The New York Stretch Energy Code: A Convergence of Opportunity

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ABSTRACT

The New York State Energy Research and Development Authority (NYSERDA) is responsible for creating a "stretch" code for New York, which is available to jurisdictions for adoption. The new stretch code is intended to support New York's ambitious goal of reducing economywide greenhouse gas (GHG) emissions by 40 percent of 1990 levels by 2030 and 85 percent by 2050. This paper describes the development of the new commercial stretch code measures (NYStretch), and the unique approaches used to meet New York's building decarbonization goals.

NYSERDA's overarching goal for this effort is to create a holistic energy conservation code, breaking the typical silos that separate building systems, and deliver one of the most efficient codes in the country. This holistic approach allowed greater investment in durable efficiency because system improvements were arranged to balance and reinforce each other. For example, mitigating thermal bridging in wall assemblies allowed increased insulation to function properly, which then justified additional fenestration performance, and enabled highly efficient heat pump-based HVAC systems to be cost-effective.

Aside from the extensive collaboration and contribution of stakeholders, the primary elements enabling holistic building performance were a good thermal envelope (low air leakage, thermal bridging mitigation, and increased insulation), highly efficient all-electric HVAC systems (delivered through a system performance approach), a selection of high-impact energy credit options, and enhanced performance modeling options with customized ASHRAE 90.1 Appendix C and G implementations. This holistic and tailored approach to high-performance energy code design could be used in jurisdictions around the country to achieve deep energy and carbon reductions.

Introduction

This paper examines New York State Energy Research and Development Authority's (NYSERDA 2024) ongoing efforts to develop and deliver amendments to the national model codes and standards for New York State and the City of New York. The amendments have been prepared under a stretch code, called 2023 NYStretch, which is a voluntary code available to jurisdictions for adoption. Requirements from the previous code, 2020 NYStretch, were adopted into the minimum energy code by New York City. Additionally, proposals have been submitted to the Department of State (DOS) to amend the statewide minimum energy code to align with 2023 NYStretch.

NYSERDA funded NORESCO and a team of consultants to develop 2023 NYStretch. NORESCO led the development of the commercial code, which is the focus of this paper. Code development was performed using guiding principles that were formulated at the start of the project and the overarching goal of supporting New York's economywide greenhouse gas reduction goals of 40 percent of 1990 levels by 2030 and 85 percent by 2050 (Climate Action Council 2024). The code development process involved stakeholders who provided feedback on the code architecture, the package of measures, and the code language.

New York State and the City of New York are aligned in a desire to transition to a more sustainable energy economy (NYSERDA 2023) (City of New York 2024). There is significant interplay among construction codes, local laws, and recently updated regulatory frameworks, all of which acted upon the stretch code development.

The topic of energy efficiency and associated "clean energy" measures in construction regulation has gained popular momentum in contemporary discussions of sustainable development. Energy efficiency advocates and leading jurisdictions have been demanding higher building performance, and in response even "minimum efficiency" standards (ASHRAE 2023) (ASHRAE 2022) are on path to achieve net zero carbon and net zero energy in near-term code development cycles. With additional support from federal funding (The White House 2023), stakeholders have an unprecedented opportunity to participate in the code development process to help influence their clean energy future through rulemaking enforced by the City and State of New York.

Background

History of NYStretch

NYSERDA began development of the stretch code in 2017, as part of an effort to move New York towards a statewide Net Zero Energy Code by 2028. The first NYStretch version was released in 2020 by NYSERDA. The 2020 NYStretch was an overlay of 2018 IECC (ICC 2018) and ASHRAE Standard 90.1-2016 (ASHRAE 2016), and was based on implementing high-performance energy-efficiency measures (EEMs) from national model codes, other beyond code programs, and measures proposed during the stretch code development process. A package of cost-effective EEMs that went beyond the 2018 IECC and Standard 90.1-2016 was analyzed and language corresponding to the EEMs was included in 2020 NYStretch. Compared to ASHRAE Standard 90.1-2013 (ASHRAE 2013), the 2020 edition of NYStretch saved 11.1 percent site energy and 12.1 percent in energy cost across the state of New York (Chen, et al. 2019). Certain provisions within the 2020 NYStretch code were adopted by New York City to form the 2020 New York City Energy Conservation Code (2020 NYCECC). New York City is required by ordinance to adopt an energy code not less efficient than the stretch code published by NYSERDA (City of New York 2016).

