  - c. Modeling compliance
    - Appendix G and ECB
    - Combined Heat and Power
  - d. Passive House
- 11:40 am - 12:40 pm Overview of Residential Modeling Methodology - David Heslam, Earth Advantage
- a. Review of base measures and additional efficiency measures
  - b. One-in/One-out method
  - c. ERI Requirements

- d. Savings assignment relative to project goals - David Heslam and Mark Lyles
- e. Proposed structure of residential code requirements including credits - Jim Edelson and Mark Lyles

12:40 - 12:45 pm      Alignment of Low-Rise and High-Rise requirements - Jim Edelson

12:45 - 1:00 pm      Closing thoughts and Project Wrap - Jim Edelson and Priscilla Richards

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### **Recap of Stretch Code progress and schedule** - Jim Edelson, NBI and Priscilla Richards, NYSERDA

Following a roll call of participants beginning at 9:00am and a welcome by Priscilla Richards, Jim Edelson provided a brief overview of the agenda and the effort and progress made to-date and noted the majority of the meeting will focus on the residential and commercial modeling performed to achieve the project goals since the 2nd Advisory Group which took place on 9/28/17, and next steps to transfer recommendations into code language.

Jim spoke to the Schedule presented (see slide), which proposed completion of the draft language for NYStretch-Energy 2018 in December, legal review in January 2018, and a public comment period in February 2018. Jim also noted that two paths for development will be followed – one for New York City and one for the New York State version of the NYStretch-Energy 2018 code.

### Discussion/Stakeholder input

- Don asked about schedule and ability/timeline for reviewing the modeling results in detail and draft language – suggests more time, e.g., 2 weeks for review and another 2 weeks for discussing and is needed in the schedule. While consensus on concepts may be close, Don suggested they are far from consensus on the code language, and that the language is the crucial area from which implementation challenges will stem. New York City members agree with need to allow more time for review to get to the correct code language.
- Jim suggests that since the language of the near-final NYStretch Energy-2016 will be used as the template for the NYStretch-2018 code language, coming to consensus may not be as significant a challenge as expressed by Don. Priscilla indicated the schedule may be adjusted to allow more time for Advisory Council review.
- John Lee asked about the responsibility/requirements associated with responding to public comments. Priscilla indicated that NYSERDA keeps record of all comments, but as an Authority is not subject to the same obligations as a City or State agency. At NYSERDA's discretion, previous comments were either (a) incorporated in the stretch code; (b) not incorporated into that draft, but were carried forward for next round of development, or (c) were not incorporated as NYSERDA deemed they did not make sense or for which NYSERDA didn't agree.
- As this is a model code development process and not creation of an ordinance, it is not subject to the same requirements. Formal review enters the process later when locations move to adopt versions of the model code.

### Actions

- Advisory group members should send questions, concerns, and comments to Jeff Domanski, who will collect and transfer them to the team leads (NYSERDA, NBI, PNNL) for review and response.
- NYSERDA and NBI to evaluate the schedule, check in with New York City on its timetable, and consider allowing more time for Advisory Committee review of the draft language.

### **Overview of Commercial Modeling Methodology and Innovative Multifamily Approach**

Bing Liu of PNNL led the discussion of the commercial modeling methodology, beginning with a review of the working group conference calls process and contributions, during which proposed measures, “standard practices,” and the feasibility in NYC and other locations of many of these measures were discussed and evaluated. These efforts led to several measures being revised or removed from consideration, and addition of other measures, including lighting, elevator (from IgCC – see slide), ERV, and DHW strategies (see slides for details). Individual measures were modeled for various building types, as well as optional and bundled measures (Base, Optional, and Packages – see slides). A new high-rise building prototype was added based on data received from NYC team members.

Conservative modeling assumptions were generally used in the methodology (e.g., 5% energy benefit from use of regenerative elevators, 70% of exhaust air captured by ERVs).

