NYStretch 2018 Energy Code Advisory Meeting
September 28, 2017 | 12:00 pm – 5:00 pm

Location: Building Energy Exchange, 31 Chambers Street, Suite 609 Boardroom, New York, NY 10007

PARTICIPANTS

In Person: Priscilla Richards, Jim Edelson, Jeff Domanski, Marilyn Dare, Lois Arena, Gina Bocra, Emily Hoffman, Joe Dolengo, Tom Eisele, Ian Graham, Jodi Smits-Anderson, Don Winston, Jack Bailey, Laurie Kerr, John Lee, Patrick Love, Zachary Zill

Remote: Mark Lyles, Bing Liu, David Heslam, Lou Vogel, Dave Abrey, Harry Gordon, Steve Rocklin, Christopher Sgroi, Kevin Stack

Absent: John Addario, John Ciovacco, BJ Gettel, Kerry Jane-King, Tony Lisanti, Tim McDonald, Joe Hill, Joe Hitt, Pasquale Strocchia, Rebecca Ruscito, Katrin Klingenberg

AGENDA

12:00 – 12: 30 pm	Gather, Settle-in
12:30 – 12:45 pm	Roll call and introductions of new members – Jeff Domanski
12:45 – 1:15 pm	Recap of Stretch Code progress and schedule and NYC efforts
	a. Review Project Schedule – Priscilla Richards
	b. Working Group review and resources – Jim Edelson
	c. New York City Update – John Lee
1:15 – 2:45 pm	Review preliminary residential modeling results
	a. Single Family Dwelling – David Heslam and Mark Lyles
	b. Low Rise Multifamily – David Heslam and Mark Lyles
	c. Multifamily consistency in the codes – Jim Edelson
2:45 – 3:00 pm	Break
3:00 – 4:30 pm	Review preliminary Multifamily and Commercial modeling results
	a. High-rise Multifamily prototypes – Bing Liu
	b. Commercial results – Bing Liu
4:30 – 5:00 pm	Cue remaining issues for feedback and discussion

Welcome and Policy Context

The meeting opened at 12:30 pm by Priscilla Richards, Program Manager, NYSERDA Codes Team. Priscilla provided a brief overview of the Stretch Code effort and progress made since the inception of

this project in June 2017. Jim Edelson of NBI described the stretch code concept and New York's efforts to date, including development of the first NYStretch-Energy framework in 2016.

The development and implementation process includes analysis of other stretch code structures to develop an overlay framework that can align with other building codes. The goal is to produce a final draft of the NYStretch-Energy language by the end of 2017 with final language produced by April 2018. A final meeting of the Advisory group is anticipated in early December 2017.

Jim added that this project is borrowing from the Zero Cities code development effort, and the implementation process is anticipated to begin with adoption by a leading city. Jim reviewed the resources page available on the NBI website and stakeholder input channels.

The end of 2017 is schedule for finalized draft of stretch energy language. It will stretch off of 2018 IECC code language; final language and publication planned for April 2018.

John Lee provided an update on the active efforts in New York City, notably the introduction of the stretch codes bill in June 2017 which proposes NYC's approach over the next three adoption cycles - 2019, 2022 and 2025. This bill obligates NYC to use a stretch version of the code to be published by NYSERDA as the base version for the 2019 and 2022 codes. If NYSERDA does not publish a stretch framework, NYC needs to adopt a version of the code that is 20% better than ASHRAE 90.1-2013 in 2019 and 40% better than ASHRAE 90.1-2013 in 2022. In 2025, building over 25,000 sf will have to meet a performance metric to be determined by the NYC code development committee and that is at least 30% better than ASHRAE 90.1-2013. It should be noted that this is a bill in active negotiation, and the final version, if enacted, may differ from the above.