Regulatory Landscape

The regulatory landscape in New York changed significantly while developing the new stretch code. On February 1, 2023, New York State lawmakers passed the "All-Electric Buildings" law[1] that imposed a prohibition on fossil fuel building systems in most new construction (State of New York 2023). With this law, New York became the first state in the nation to require essentially all new buildings to be all-electric. The key aspects of the law are:

- Zero on-site greenhouse gas emissions for all new construction (residential and commercial) no later than 2027.
- As soon as possible, revise the Energy Law related to the State Energy Code to remove the 10-year cost effectiveness criterion.

[1] A user-friendly summary is provided at https://nyassembly.gov/all-electric-buildings/?sec=home

- In 2023, adopt a highly efficient State Energy Code for new construction and require electric readiness, EV readiness, and solar PV wherever feasible.
- In 2024, adopt all-electric State codes that prohibit gas/oil equipment for space conditioning, hot water, cooking, and appliances for new construction of single family and low-rise residential buildings.
- By 2027, adopt all-electric State codes that prohibit gas/oil equipment for space conditioning, hot water, cooking, and appliances for new construction of multifamily buildings over three stories and commercial buildings.

The prohibition on fossil fuel equipment will be implemented in phases based on number of building stories. In 2026, buildings up to seven stories tall, except for commercial and industrial buildings larger than 100,000 square feet, will be required to be all-electric. In 2029, new buildings of all sizes will be required to be all-electric. The law must be implemented and enforced through the state energy code, and the new stretch code that was being developed fit the needs of this new law.

Other than the All-Electric Buildings Law, local governments in New York are authorized to amend the Uniform Building Code (NYS Senate 2017) and the Energy Conservation Code (NYS Senate 2014) with strengthening amendments. As described previously, New York City amends the state code using the stretch code published by NYSERDA. In addition, New York City has several laws and regulations related to building energy conservation, emissions reductions, and renewable energy generation. Of these, Local Law 154 is worth mentioning, because like the All-Electric Buildings law, it prohibits the use of fossil fuel-based space heating and service water heating (SWH) in new buildings (City of New York 2021).

Guiding Principles for the New Stretch Code

With the regulatory landscape providing impetus to pursue building decarbonization, energy efficiency, and renewable energy, the next version of the stretch code (the subject of this paper) could be more ambitious. With nearly all efficiency measures, decarbonization measures, and renewable measures on the table, there were several approaches to crafting the new stretch code. A set of principles was laid out to guide the development of the stretch code:

- Holistic approach: Measures would not be evaluated for cost-effectiveness on an individual basis. Envelope improvements are generally more expensive but the savings last longer. This approach allowed greater investment in durable efficiency because system improvements were arranged to balance and reinforce each other. For example, mitigating thermal bridging in wall assemblies allowed increased insulation to function properly, which then justified additional fenestration performance, and enabled highly efficient heat pump-based HVAC systems to be cost-effective.
- Weight on durable efficiency: Provide appropriate weight to efficiency measures that last longer and can serve to reduce the load. This means giving more weight to envelope measures and protecting them from being traded-off.
- Promote decarbonization: Where cost-effective, require heat pump-based space heating and water heating. Build flexibility so designers have choices for achieving decarbonization.

- Cost-effectiveness: The new stretch code must be technically feasible and must be cost-effective over a 30-year horizon (NYSERDA 2023).
- Usability and Enforcement: The new stretch code must be easy to understand, to use, and must be easily enforceable.