### Discussion/Stakeholder input

- Don reiterated importance of obtaining modeling detailed information, including building weighting strategies used in the modeling. This data suggests that not much energy is gained via this equipment – likely 5% energy benefit in tall buildings at most. Jim indicated that the modeling team was conservative in its assumptions.
- Don suggests the 70% capture rate is likely not conservative enough and unrealistic, including because of the mechanical structure of buildings, but not necessary to prevent PNNL modeling efforts from being used.
- Don believes it is a significant issue to include this as he has problem with demand-based controls on DHW systems, as the thermostatic mixing valves require continuous circulation for operation – not intermittent. Don would argue against inclusion as it clashes with necessary operating practice. Emily concurs, indicating that numerous mechanical engineers working in multifamily buildings have reported inability to meet this requirement, and that the NYS DOS has not provided guidance. Concerns also include scalding-risk and Legionella. Proposed approach is to go with ASHRAE as it does not require this.

### Actions

- Don Winston to provide metering data from elevators at the Bank of America building to give insight on benefits of regenerative equipment. NBI/PNNL to discuss regenerative equipment data with Don Winston.
- NYSERDA/NBI/PNNL to provide modeling reports to the Advisory Group with details of modeling methods employed.

- To support determination of how to proceed with respect to the demand-based controls on DHW systems, Emily will provide information on the concerns received in NYC buildings.
- PNNL/NBI/NYSERDA to provide recommendation on how to proceed with demand-based controls on DHW systems after conferring with NYS DOS on its position and/or suggestion.

**Matrix of base measures, additional efficiency packages and bundles and Proposed structure of commercial code requirements and savings potential against goals**

Bing describes the modeling findings of the efficiency packages displayed on the bar charts (see slides) which are compared to 90.1-2013. Jim noted that there is nothing that can be done with the miscellaneous energy categories shown in the stacked bar chart tables for the modeling prototypes which has significant impact on ability to achieve the 20% goal, particularly in Large Office building prototype.

Discussion/Stakeholder input

- Harry Gordon asked why apartments are such a large portion of the construction weighting. Bing presented backup slides on construction weights to explain that PNNL used data for all New York (“Dodge Report” aggregated data from last 5 years) and data provided by NYC DOB. The construction weights are based on floor areas. Don Winston suggests trending vs. aggregated data should be considered due to likely dip in commercial construction anticipated in next 10 years.
- Program goals were discussed with respect to contribution of NYStretch code to New York State and New York City carbon reduction goals. Advisory members expressed need to balance contribution of effort to states 2050 GHG reduction goals, and near-term practical and cost-effective aspects of measures, a caution against rushing adaptation of technologies. There was disagreement about the role of the NYStretch effort to promote technologies and strategies, including LEED and passive house, and the proven nature of such strategies. Katrin noted the difference between PHIUS and PHI approaches. There was agreement that NYStretch is a minimum (20% energy savings) that can be exceeded.
- Jodi Smits Anderson suggested NYStretch should be looked at as a method to leapfrog technologies, as transformational strategy vs. incremental effort, the need to discuss the durable part of the buildings rather than just the systems within buildings, and when looking at cost-effectiveness, need to consider long-term cost-effectiveness, as well. These aspects are important as the “default” option represented in the framework will have significant influence on stakeholder actions vs. optional measures not prioritized and the perception of relative impact of measures.
- Jim noted that the NYStretch is a tool that will sit alongside other concurrent efforts with more aggressive goals, including the Zero Cities national project, ZNE code efforts, and the anticipated NYSEDA ZNE pilot city projects.
- Process loads in office buildings discussed, with clarification that savings are not derived from this “miscellaneous” area of energy use. Maria suggested it could be better to lower the plug/process loads in the model as this is suggested by the data seen in utility bills from buildings, but PNNL/NBI suggested keeping the conservative approach currently employed to not overestimate overall savings potential.

