

**Codes and Standards for Carbon Neutral Buildings  
Initiative Year 5 Market Evaluation Report:  
Savings Estimates and Progress Toward Goals**

*Final Report*

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# Acronyms

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ACS	American Community Survey
AHJ	Authorities having jurisdiction
CEF	Clean Energy Fund
CEF CIP	CEF Compiled Investment Plan
CIP	Compiled Investment Plan
CJWG	Climate Justice Working Group
CSCNB	Codes and Standards for Carbon Neutral Buildings
DACs	Disadvantaged communities
DER	Distributed energy resource
ECCCNYS	Energy Conservation Construction Code of New York State
ERV	Energy recovery ventilators
EV	Electric vehicle
FY	Fiscal year
GWh	Gigawatt hour
HRV	Heat recovery ventilators
ICC	International Code Council
IECC	International Energy Conservation Code
MW	Megawatt
NEEP	Northeast Energy Efficiency Partnership
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
PON	Program Opportunity Notice
PV	Photovoltaic
SBC	System Benefits Charge
T&MD	Technology and Market Development Program
Tbtu	Trillion British thermal units

# 1. Introduction

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NYSERDA and the market evaluation team designed a Market Evaluation of the Codes and Standards for Carbon Neutral Buildings (CSCNB) Initiative that has assessed the initiative for five years (2020–2024), with the indirect market impacts of the five-year evaluation period determined in Year 5. This Year 5 report presents the market evaluation team’s evaluation findings for the initiative based on activities conducted in Year 5 (2023-2024), including surveys with participants in NYSERDA-funded trainings, interviews with code officials and building professionals from jurisdictions across New York State, and the results from a Delphi panel focused on a review of New York State energy code compliance. An independent panel that comprised New York State and national experts in code development and code compliance assessed the impact of code compliance, code development, and code enforcement activities of the initiative. The market evaluation team also consulted with NYSERDA staff who contributed to the initiative to understand the evolving regulatory space and priority activities. This report provides the estimate of initiative savings for the five-year evaluation period, assessed using the data provided through evaluation activities and in accordance with a methodology developed in collaboration with NYSERDA at the beginning of this evaluation period.

Through research conducted in Year 5, the team has continued to gather data to estimate final initiative impacts and to track progress toward the initiative goals (associated with outputs and outcomes).

According to NYSERDA’s Clean Energy Fund (CEF) Compiled Investment Plan (CIP),<sup>1</sup> the following goals are set for the end of 2025:<sup>2</sup>

- 20,000 training seats filled
- Four policies or regulations to promote efficiency, flexibility, and decarbonization developed or updated
- 35 jurisdictions adopt approaches, such as stretch codes or alternative code compliance, advanced by NYSERDA through pilots

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<sup>1</sup> Refers to the November 2024 Compiled Investment Plan, as the latest Plan published at the time of this Report. <https://www.nyserdera.ny.gov/-/media/Project/Nyserda/Files/About/Clean-Energy-Fund/Matter-1600681NYSERDA-CEF-CIP-1-November-2024.pdf>

<sup>2</sup> In the Year 4 report, the market evaluation team tracked progress toward the previous investment plan’s goals, which increased code compliance by 8% to 16% throughout New York State, depending on the sector and construction activity. The plan achieved developing seven policies or regulations to promote efficiency, flexibility, and decarbonization; filling 70,776 seats at trainings; 43 jurisdictions adopting policies at state or local level; and 16 jurisdictions adopting pilot approaches.

- 28 policies or codes adopted at the state or local level

## 1.1. Initiative Overview

Through its CSCNB Initiative, NYSERDA implements approaches that accelerate the pathway to more efficient, flexible, and decarbonized buildings by supporting the advancement of building codes, standards, and other building policies. The initiative's efforts are consistent with and supportive of the Carbon Neutral Building roadmap, which has been adapted to support the recommendations of the Efficiency and Housing Advisory Panel to the Climate Action Council. To support the direction from the Climate Action Council, NYSERDA pursues activities related to the advancement of all state building codes and standards, including the state uniform and energy codes as well as stretch energy codes, to require efficient, all-electric residential new construction by 2024 and commercial new construction by 2027. NYSERDA also develops, implements, and promotes parallel regulatory and policy programs to address building decarbonization in line with the Climate Act, including strategies, building performance standards, on-site emissions regulations, and building labeling. Engagement processes with stakeholders and subject-matter experts inform program investments and activities. NYSERDA offers training, technical support and tools to jurisdictions to improve compliance and performance and designs these activities to increase the percentage of buildings that are energy code-compliant. NYSERDA also accelerates the adoption and enactment of energy codes and policies to promote efficiency, flexibility, and decarbonization at the state and local level.