Development of the New Stretch Code

The NYStretch development process involved the following steps:

1. Target development: Based on the guiding principles, the previous stretch code, and progress made in the national model codes since the previous New York state energy code was adopted, a target improvement by building type and climate zone relative to the state code was developed. The objective was to assess the range of possible improvement that may be achievable.
2. Code development: The code development and stakeholder feedback (described in the next step) were performed in an iterative manner. The first step was to develop a code architecture that would achieve target improvements while staying true to the guiding principles. The next step was to develop code language, which was provided to stakeholders for review. Several rounds of feedback from stakeholders and NYSERDA staff were incorporated into the development of the code language.
3. Stakeholder feedback: A crucial part of the code development process was stakeholder feedback for sorting through code approaches, evaluating metrics, energy modeling analysis, cost-effectiveness parameters, refining code language, and arriving at a code that was satisfactory to design professionals and code officials in New York.
4. Cost-effectiveness analysis: The last step involved evaluating the life-cycle cost of the proposed changes to the state code. This step allowed NYStretch provisions to be adopted by jurisdictions with the full knowledge of cost-effectiveness of the new requirements.

Uniform Target Development

The very first step in the development of the new stretch code was evaluating where energy was being consumed in buildings in New York. Table 1 shows the building types and end-uses with the highest energy consumption. This analysis showed that:

- Nearly 70% of newly constructed buildings in the state were in New York City and of those, almost 50% comprised apartment buildings and large office (>150,000 ft^2 and taller than 4 stories) buildings.
- Service water heating (SWH) and space heating in apartment buildings consumed the most energy of all end-uses across the state (approximately 40% of statewide new construction building energy use).

Table 1: Highest consuming end-uses in newly constructed buildings in New York

Building Type	End-Use	Proportion of Floor-Area Weighted New York End-Use Consumption[1]
High-rise Apartment	SWH	19%
High-rise Apartment	Space Heating	11%
Mid-rise Apartment	SWH	7%
Standalone Retail	Space Heating	6%
High-rise Apartment	Space Cooling	4%
Non-Refrigerated Warehouse	Space Heating	4%
Large Hotel	SWH	4%
High-rise Apartment	Interior Lighting	4%
High-rise Apartment	Fans	3%
Standalone Retail	Interior Lighting	3%
Mid-rise Apartment	Space Heating	3%
High-rise Apartment	Exterior Lighting	2%
Standalone Retail	Fans	2%

[1] Based on Standard 90.1-2019 Prototypes from PNNL and New York construction weights also from PNNL (Lei, et al. 2020).

The end-use analysis revealed the sources of highest energy consumption, and these sources then became the target for improvement. An estimate of achievable energy reduction from the state energy code was developed using past stretch code analysis and the site energy savings numbers provided in the energy credits tech brief developed by PNNL (Hart, McNeill, et al. 2021). Using assumptions for savings from improved envelope and selecting credit measures for each prototype, a 10-20 percent reduction in site energy was deemed achievable across building types with the highest floor area in New York.

Stakeholder Feedback

The previous iteration of NYStretch was developed using stakeholder feedback during various stages of development. NYSERDA intended to follow a similar approach in the development of the new stretch code. It cannot be emphasized enough that stakeholder feedback played a crucial role in the development of this new stretch code and without this feedback, the new stretch code would have been far less usable and would not have achieved the intended improvements in stringency.

A team of experts in building design, energy codes, code verification and enforcement, as well as recognized design experts in New York State were gathered by NYSERDA to form a stakeholder group. This diverse stakeholder group participated in regular meetings with the code development team during stretch code development, providing feedback and subject matter expertise. There were three stakeholder sub-groups: commercial, residential, and an outreach and implementation group. Each of these groups met with the consultant team to discuss code architecture, specific requirements, code language, and usability and implementation. Stakeholders engaged in multiple rounds of development.