- Skepticism of the energy saving benefits of automatic demand response and sub-metering were expressed by Don, who also is concerned they would be an imposed cost on developers, but value of these measures was supported by John and Jodi, who indicated DASNY saw benefits after installing metering.
- Related to metering data, Jodi asked if a linkage or requirement to use Portfolio Manager should be included as a measure, as data value is important and often overlooked before upload. Don stressed the importance of reviewing the data to ensure quality.
- Passive house compliance path language will be included in the framework. Katrin suggested the language specify which passive house model is used with respect to air tightness protocols provided by PHIUS and PHI. Jim indicated that language would be drafted that doesn't refer to particular protocols but allows both main systems to comply with the envelope requirements. Language to be reviewed for DOS.
- Members of the advisory committee endorse inclusion of a minimum envelope floor (backstop) for performance, as ASHRAE has for lighting. Emily and Gina supported this suggestion and expressed concern about the insufficiency of U-values seen in modeling efforts, as much of the modeling is based on perfect operation assumptions, which are unrealistic. NYSECCC requirement is insufficient. Maria suggested it need not required meeting the ASHRAE 90.1 standard.

#### Actions

- Katrin Klingenberg to share additional information on the differences between the PHIUS and PHI passive house approaches.
- NBI/NYSERDA to confer with Department of State with respect to how to incorporate Passive House language in the next draft of the effort.
- Maria to circulate points for conversation to develop an air barrier backstop by email.

#### **Existing Buildings approach**

Jim addressed the approach taken to address the discussions in previous meetings on Existing Buildings, which included input from John Addario on what's allowed by NYS law and feedback from NYC DOB. This single, proposed approach addresses concern of BOMA and code officials expressed in 2018 ICC development efforts, which requires 'downstream' testing of new, accessible equipment.

#### Discussion/Stakeholder input

- Don sought clarification of the approach, including how much requires commissioning, and cautioned about the size of the impact of the proposed approach. Jim argued that the size requirements keeps threshold the same and that the intent is to carry NYC requirement language to NYS, where it does not exist.

#### Action

- Jim to review NYC language and to send drafts to the DOB for guidance on the appropriate language.
- Jodi to share NYS GreenNY OGS approved specifications with guidance language for suggested measures language for consideration for the Implementation package.

## **BREAK**

### **Overview of Residential Modeling Methodology**

David Heslam, Executive Director of Earth Advantage, described the residential modeling methodology with focus on the base package, the options, and the achievement of the targeted ERI.

### **Review of base measures and additional efficiency measures**

A similar structure was utilized for the residential framework as was applied for the commercial measures. David walked through the mandatory measures included in the model, including for fenestration, HVAC systems, lighting, and capture of heat from hot water systems (see slides for details) on the 36 prototypes, which included all climate zones. Slides presented the savings for the mandatory measure packages based on weighted average fuel consumption for climate zones 4, 5 and 6 compared to the 2015 baseline for both single family and multifamily model prototypes, which delivers a solid amount of saving (see slides and modeling methodology for details). Overall, the base multifamily bundle yields greater than 10% savings for electric and more for gas. When the additional Efficiency Packages are modeled (see details on slides). Note that David left numbers of packages as they were before he excluded package #5, so 6 and 7 are equivalent to 5 and 6 on base package slide. Jim explained that the Multifamily working group decided to work towards the Washington State approach in package development. Super high efficient water heating measure on multifamily yields more savings than others (c. 7%) because of the relatively low heating load in multifamily settings. This is reflected in energy efficiency programs across the country. A few combination scenarios were modeled as well (see detail on Multi-Measure Scenarios slide).

### Discussion/Stakeholder input:

- Don requested clarification of the "Ducted HVAC system" measure, which led to discussion of potential requirement to have ductwork and cooling and heating/combustion equipment installed inside conditioned space. Don expressed concern that the language be sufficiently clear to avoid misinterpretation on of location of combustion equipment such that equipment closet not be overlooked. Joe clarifies that fuel gas code applies to residential with need to meet minimum cubic foot enclosure for installation within conditioned space.
- The savings is less in multifamily than in single family due to there being less potential in heating loads when looking at zone 4 for the same mandatory measures. Electric heat is lower than gas because it is site energy focused, and savings is less than residential because of the heating loads. While climate zones 5 and 6 were not modeled for the multifamily prototypes, it was indicated that there would be no major differences, but the heating reduction would grow slightly due to increased heating need; zone 6 does have a different IECC baseline. Also, the lighting and appliances includes fan energy, which results in a slight difference as well. Bing suggested conversion from electric to gas could also account for some difference.
- Jodi stated appreciation for seeing nexus of water and energy from focus on water heating package measures in multifamily and suggested behavioral-based strategy advantage of listing envelope

measures first on the Multi-Measure Scenarios slide. The third multi-measure approach combined with the base measures gets beyond the 20% savings requirement.