From 2020 through 2024, NYSERDA worked to significantly transform the new construction and major renovation market in New York State through providing technical assistance to jurisdictions and training to code officials and other building professionals. NYSERDA's utilized multiple levers to achieve energy savings in New York's new construction and major alterations; specifically, NYSERDA:

- Worked with state-level and local officials to develop and further adoption of more stronger energy codes. At the state level these codes set the minimum construction standard for all new construction and major alterations, and at the jurisdictional level, stretch codes set standards that supersede the statewide code. Between 2020 and 2024 NYSERDA conducted the following work to advance energy codes:
  - Worked with the New York State Department of State (DOS) and the Code Council to develop and advance the Energy Conservation Construction Code of New York State (ECCCNYS). New York State adopted the latest version of the statewide code (ECCCNYS-2020) in May of 2020. From 2020 through 2024 NYSERDA continued to work with State

- agencies to advance an even more efficient version of ECCCNY. Adoption of this code, ECCCNY-2025, expected in 2025, will result in significant energy savings across the state.
- Provided critical direct technical assistance to the City of New York to adopt NYStretch-2020 as the New York City Energy Conservation Code (NYCECC). NYSERDA's strategic direct engagement with the City of New York was important, given that New York City accounts for approximately half of the square footage impacted by energy codes New York state.
  - Developed a model local energy code (NYStretch-2020) that is approximately 11% more efficient than ECCCNY-2020. Provided technical assistance to jurisdictions to adopt the stretch code.
  - As typically not all buildings meet all the provisions of construction codes, NYSERDA also made significant investments to increase the level to which buildings comply to the ECCCNY-2020 and local stretch codes. Increasing the level of compliance to energy codes results in savings because buildings that are more compliant are more energy efficient. To increase code compliance, NYSERDA conducted the following activities:
    - Filled more than 88,000 training seats training more than 11,000 unique code officials and building professionals about specific provisions of the codes. These trainings reached jurisdictions in all 62 counties throughout New York State, impacting 438 million square feet of construction activity and raising code compliance.
    - Developed resources, trainings, and pilot projects to modernize jurisdictions' code enforcement processes. These efforts further increased levels of code compliance for 7 million square feet of construction activity.

Together, these activities are estimated to have resulted in an energy savings impact of 1.6 million MMBTU (1.6 Tbtu) over 5 years, exceeding NYSERDA's initial savings targets for this initiative.

## 1.2. Initiative Changes During Year Five

Developments in New York State building energy policy and new data availability have informed initiative activities in Year 5 of the evaluation. NYSERDA made the following adjustments to initiative activities:

- **Offering additional trainings and support.** In Year 5, NYSERDA worked to attract additional builders to energy code trainings by exploring builder-focused trainings and relationships with regional home builder associations and suppliers. NYSERDA also launched a set of asynchronous online courses in Year 5 to offer participants the flexibility to complete trainings on

their own time. Additionally, NYSERDA and the DOS collaborated on a needs assessment of the state’s basic training program and on preparing updates to basic training and in-service trainings that will support compliance with upcoming or proposed energy and uniform codes.

- Leveraging federal funds for expanded code compliance support.** Following learnings from the Program Opportunity Notice (PON) 4600 pilots, NYSERDA is expanding its offerings of third-party support and code compliance technology access to serve additional communities. NYSERDA also started planning procurement of a centralized compliance platform to serve code offices and permit applicants across the state. NYSERDA adjusted the launch of the new PON forward to apply for and receive \$3 million in grant funding from the U.S. Department of Energy; the new PON is now expected in 2025.
- Planning for the next state energy code and uniform code.** In Year 5, NYSERDA supported the development and analysis of the new proposed statewide energy code, discussed further in Section 5.1, which is anticipated to be adopted in 2025.

### 1.3. Summary of Evaluation Objectives and Activities

Table 1 lists the objectives and activities of the CSCNB Initiative evaluation, which are the key building blocks of the indirect savings methodology. The market evaluation team developed the multiyear indirect savings methodology in Year 2 and reviewed and refined it in Year 4, given changes to the initiative’s design. Appendix G further describes the CSCNB Initiative evaluation methodology including the approach and data inputs applied in this fifth year of the evaluation period.