In addition to the stakeholder group, code adoption bodies in New York provided feedback during the stretch code development:

- *The State of New York's Department of State (NYDOS).* The Department of State houses the State Fire Prevention and Building Code Council, which is generally similar in appointment, structure, and composition to typical code councils (NYDOS 2023). While the Code Council ultimately adopts or rejects proposed amendments to the Uniform Fire Prevention and Building Code (UBC) and the State Energy Conservation Construction Code (ECCC), NYDOS staff review proposals and ensure that the Code Council has all resources needed to make their decisions. For this suite of proposals NYDOS provided review for clarity, consistency with existing rulemaking and state law, and continuity among the code volumes comprising the UBC and ECCC. Additionally, they reviewed claims regarding first cost, operational cost savings, and lifecycle costs or savings.
- *The City of New York's Department of Buildings (NYCDOB).* New York City has adopted NYSERDA's Stretch Energy Code as the NYC Energy Conservation Code (NYCDOB 2024). For New York City, the NYCDOB acted in a similar capacity to NYDOS; because they are the City's building officials, they provided stakeholder input during the development process and reviewed the code and analyses for potential recommendation to the City Council. They were the subject matter experts for New York City's unique construction and regulatory demands.

Code Development

NYStretch Architecture

The guiding principles (described earlier) stated that the new stretch code must have a high-performing envelope, protect the envelope from being traded-off, and provide flexibility for designs to meet the decarbonization requirements. With that in mind, several code architectures were explored and presented to the stakeholder group. The code architecture must result in a framework that makes the code easy to understand, implement, verify, and enforce. The new stretch code would be based on the latest IECC and Standard 90.1 and would inherit many of the features of the national model codes. Thus, the code architecture must also merge seamlessly with the two national model codes.

Figure 1 shows the final stretch code architecture. Projects complying with the stretch code would have two paths:

1. Prescriptive: Meet the mandatory and prescriptive requirements of the 2024 IECC or the 90.1-2022 model codes, and the mandatory and prescriptive requirements of the stretch code.
2. Performance: Meet the mandatory requirements of the 2024 IECC or 90.1-2022, the mandatory requirements of the stretch code, and the whole building performance requirements of the stretch code.

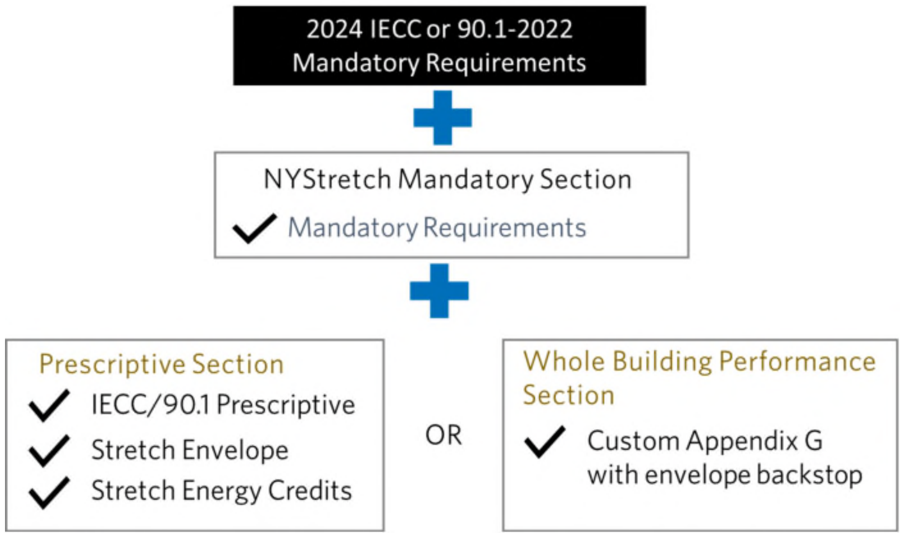

Figure 1: Stretch Code Architecture

The prescriptive stretch requirements include only two major items: requirements for a highly efficient envelope and energy credits. The prescriptive envelope measures were applied to all building types, but energy credit requirements were developed based on Table 1 and by selecting credit measures appropriate to individual building types. For example, the energy credits requirement for apartment buildings (R-2 occupancies) was set with the assumption that credit measures for reducing the SWH consumption would be used.

In the performance approach, an envelope backstop was created that prevented the envelope requirements from being traded-off. All decarbonization requirements for space heating and water heating were placed in the energy credits section, thereby providing ample flexibility for projects to choose how the total credits requirement was achieved. The envelope, energy credits, and performance path requirements are described in greater detail below.