### Actions

- Team to examine appropriate language for allowed placement of residential combustion equipment with respect to conditioned space.
- Mark/David to provide correction to the Multi-Measures Scenario slide to correctly note the inclusion of HE Equipment 3 (for water heating) instead of HE Equipment 2 in the second (bullet) scenario.

### **ERI Requirements**

This section focused on calculating ERI differences between new and old version of REM/Rate. REM/Rate version 14.6 and version 15.4, the latter will be required in 2018. All above based on site energy and % differences thereof. Architectural Energy (the software company) indicated inclusion of ANSI Standard 301 into the software is the main cause of the difference, which in our modeling resulted in a 6 point difference, but has shown a difference of 8 points in other modeling. This is important when using ERI performance pathway for builders.

### Discussion/Stakeholder input:

- David and Bing noted the analysis of differences between REM/Rate versions is still being examined. Katrin asked whether this would indicate benefit of performance based approach vs. percentage difference via prescriptive approach based on modeling. David expects another shift in the modeling tool will come in a year or two, which it was agreed is good that the modeling is improving. Pasquale stated he has used the version 15 modeling and has seen a more modest difference (i.e., 3-4 points) in thousands of rating model runs, and that this trend is good in not requiring code official to know all energy details. Joe Hill supports the latter statement.
- Some municipalities have mandated ERI approach, but it is not a requirement across the state energy code. In NYStretch-2016, ERI was mandated compliance for single family, but a prescriptive path for single family has been requested for inclusion in NYStretch-2018. Gina supports this as no one has yet done the ERI path in NYC.
- Pasquale suggested it is difficult to get aggressive ERI result in a small unit because surface area is important, so not yet appropriate to mandate ERI path for multifamily.
- Jodi asked why 90% high efficiency lighting requirement is not 100%. Jim suggests this is because there are some lighting applications which do not have a high efficiency option.

### **Proposed structure of residential code requirements including credits *and* Passive House**

See slide from framework diagram. First column shows mandatory base measures, the second column needs adjustment for ERI path alternative option, and the last column captures intent to include options based on different unit sizes.

### Discussion/Stakeholder input:

- Jodi suggests not using the phrase “How water piping limits” within the framework, but rather a more positive spin via use of the phrase “How water distribution.”

- Priscilla noted there has not yet been a DOS determination with respect to passive house envelope provisions. Katrin spoke to need for distinct difference between PHI and PHIUS passive house systems. Priscilla suggested that there may need to be identification of specifics for each system and that it would be best to not have NYSERDA pick the winner but rather to have the two system champions work to a commonly agreed approach. Katrin noted this is potentially trivializing the issue – PHIUS has responded to DOE suggestions but PHI has not, and she would like to see response on the applicability of the approaches for NYS from the framework and modeling teams.

Action:

- David/Mark to provide an updated version of the framework to capture change to include prescriptive path that doesn't include ERI requirement.
- Framework development team to consider Katrin's challenge/request for response on the applicability of the two passive house approaches for NYS from the framework and modeling teams.

**Alignment of Low-Rise and High-Rise requirements**

Jim describes distinction between commercial and residential codes for multifamily and explained that they are doing their best to have common requirements. "Alignment of Low-Rise and High-Rise Requirements" slide shows four areas where they can do this (see slide).

**"Parking Lot" Issues**

Discussion of issues which have arisen over framework and modeling efforts that do not fall in more general categories.

**Site vs. Source vs. Cost EUI values.** Table on "Energy Targets: Site EUIs" slide shows site values while second table (next slide) shows the source values for NY, and the "Conversion Factors" slide shows values used for calculated saving estimates. NBI requests guidance on how to write Appendix G and Section 11 language with reference to the desired EUI metric to use. State has a simple cost approach, by law.