**Table 1. Year 5 Evaluation Objectives and Activities**

Y5 Evaluation Objective	Y5 Evaluation Activities	Purpose
Determine the percentage of the market complying with the energy code	Compliance-focused Delphi panel; longitudinal jurisdiction in-depth interviews; training participant surveys; independent expert panel	Follow changes in energy code compliance over time and identify market compliance trends
Determine progress and impacts of pilots supporting code compliance	Longitudinal jurisdiction in-depth interviews; interviews with NYSERDA project management; independent expert panel	Understand pilot progress, the impact of pilot projects on code compliance, and associated savings
Assess the impact of NYSERDA’s training on compliance levels, decision-making, and behavior	Independent expert panel; training participant surveys	Recognize the extent to which energy code training and education has influenced the market’s code compliance
Assess the impact of NYSERDA’s activities on stretch code adoption	Independent expert panel; interviews with NYSERDA project management; training participant surveys	Understand market tools and actions that further investments above statewide code

The market evaluation team conducted an independent expert panel this year to develop the evaluation period's final estimates of indirect market impacts of initiative activities.<sup>3</sup> The independent panel included a mix of energy code experts, including nationwide experts and those focused on New York State, who understand the relationship between program activities and compliance with building codes. The market evaluation team provided panelists with data on initiative activities that the team had compiled and presented these materials at a webinar at which panelists had the opportunity to ask questions. The market evaluation team then asked the independent panel to estimate the specific parameters required to update the indirect energy impacts for the three components of initiative savings. Final indirect savings estimates show NYSERDA exceeding its initial savings targets for the initiative in all years.<sup>4</sup> These final estimates are discussed in Section 2.2. This report also discusses the independent panel findings in Sections 3, 4, 5, and 6.

#### 1.4. Five Year Highlights

The market evaluation team conducted a review across the evaluation period in strategic areas. Summaries of initiative activities throughout the evaluation period are included throughout the report, including the five-year review of compliance rates in Section 3, estimates of the impact of code compliance activities in Section 4, and a review of feedback on the impact of training in Section 6.

#### 1.5. Changes to the Evaluation Over Five Years

Changes to state legislation, evolving policies, and economic shifts have affected the specific activities of the initiative over the past five years, which have, in turn, affected this evaluation. To analyze indirect savings at the beginning of the evaluation period, the market evaluation team and NYSERDA developed a methodology that calculated the total indirect savings assigned to the initiative as a function of four key categories of activities: (1) energy code trainings, (2) stretch code adoption, (3) other strategies to support compliance (e.g., third-party support and new technologies), and (4) the development and adoption of a new statewide energy code midway through the evaluation period. Appendix G contains the equations the team used to calculate these savings components. The equations are a function of energy use intensities (EUIs) developed for different market segments, construction square footage data, and evaluation findings

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<sup>3</sup> The role of the independent panel in the calculation of impacts is discussed in more detail in NYSERDA's CEF Methodology, Last Revised April 6, 2021 (Appendix G).

<sup>4</sup> While the original evaluation methodology planned to assess four savings components of the initiative, one of the components was contingent upon adoption of a new statewide energy code before 2024; as the new statewide energy code is now projected to move forward in 2025, the team did not analyze this component.

regarding the estimated impacts of different activities and NYSERDA's influence on compliance. Several unforeseen events affected these inputs:

- The COVID-19 pandemic had a direct effect on initiative activities and led to shifting trainings and stretch code outreach activities to an online format. The pandemic also affected economic activity, which has been tied to a fluctuations in construction activity in 2021 and 2022 as pandemic restrictions eased.
- The 2022 All-Electric Building Act; Advanced Building Codes, Appliance and Equipment Efficiency Standards Act of 2022; and the FY2024 State Budget directed the development of zero-emission building codes and additional activities, including NYSERDA's development of a new cost-effectiveness methodology. Because of the level of work and stakeholder engagement involved in developing the new statewide uniform code and statewide energy code, the new code's adoption is now anticipated in 2025, beyond the timeframe of this evaluation.
- NYSERDA pivoted its stretch code support to focus on developing a new statewide energy code that was expected to be similar to future stretch codes. As a result of this pivot, NYSERDA stopped promoting stretch codes at the jurisdictional levels and increased technical support to prepare communities for compliance with the upcoming statewide code.