Prescriptive Path

Envelope

The opaque envelope and fenestration requirements were strengthened considerably relative to the 2024 IECC and 90.1-2022. Table 2 and Table 3 show the opaque and fenestration requirements in the stretch code relative to the 2020 Energy Conservation Construction Code of New York State (ECCCNYS.). Initial drafts of the stretch code specified passive-house levels of insulation; however, those values were deemed to be impractical for adoption by jurisdictions during stakeholder discussions. The final values were deemed to be buildable by the stakeholder group with ample evidence of previous construction to these levels from existing high-performance buildings. A user guide for envelope compliance options is planned.

Table 2: 2023 NYStretch opaque maximum allowed U-factor relative to 2020 ECCCNYS

CLIMATE ZONE	Code Version	4		5		6	
		All other	Group R	All other	Group R	All other	Group R
Roofs							
Insulation entirely above roof deck	Previous	U-0.032	U-0.032	U-0.032	U-0.032	U-0.032	U-0.032
	Stretch	U-0.030	U-0.030	U-0.030	U-0.030	U-0.028	U-0.028
Metal buildings	Previous	U-0.035	U-0.035	U-0.035	U-0.035	U-0.031	U-0.029
	Stretch	U-0.035	U-0.035	U-0.035	U-0.035	U-0.028	U-0.026
Attic and other	Previous	U-0.027	U-0.027	U-0.027	U-0.021	U-0.021	U-0.021
	Stretch	U-0.020	U-0.020	U-0.020	U-0.020	U-0.017	U-0.017
Walls, above grade							
Mass	Previous	U-0.104	U-0.090	U-0.090	U-0.080	U-0.080	U-0.071
	Stretch	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055
Metal building	Previous	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052
	Stretch	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.046
Metal framed	Previous	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064
	Stretch	U-0.044	U-0.044	U-0.044	U-0.044	U-0.044	U-0.044
Wood framed and other	Previous	U-0.064	U-0.064	U-0.064	U-0.064	U-0.051	U-0.051
	Stretch	U-0.043	U-0.043	U-0.043	U-0.043	U-0.043	U-0.043

Table 3: 2023 NYStretch Fenestration Requirements relative to 2020 ECCCNYS

Climate Zone	Code Version	4	5	6
U-factor				
Fixed fenestration	Previous	U-0.38	U-0.38	U-0.36
	Stretch	U-0.28	U-0.28	U-0.28
Operable fenestration	Previous	U-0.45	U-0.45	U-0.43
	Stretch	U-0.32	U-0.32	U-0.32
Entrance doors	Previous	U-0.77	U-0.77	U-0.77
	Stretch	U-0.60	U-0.60	U-0.60
SHGC				
		Fixed/operable		
PF < 0.2	Previous	0.36	0.38	0.40
	Stretch	0.25	0.32	0.34
0.2 ≤ PF < 0.5	Previous	0.43	0.46	0.48
	Stretch	0.30	0.38	0.41
PF ≥ 0.5	Previous	0.58	0.61	0.64
	Stretch	0.4	0.52	0.54

Climate Zone	Code Version	4	5	6
Skylights				
U-factor	Previous	0.5	0.5	0.5
	Stretch	0.4	0.4	0.4
SHGC	Previous	0.4	0.4	0.4
	Stretch	0.3	0.3	0.3

Thermal Bridging. Together with the improved opaque insulation and fenestration requirements, a critical improvement over the national model codes was the thermal bridging requirement in the stretch code. Standard 90.1 developed a detailed prescriptive approach to thermal bridging and the 2024 IECC follows a simpler but similar prescriptive approach. These existing prescriptive approaches, while easy to follow, restrict projects to only a few options for compliance. The guiding principles for the stretch code stated that not only must the envelope be highly efficient but also that projects must have flexibility when complying with the code. The approach used for thermal bridging in the stretch code significantly increased the stringency of the thermal bridging requirements while providing added flexibility. This was accomplished by providing an additional U-factor allowance for thermal bridging to be added to the clear field U-factor., *i.e.*, the wall assembly with no bridging. This approach is similar to additional lighting power allowances provided to certain applications (such as display cases in a jewelry store). The thermal bridging allowance can be traded off against insulation, i.e., a project may use more insulation and poorer assembly intersection details to meet the combined U-factor (clear field plus thermal bridging). This leaves some of the detailed design work to the designer and was identified as an area where additional outreach and training would be required to transform the construction and design industry and help support the transition towards thermal bridging mitigation requirements in the energy code.