Discussion/Stakeholder input

- NYC is anticipated to achieve a 6-8% improvement over the national average, which implies a a 12-14% improvement for the stretch code.
- The adoption process is expected to include interested municipalities filing with the New York Code Council and if filing requirements are met will be allowed to enforce unless the stretch code unless indicated otherwise by Code Council.
- As in the previous effort, a public comment process will be included; the development team will take comments that have new ideas not vetted by the advisory council as suggestions for next version (vs. review with this group). This was shown to be an effective approach for NYStretch-2016. The public comment period is anticipated to take place in February and/or March 2018.
- PNNL indicated that a quantitative assessment of NYStretch-2016 had been performed, but that comments received during that effort will have no impact on the process.
- NYS DOS confirmed that the state is anticipated to adopt the new code cycle version in 2019.
- New York City is anticipated to adopt the new code in April/May 2018. The NYCDOB committee process, by law, includes a number of members on the mandatory committee. A public process leads to creation of a draft bill which goes undergoes review by the Legal Department. Once approved, it the bill goes to the City Council, which can make changes to the bill. The time period before going to the Council is unpredictable, this it is important to have the framework ready as early as possible to meet the timeline goals.
- New York City is trying to achieve the trying to get to 20% target while aligning with the existing code adoption process.

- NYSERDA has conducted a number of cost-effectiveness analyses but not necessarily for all building types.

Residential Modeling

The team is modeling single family and low rise multifamily residential prototypes. Earth Advantage is performing the residential modeling and is a certifier of low energy homes in the northwest. Mark Lyles (NBI) and David Heslam (Earth Advantage) described the preliminary analysis.

Jim displayed the Structure Diagram for the residential NYStretch, which includes mandatory measures and ERI requirements based on what was published in IEC 2012 and subsequently analyzed, with a division at 3000 SF (see slide for details). For multifamily buildings where ERI path is not as applicable, there is a modeling path option. Based on what NYSERDA provided, the ERI Prescriptive approach home was modeled. The team developed proposed measures based on this structure.

The 2015 IECC values for the ERI were skewed based on the original analysis conducted by RESNET for the proposal to 2015 IECC.

Based on feedback from the working groups, a passive house path will be considered for next round and should be considered in the commercial code.

The residential modeling methodology included the same size of the single family prototype as was used for the previous NYStretch analysis (DOE prototype: 2400 SF two story). The team chose to do one composite unit with 1200 SF (see slides for details) from a 3 story building for the multifamily prototype. Results are representative average and are not weighed.

Three code baselines are considered (see slides for details) for this round of analysis to allow evaluation of impact of different improvement packages. The new version (15.4) of REMrate software (details on slide) was used, which will be the new standard accepted by code. The modeling team also applied ekotrope which will also be approved for code compliance. Variations in results were evident (see slides). Nine (9) of 36 prototypes had fully conditioned basement which increases size – sq. footage affects denominator.

Discussion/Stakeholder input

- The differences between PHI and PHIUS need to be addressed. Massachusetts allows only allows PHIUS. Because this approach is performance based both PHI and PHIUS will have to have performance approach developed for it and approved by DOS.
- A bigger change is to consider credit approach for the efficiency packages. Two additional packages to choose from would give builders/developers more choices. Outstanding item to address is how to credit renewables in ERI score.
- The multifamily model prototype, its relation to the national average was discussed. The PNNL prototype for lowrise multifamily is 2 a story building with 4 units on each floor. The national average for total apartment building square footage and the DOE prototype was adjusted.
- The appropriateness of the prototype to New York City was questioned and inclusion of common space in the prototype. Ian noted that in New York City, anything over 3 stories is commercial. While BOMA includes common space, according to Tom, David clarified that the prototype is

known as a "woody walk up" with no interior common space. The model does include some shelter space. Energy losses occur primarily through the foundation, attic, and walls. The prototype is somewhat similar to a townhouse.