The market evaluation team has worked with NYSERDA to revisit the evaluation logic model to ensure that it continues to capture the established activities of the initiative, given these changes. However, there have been substantive and unanticipated activities through which NYSERDA has supported code adoption, which do not show up in the energy savings of this evaluation period. NYSERDA's Final Rule to update the cost-effectiveness methodology to evaluate updates to the statewide energy code, development of the new proposed statewide energy code and uniform building code, and support for the release of the Notice of Rule in Development by the DOS in July 2024 are included in the initiative's Progress Toward Goals (Table 2). However, they are not represented in the indirect savings included in Section 2.2 as they cannot be tied to energy savings occurring in this evaluation period.

## 1.6. Challenges to the Year 5 Evaluation

The Year 5 evaluation faced several challenges related to attrition in expert input and training data delivery.

### 1.6.1. Attrition in Expert Input

The team conducted longitudinal interviews with the goal of engaging the same code experts throughout the evaluation to see how perspectives changed. During Year 5, the team was unable to schedule interviews with two of the same people because they had changed jobs or roles or were too busy. The team resolved this issue in part through identifying new jurisdictional contacts. For the Year 5 evaluation, the team conducted two Delphi panels with three rounds of feedback from the expert panelists. In both the compliance-focused Delphi panel and the broader independent panel, not all of the panelists who started the process finished the third and final round, but with at least seven panelists in each panel completing all rounds, the evaluation was able to maintain its goals for diverse representation. The reasons for attrition were consistent with those found in previous years of the initiative evaluation. Several panelists cited busy schedules, and others cited the challenge of estimating compliance across jurisdictions.

### 1.6.2. Training Data Deliveries

The team relied on records received directly from training implementers to conduct immediate and follow-up surveys with participants. Some complexities in determining the format for deliveries of new types of data, such as data on asynchronous trainings that do not have a single training date, delayed the data and impacted the team's ability to send surveys on the ideal schedule.

## 2. Progress toward Goals and Initiative Impacts

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This report documents progress toward the most recently updated CSCNB Initiative goals, as affected by revisions to initiative output and outcomes conducted in May 2023 (Year 4).

A key goal of the initiative is to provide NYSERDA-supported training to code officials and building professionals to increase code compliance in the state. As of November 1, 2024, at least 11,026 unique code officials and building professionals completed a total of 88,942 trainings (seats filled),<sup>5</sup> with some attending multiple trainings. In surveys both immediately after training and six months later, training participants reported high satisfaction with the trainings and a greater understanding of the content. They also said they had made changes to day-to-day activities related to code implementation as a result of the trainings.

Another key goal of the initiative is to influence local policymakers to adopt approaches to code enforcement that lead to greater code compliance by testing different approaches in pilot programs. In 2022, NYSERDA accepted applications from authorities having jurisdiction (AHJs) to participate in a pilot program for alternative code compliance strategies: the Third-Party Support and Advancing Code Compliance Technology Pilot Program (PON 4600). NYSERDA is engaged with eight AHJs on pilots implementing third-party support and 10 AHJs on pilots implementing advanced code compliance technologies through this effort. Although these pilot programs started relatively recently, many AHJ participants have reported improved capabilities with code compliance and building plan applications, reviews, inspections, and capacity for enforcement. NYSERDA is also engaged with three jurisdictions on Stretch to Zero pilots, through which NYSERDA supports planning for compliance with stretch and upcoming energy codes.

Table 2 shows the initiative’s progress toward the goals presented in the most recent CEF CIP.<sup>6</sup>

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<sup>5</sup> NYSERDA provided the total number of training “seats filled” (an individual may attend multiple trainings and thereby be represented in multiple seats filled) to the market evaluation team by email. The number of individuals trained is based on training records received by the market evaluation team from training implementers.

<sup>6</sup> See “Codes, Standards, & Other Multisector Focus Area Plan” Pages 8, 9 and 10. Clean Energy Fund Compiled Investment Plans. NYSERDA, July 3, 2024. <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/About/Clean-Energy-Fund/2024-07-03-compiled-investment-plan.pdf>.