Air Leakage. Informed by previous discussions at the ASHRAE 90.1 Air Leakage Working Group, the stretch code specified that air leakage testing would be required for all buildings and reduced the air leakage rate to 0.20 CFM/ft^2 at 75 Pa to preserve the thermal performance of the other envelope components. The air leakage, thermal bridging, and improved opaque insulation and fenestration requirements result in a highly efficient envelope, which is protected by the envelope backstop in the performance path.

Energy Credits

The second element of the stretch code prescriptive path, after envelope requirements, was the energy credits section. Energy credits provide a menu-based option for selecting high-efficiency measures that may be appropriate for a given project. The concept was developed by PNNL (Hart, McNeill, et al. 2021) and has found its way into national model codes and state and local energy codes. It provides a convenient and flexible way for energy codes to increase stringency without running into cost-effectiveness boundaries and providing a flexible path for projects towards compliance.

For 2023 NYStretch, the existing energy credits section in the 2024 IECC (and 90.1-2022) was replaced in its entirety with a new credits section. The credit values were based on site energy use (a consensus decision of the stakeholder group) and represent a 0.1 percent site energy savings for a given occupancy type. Using the site energy metric was a deliberate choice because it captures the improved performance of heat pump-based systems compared to their fossil fuel-based counterparts.

To promote decarbonization, the HVAC system performance energy credit measure and heat pump water heater (HPWH) energy credit measure were included. The HVAC system performance measure sets a budget for HVAC system performance. Efficient system design with heat pump-based systems were used to set the HVAC performance budget. The equipment efficiency was set to the minimum required for equipment covered by federal or ASHRAE Standards, but the system design was optimized for each building type. Table 4 shows the HVAC systems used to set the target performance; note that the stretch code does not disallow National Appliance Energy Conservation Act (NAECA) minimum equipment. The HPWH measure provides a significant number of points in multifamily occupancies.

The total points required sets the stringency for the entire energy credits section. Decarbonization of space and water heating systems was encouraged by requiring a tally of points that most easily would be achievable using heat pump-based space and water heating systems. Fossil fuel-based systems can be used to meet the stretch code, but these projects would need to apply several other efficiency measures to meet the site energy savings achieved by heat pump-based systems. As seen in

Table 4, SWH end-use in the multifamily occupancy consumes the most energy out of all end-uses in New York state. The HPWH and SWH preheat measures provide ample credits to reduce the SWH consumption in multifamily occupancies.

The energy credit section retained other key energy saving measures, such as SWH preheat, interior and exterior lighting power reduction, and plug and process load measures. An envelope trade-off measure also was provided and is based on the 90.1 Appendix C trade-off approach. The rules for the trade-off approach calculation were adjusted to incorporate the novel thermal bridging approach and U-factor allowances.

Table 4: HVAC target systems for HVAC system performance measure

Prototype	Cooling	Heating	Ventilation/Air Distribution
20-story Apartment (NYC)	WSHP	AWHP	DOAS with ERV
10-story Apartment	WSHP	AWHP	DOAS with ERV
Standalone Retail	DX (2-speed packaged ASHP)	DX (2-speed packaged ASHP)	Integrated outdoor air
Large Office	Water-cooled chiller	AWHP for heating	DOAS for ventilation, FPFC
Large Hotel	DX (Split ASHP for guestrooms, PSZ-ASHP for Kitchen, Dining Room, Café Zones)	DX (Split ASHP for guestrooms, PSZ-ASHP for Kitchen, Dining Room, Café Zones)	Central DOAS with ERV for the guest rooms and common areas