- David suggested that the modeling could treat results as weighted average on construction type.
- Ian: is it safe to say 4 - 5 point jump for most buildings?
- The difference between the two version of REMrate were discussed. The model is largely considered basically a black box that defies full understanding of differences. REMrate is undergoing another engineering shift. RESNET is moving towards hourly simulation model which REMrate has never had. Working with NREL to utilize Energy+ as new energy model to sit under REMrate. Next 2-3 years. Will cause numbers to shift again. The modeling effort, and its ability to compare to and/represent reality is complicated and still actively being explored.
- The new model software estimates lower energy use than older software in a comparison of a 2015 home. Ian notes that a higher ERI results. When you look at packages, both modeling tools produce relatively consistent results, with some variation. If looking at EUIs, package EUIs on average is consistent (54) and better than base code (64).
- The REMrate 15.4 results table that compares different baselines shows that homes with electric heat have larger ERIs. Lowest ERI homes are gas heated with heated basements. Highest values are heat pump homes because they are electric heated.
- Lou Vogel noted that there was little difference between 2015 and 2018 codes, which Jim indicated was a disappointment at the IECC hearing, which won't serve to meet the needs of NYStretch.
- If the 2016 NYStretch, next stretch code will get a much more energy efficient target. For a point of comparison, Washington State, where they have a legislative mandate, should be hitting that level by 2nd cycle from now (achieve or surpass) with their standard base code. Oregon has fallen off leadership position, but expecting a governor mandate. There is the option to be 2 cycles ahead with Stretch frameworks.
- Each package modeled by Earth Advantage gets NYStretch to about 15% savings. For the ERI, we need to achieve about a reduction 12 ERI points from the base of 64 to get to 20% goal.
- Up to this point only climate zone 4 has been modeled with- composite units vs. measure variations as this was assumed to be the majority of that building type when developing protocol. Priscilla notes that this will not be the case for low rise multifamily.
- Water heaters were consistent in the modeling. It is possible to model domestic hot water (DHW) heat pumps in any building.
- Use of ekotropes within the model predicts even less than REMrate 15.4, which was less than the older REMrate (14.6) version. David asked if we needed to handle heat pump home differently as ekotrope appears to do a better job with heat pumps.
- Package Options slide: Washington State used a laundry list/flexible approach which allows decision making over a three period and negates need to adjust the bundle every time.
- As the results of modeling show consistent results, the modeling tool and package selection process shouldn't matter. To achieve the 5% gap in saving, it may be necessary to add enough measures not included in the strawman.
- Don suggested that the bundles approach is a bad idea as it may not work with the program to mandate measures.

- Gina indicated that the ERI path is rarely used since it was adopted in NYC. The industry currently does not embrace a points-based approach, so would education and advocacy would be necessary. REScheck does a tradeoff balancing approach but only between envelope and lighting.
- The proposed approach must allow changes that don't cause huge costs, encourage synergies versus expensive prescriptive measures, and don't rely on an arbitrary point system.
- Residential buildings options proposed for consideration: duct leakage, operation details of equipment (e.g., the return temp in a condensing boiler), and a system efficiency requirement. Concerned over mandating purchases that achieve little at great expense.
- Possible blended solutions proposed include mandating a minimum number of points requirement, a combination of a bundle system and point system for more sophisticated builders – each offer a clear and simple path.
- Kevin Stack suggests the team should look at performance based model. ERI approach requires performance based model. 2015 IECC requires blower door test for homes. Leads us to pathway for more ENERGY STAR homes (NYERDA incentivized) so may be a structure for more participation vs. a solo approach.

Actions:

- NBI will post modeling results on the NYStretch Resources page for information on point system options approaches.
- NYSERDA will coordinate with DOS and see what NYSERDA would approve with respect to the passive house path.
- The modeling team will consider how to credit renewable energy system inclusion in ERI and other scores going forward.
- NBI will coordinate with PNNL to examine use of foundation type and construction type data for New York State modeling.
- The modeling team will seek additional savings options to get beyond the currently modeled 15% savings result and will examine EUIs for comparison to 2015 IECC.

Multifamily modeling

The multifamily modeling began with review of construction projections and its increase over single family residential in New York State and NYC. The performance measures pathway approach (pick one per box) was modeled for multifamily and showed similar modeling results. Numerous options considered for previous NYStretch effort were removed because they are incorporated into 2018 code.

The IECC proposal to remedy multifamily as a split building type was considered, but this approach failed to be included in 2018 IECC. NYStretch measures that will be modeled will be applied to both low and high rise MF.

Bing described the multifamily modeling results and discussed the specific EUI savings derived, showing that the total bundle yields 36.5% savings over IECC 2015. Multiple optional measures were considered, including measures which yield energy savings and comfort benefits.