**Table 2. Initiative Progress Toward Goals**

<b>Output/ Outcome</b>	<b>Indicator</b>	<b>Baseline</b>	<b>2024 Target (Cumulative)</b>	<b>2024 Progress (Cumulative)</b>
Outputs	Number of seats filled in NYSERDA-supported training	0	16,000	88,942 trainings completed (seats filled) since March 2020, and at least 11,026 unique code officials and building professionals trained
	Number of regulations or policies developed to promote efficiency, flexibility, and decarbonization	0	2	9 policies developed <ul style="list-style-type: none"> <li>• NYStretch2020, v1.1, NYStretch2023 / Adv. Energy Code</li> <li>• ECCCNY-2020 and the All-Electric Building Act</li> <li>• Policies for building energy grades and benchmarking standards</li> <li>• Policies around preemption between appliance standards and codes</li> <li>• Notice of Rule in Development for statewide energy code and uniform code</li> </ul>
	Number of entities adopting pilot approaches	0	25	21: NYSERDA is engaged with eight communities for third-party support through PON 4600, ten for compliance technology adoption, and three through the Stretch to Zero pilot
	Number of policies or codes adopted at the state or local level	0	27	46: 44 jurisdictions have adopted stretch codes, the Codes and Standards Act of 2022 was adopted, and the final rule to update the cost-effectiveness methodology was issued.
Outcomes	Increase in percentage of market complying with the energy code	0%	Increase of 5% compared with business as usual (without initiative intervention)	7% to 22% increase depending on sector and construction activity since 2015
	Codes and policies adopted and enacted faster than they would without NYSERDA's intervention, as reported by industry experts	Qualitative	Yes	According to AHJs adopting alternative code compliance strategies and NYStretch, NYSERDA played a key role in facilitating adoption by developing the model code and providing financial and technical assistance for adoption. Per the Year 5 expert panel, upstate jurisdictions in particular relied on NYSERDA's support for code adoption as well as code support. NYSERDA has supported the development of a new statewide energy code, although this code has not yet been adopted.

## 2.1. Initiative Logic Model

The market evaluation team reviewed the logic model in both Year 3 and Year 4 of the initiative. The team included recommendations to better delineate actual outputs as well as near- and long-term outcomes to improve evaluability and, in turn, improve potential for adaptive program management. The

team tracked short- and long-term outcomes based on the outputs of the logic model’s four activities, represented by each of the four indicators associated with outputs in Table 2.<sup>7</sup>

## 2.2. Savings Estimates

The market evaluation team has estimated the indirect savings of the CSCNB Initiative for the five years of the evaluation (2020–2024) in accordance with the savings calculation modeling methodology established in Year 2 of the evaluation (2021). In other reporting years, the team had provided preliminary estimates of indirect savings at the request of NYSERDA; these preliminary estimates were developed using benchmarks and internal panels to provide an interim view of initiative progress, with the understanding that final estimates would be conducted in the final year of the evaluation with the full rigor defined in the evaluation methodology, using the assessment of an independent panel of code experts provided with information on initiative activities. The findings of the panel were in many areas consistent with preliminary estimates, with training found to improve compliance rates by an estimated average of 5.0% (5.4% in 2020, decreasing to 4.5% in 2024). The panel provided estimates of the influence of NYSERDA on stretch code adoption, which after adjustment by the team ranged from 50% for New York City to 68% for other jurisdictions. The panel also estimated that NYSERDA’s code compliance support activities could increase compliance; panelists estimated third-party support could increase compliance by 10%, and implementation of code compliance technologies could increase compliance by 6%.<sup>8</sup> The team also updated estimates from 2020 to 2024 to reflect the latest data available on square footage affected by code adoption and compliance activities. Total square footage of construction activities in jurisdictions of the state is a direct multiplier of each savings estimate,<sup>9</sup> and fluctuations in construction activity across the years (in part due to the COVID-19 pandemic) can be seen in the lower savings values of 2021 and the higher values of 2022. The data below, which show final savings estimates for years 2020 through 2024, show NYSERDA exceeding its initial savings targets in all years.

Table 3, Table 4, and Table 5 show the CSCNB Initiative’s indirect savings targets as established in the early years of the initiative by NYSERDA and estimated savings associated with CEF and Technology &

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<sup>7</sup> Appendix F contains the logic model. See page F2 of the Appendices.

<sup>8</sup> The panel provided estimates on the impact of code compliance trainings, stretch code technical assistance and resources, and resources provided through pilots on code compliance and stretch code adoption.

<sup>9</sup> See Appendices for equations for each component of savings analyzed.

Market Development Program (T&MD) investments.<sup>10</sup> The market evaluation team conducted a retrospective review of the evaluation at the initiative level to estimate 2015 through 2019 savings; the estimates from 2020 through 2024 resulted from the team's work under this five-year evaluation.