WSHP = water-source heat pump, AWHP = air-to-water heat pump, DOAS = dedicated outdoor air system, ERV = energy recovery ventilation, DX = direct expansion, ASHP = air-source heat pump, FPFC = four-pipe fan coil, PSZ = packaged single zone

Performance Path

The performance path follows the 90.1 Appendix G requirements with a few modifications. The metric used for performance compliance is site energy use because it properly accounts for the energy efficiency of heat pump-based systems relative to fossil fuel-based systems. Building performance factors (BPF) were calculated using site energy as the metric specifically for New York locations using New York-specific prototype models developed explicitly for this project. The energy budget was based on the improved envelope requirements in the stretch code and a package of energy credit measures that achieved the minimum required points that were equivalent to the most efficient code compliant equipment selection. The HVAC system performance measure was used to achieve the credits in all occupancies where it is available. In addition, the HPWH and point-of-use measures were used where appropriate to reduce SWH consumption.

Cost-Effectiveness of the New Stretch Code

A cost-effectiveness analysis was performed to determine if the incremental costs incurred because of the improvements required by the stretch code could be paid for by energy cost savings generated by those improvements. The NYSERDA cost-effectiveness methodology (NYSERDA 2023) that specifies the approach and economic parameters for energy code cost-effectiveness was used. This NYSERDA methodology is based on the DOE methodology (Hart and Liu 2015). A few key additions to the NYSERDA methodology are as follows:

- Property tax rate is set to zero. Taxes are dependent financial conditions and vary significantly. A pre-tax discount rate is used, and this aligns with the economic approach used by Standard 90.1 for evaluating proposed changes.
- In the DOE methodology, fuel cost savings are taxed. In this analysis, in alignment with the above item, energy cost savings were assumed to be reinvested and not taxed as they would be if kept as cash on hand. That is, owners were assumed to minimize tax liability where possible.
- Social Cost of Carbon: Using guidance from the New York State Department of Environmental Conservation (DEC), a social cost of carbon (DEC 2023) was incorporated into the analysis.

The package of measures used to develop the BPFs for the performance path was used for the proposed case in the cost-effectiveness analysis. The base cases were based on a weighted average of mixed-fuel and all-electric buildings, where the weighting was determined by the effective date of all-electric requirements for a given building type, based on the All-Electric Buildings Law (State of New York 2023). Cost-effectiveness was evaluated on a 30-year period of analysis, and included the first cost, maintenance and replacement costs (based on equipment life), and residual values. A cash flow analysis was developed with loan payments, maintenance and replacement costs, and gas and electric cost savings, and social cost of carbon benefits from the gas and electric energy savings. NYSERDA published a rule to amend the DOE methodology (NYSERDA 2023) and formalize the economic parameters and procedures for performing cost-effectiveness evaluations of the energy code.

The 2023 NYStretch was shown to be cost-effective on a life-cycle cost basis compared to the current state code at the statewide level and at the climate zone level. The detailed results of the cost-effectiveness analysis have not been published yet and cannot be incorporated into the paper at the time of writing.

Summary and Next Steps

This paper described the development of New York's stretch energy code, developed with support from NYSERDA. The stretch code used a unique code architecture (Figure 1) that merges the prerequisite of the 2024 IECC and 90.1-2022 national models with new stretch code requirements to align both primary compliance paths. Instead of past measure-by-measure approaches to stretch code development, a holistic approach was used that allowed durable envelope improvements to be combined with decarbonization measures for an energy code that delivered not only deep and long-lasting site energy savings but also emissions reductions that align with New York's GHG reduction goals. The stretch code also supports New York's overarching goal of adopting a net-zero carbon energy code by 2027.

The next step in the stretch code journey is adoption of the code by NYDOS. To that end, the team has submitted code change proposals that furnish the required information on code language, cost-effectiveness, and enforceability. This new stretch code has been renamed the New York Energy Code as of this writing. A guideline describing the features of the new code, the intent, and approaches to compliance is planned to support adoption and compliance.

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