Discussion/Stakeholder input

- NBI confirmed the "bundle + ERV" is less than the bundle alone because it is an ERV that uses active fans in the ERV units throughout building resulting in negative performance.
- Ian asked if there is potential problem of with the performance measures selection approach if/when a developer proposed to pursue two measures from first box and none from the second box. Priscilla indicated that this is the advantage of use of a point system.
- It was noted that the commercial fenestration tables were altered to avoid excessive stringency by applying the architectural window approach. Three shading alternatives available include: overhang, use of blinds, or dynamic glazing. Thermal bridging approach is also being proposed. There was good feedback on cooling tower proposal adjustment. Windows are proposed to be divided into two classifications: "structural" and "punch" windows with each having their own u-value requirements. Don asked if curtain wall windows arer stringent enough.
- The Air Leakage slide prompted discussion of the reasonableness of baseline set at 1.0 cfm/ft^2. Ian suggests that the proposed number is ridiculous. NBI confirms that this was a NIST number (published in 2014) for buildings under 10 stories.
- Mark indicated that the cooling towers proposed measure was based on research published in ASHRAE journal and included in Title 24-2016. Don suggested that if considered for the next round of modeling, input from structural engineers on potential weight-related impacts on the overall building should be sought as it may increase weight by 50% and could have significant impacts on structure and health.

Actions:

- PNNL (Bing) suggests that data from NIST should be evaluated by Commercial working group.
- Modeling team to consult structural engineers on the proposed cooling tower measure.

PNNL modeling slides

Bing Liu led discussion of the PNNL modeling approach, which will include the recommendation by the Multifamily working group to model two apartment building types: a 10 story with hydronic heating and a 20 story with water source heat pump (see slide for details). The PNNL "straw man" document identifies16 proposed measures to be modeled in the prototypes, including envelope, lighting requirements, and 90.1 requirements for occupancy.

Discussion/Stakeholder input

- While parking light lighting may not be extensively used in New York City, it is considered because of use across the state.
- Power fan limits were those used in the NBI Guide, which may not be applicable for the 10/20 story building or hotels prototypes, as it may be too generous.
- The proposed equipment is not pre-empted by federal standards if there are packages. Ian and Don are concerned about giving credit for things they already do.
- Jack Bailey expressed concern that it is not clear how proposed additional daylighting is an enhancement. Bing indicated that models increase area that's required (to secondary zone) - from 50 to 80%.

- PNNL explained that the "optimize ventilation" is based on shifting to occupancy sensor to control ventilation.
- Preliminary showed results, lighting measures produce most savings for large office, service hot water recovery is dominant measure for Hotels, while in Schools, lighting and plug load dominate.
- Discussion of three bundles to demonstrate interactive savings: In schools, results show codes are working/making progress. In retail, it is harder to achieve 20% savings. It was suggested the large office/data center prototype value (60%) may be too large. Jim agreed and noted that if accept these values, it is almost impossible to achieve the 20% savings. It may be appropriate for the miscellaneous plug loads to be 30-40% of building.

Actions:

- Bing to review parking lot lighting approach for next modeling round.
- Lighting benefits for big box retail are suggested for focus in working groups.

Next steps (Actions):

- The framework development team will work with the Multifamily working group to review the proposed measures to see where consistency can apply the across the codes.
- There will be a correction to units on air infiltration from 0.4 to 0.25.
- The DOAS option will be further defined to discern from older approach.
- Jack Bailey suggests IALD numbers are still best measure for residential as they do not dictate number of fixtures, which is why there is resistance to LPD use in residential sector. ASHRAE is not a useful resource for this area.
- Additional measures suggested for evaluation:
  - Plug load controls
  - ASHRAE 189.1 approach with ENERGY STAR equipment will be considered as a path in next draft. Jodi to share suggestion with Jim to consider for straw man.
  - Elevators measures, including possibly regenerative drive equipment with a height threshold – but no mandate on motor.
  - Lamps/luminaries, including possibly International Association of Lighting Designers (IALD) guidance on lamps side (associated with ENERGY STAR) and the CA Title 24 approach

The meeting adjourned at 5pm.