**Table 3. CSCNB Initiative Savings Estimates, GWh**

Incremental Annual Additions (GWh)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Cumul. Annual 2015-2024
NYSERDA Indirect Savings Target <sup>a</sup>	N/A	N/A	N/A	N/A	N/A	28.34	27.08	45.89	28.56	28.56	158.42
Estimated Savings <sup>a</sup>	116.88	78.88	88.35	84.19	89.00	52.85	53.92	75.77	66.25	64.52	770.61
Percentage Funded by CEF	0%	0%	0%	26%	69%	99%	100%	100%	100%	100%	
Percentage Funded by T&MD	100%	100%	100%	74%	31%	1%	0%	0%	0%	0%	
CEF Savings per budget allocation	0	0	0.34	21.59	61.79	52.32	53.92	75.77	66.25	64.52	396.51
T&MD Savings per budget allocation	116.88	78.88	88.01	62.6	27.21	0.53	0	0	0	0	374.11

<sup>a</sup> NYSERDA Indirect Savings Targets are available by year for CEF funding only and not T&MD; therefore, Indirect Savings Targets are not available for 2015-2019. The market evaluation team analyzed savings using T&MD Review (2015–2019) & the CSCNB evaluation methodology (2020–2024). The T&MD savings review is provided in the Appendix of this report.

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<sup>10</sup> CEF and T&MD are two distinct, but overlapping, funding streams that have supported energy code development and compliance since 2015. The CSCNB Initiative has received funding from two sources: originally as part of the Technology and Market Development Program (T&MD) and later from the CEF. NYSERDA estimated the percentages of overall program funding that came from the CEF and the T&MD, and the team distributed savings for each year according to the percentage of the budget that came from each funding source.

**Table 4. CSCNB Initiative Savings Estimates, MW**

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
NYSERDA Indirect Savings Target	-	-	-	-	-	-	-	-	-	-
Estimated Savings	33.23	22.52	25.01	23.76	25.35	14.02	14.52	20.44	17.87	17.38
Percentage Funded by CEF	0%	0%	0%	26%	69%	99%	100%	100%	100%	100%
Percentage Funded by T&MD	100%	100%	100%	74%	31%	1%	0%	0%	0%	0%
CEF Savings per budget allocation	0.00	0.00	0.10	6.09	17.60	13.88	14.52	20.44	17.87	17.38
T&MD Savings per budget allocation	33.23	22.52	24.91	17.67	7.75	0.14	0	0	0	0

**Table 5. CSCNB Initiative Savings Estimates, Billion BTU**

Incremental Annual Additions (Billion BTUs)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Cumul. Annual 2015-2024
NYSERDA Indirect Savings Target <sup>a</sup>	N/A	N/A	N/A	N/A	N/A	37.17	35.93	68.48	51.79	51.79	245.15
Estimated Savings <sup>a</sup>	135.4	106.56	103.51	100.13	100.69	101.73	101.06	130.03	113.96	111.41	1,104.48
Percentage Funded by CEF	0%	0%	0%	26%	69%	99%	100%	100%	100%	100%	
Percentage Funded by T&MD	100%	100%	100%	74%	31%	1%	0%	0%	0%	0%	
CEF Savings per budget allocation	0	0	0.4	25.68	69.9	100.71	101.06	130.03	113.96	111.41	653.16
T&MD Savings per budget allocation	135.4	106.56	103.11	74.45	30.79	1.02	0	0	0	0	451.33

<sup>a</sup> NYSERDA Indirect Savings Targets are available by year for CEF funding only and not T&MD; therefore, Indirect Savings Targets are not available for 2015-2019. The market evaluation team analyzed savings using T&MD Review (2015–2019) & the CSCNB evaluation methodology (2020–2024). The T&MD savings review is provided in the Appendix of this report.

Table 6 shows the estimates listed above converted to MMBtu.

**Table 6. CSCNB Initiative Savings Estimates Converted to MMBtu**

Incremental Annual Additions (MMBTUs)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Cumul. Annual 2015-2024
T&MD and CEF	534,211	375,710	404,973	387,398	404,371	282,071	285,053	388,553	340,017	331,573	3,733,929
T&MD Only	534,211	375,710	403,413	288,050	123,634	2,821	-	-	-	-	1,751,309
CEF Only	-	-	1,560	99,348	280,736	279,250	285,053	388,553	340,017	331,573	2,006,090

Table 7 provides a breakdown of savings estimates by impact area by Tbtu. (As savings by impact area was first analyzed in Year 2, impact area estimates are available starting in 2020.)