Discussion/Stakeholder input:

- Discussion of use of performance path measure and whether Stretch Code should be based on an energy unit vs. cost unit. Jodi indicates advocacy-based preference for source values but indicated that the real estate sector is incorporating site-based values into sales data, which is worthy of support, and suggests going with Site to align with that effort, which also aligns with state requirement for cost.
- Maria suggests using Source EUI, and described a study conducted for NYSERDA which looked at the impacts energy compliance using cost versus energy approaches on project design decisions for gas versus electric (VRF) heating. Maria shared the results, which suggested that a cost basis did not support variable refrigerant systems, could incentivize behavior counter to the goal of NYStretch, and undermine the credibility of the effort. The team needs to agree on which approach is consistent with the intent of the NYStretch process.

- Jim clarifies that the energy cost values currently are being used to calculate the savings percentage, and that this approach runs counter to electrification policies.
- Lou asks if fugitive gas emissions are included, and it was acknowledged that no current approach incorporates life cycle analysis efforts.
- Emily indicates that cost method in modeling in NYC leads to issue when VRF is not used because of penalty.

#### Actions:

- Priscilla to discuss with Joe Hill/DOS and Emily in NYC if “site/source energy option” would be workable. Joe’s initial response is that since not a state mandate, should be able to do it, with understanding that Code Council will ask if its more restrictive and as long as it is, shouldn't be an issue
- Maria to share NYSERDA study reference above (to be posted to website).

#### **Modeling compliance**

Jim described the efforts in which he and Maria have been engaged as part of 90.1 efforts, looking at how much generation can be used to offset efficiency efforts. The essential compromise at IECC in Chapter 11 is 5% for renewables, and likely same in 90.1. The NYStretch-2018 proposal is to limit to 5% for determining compliance. This does not discourage renewables or CHP.

#### Discussion/Stakeholder input:

- Jodi if preferable to have a sufficient, “backstop” requirement for the building envelope rather than allow this offsetting against efficiency that requires “fixing” with renewable or CHP generation.
- Emily expressed concern that the language shown on the slide doesn't address fuel switching associated with CHP, where most of savings comes from rather than from waste heat recover. Maria countered that the language captures both existing generation and waste heat. Don suggested CHP often doesn’t work in practice, has seen lots of bad implementation of CHP, so need better wording to not throw out all good with bad. Don suggests possibly including a target basis or minimum criteria (like envelope compliance) with a table of mandatory criteria that applies if using offsets.
- Maria states both approaches are required, and this treats PV and CHP equally. Don feels that PV is not equivalent – CHP can work if done right. Jim clarified that this is very applicable in state locations outside of New York City. Priscilla indicated that answer to this approach is nowhere clear in NYSERDA discussions, so appreciates discussion.
- Don suggests including language stating in event of failure of the system to operate, then there's a standard that applies as a modeling exercise.

#### **Closing thoughts and Project Wrap**

Priscilla provided a brief summary of the NYStretch-2016 effort: the technical and administrative language is complete, but held up by copyright agreement with ICC. Likely going to be able to post on

website but not print it, leaving it to localities to negotiate copyright with ICC independently. NYSERDA is attempting to address the issue to avoid that. Both NYStretch efforts will be handled together and ready for April.

Discussion/Stakeholder input:

- Katrin stated she feels passive house was not sufficiently discussed. NYPH is promoting the German standard and not PHIUS, which is going 90% of certification in US and Canada, and that they have not sufficiently been consulted. Katrin would like to know who to speak with to address this gap and suggests reading the PHIUS DOE report. Jodi supports interest in exploration because New York is a powerhouse in the building industry.

Action:

- NBI/PNNL/NYSERDA to determine when/how to share more modeling methodology details with the advisory team.
- NBI/NYSERDA to issue notice when documents and other materials are posted to the NYStretch-2018 site.

**The meeting adjourned at 1:15 pm.**