**Table 7. Initiative Savings Estimates by Initiative Activity, 2020-2024**

	<b>Energy Savings</b>				
	<b>Tbtu</b>				
	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
Stretch Code Adoption	0.02	0.05	0.07	0.07	0.07
Training	0.26	0.24	0.32	0.26	0.25
Alternative Code Support	0.00	0.00	0.00	0.01	0.01
<b>Total</b>	<b>0.28</b>	<b>0.29</b>	<b>0.39</b>	<b>0.34</b>	<b>0.33</b>

Table 3 through Table 7 represent the final initiative savings estimates, and each year’s estimates differ from the preliminary savings estimates that the market evaluation team developed in the Year 2, Year 3, and Year 4 evaluation reports. This is because the evaluation methodology called for the independent panel to estimate the impact of NYSERDA activities in the final year of the evaluation period.

### 3. Code Compliance Trends

#### 3.1. Initiative Progress

Over the course of the evaluation, the team has evaluated energy code compliance levels through multiple activities: (1) Delphi panels held in Years 1, 3, and 5 of the evaluation; (2) the energy code expert independent panel held in the summer of Year 5; and (3) interviews with public and private-sector code experts serving urban, suburban, and rural jurisdictions of the state, and (4) survey feedback analyzed in each year. Synthesis of these data has produced final estimates that **compliance rates have increased from the established baselines by increments that vary by building sector and project type and range from 7% to 22%**.<sup>11</sup> The estimates reflect compliance during different state energy code cycles, as shown in Table 8 and Table 9.

**Table 8. Estimated Code Compliance, Code Compliance Panels and Interviews**

	New Construction						Additions and Alterations						
Year	2015 (Baseline)	2020	2021	2022	2023	2024	2015 (Baseline)	2020	2021	2022	2023	2024	
ECCCNYS Version	2010	2016	2020				2010	2016	2020				
Estimated Commercial Compliance	74%	82%	82%	84%	85%	87%	59% to 68% <sup>a</sup>	71%	77%	82%	82%	82%	
Estimated Residential Compliance	77%	77%	81%	84%	84%	84%	62% to 71%	72%	76%	81%	81%	81%	

<sup>a</sup> The 2015 ERS Delphi panel did not provide an estimate for additions and alterations (referred to as renovations) but instead reported that panelists estimated renovation compliance to be 6% to 15% worse than new construction compliance.

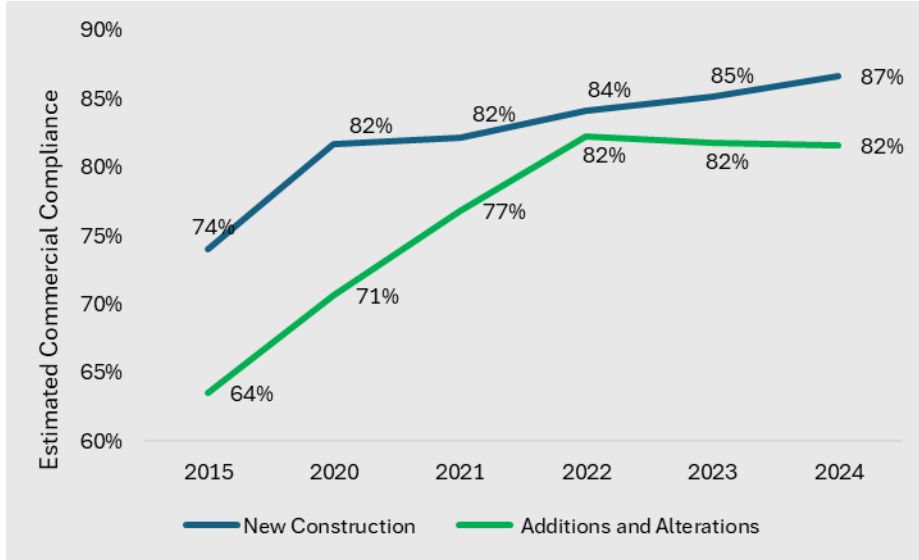
**Table 9. ECCCNYS Version Reference**

	Date In Effect	Residential Reference	Commercial Reference
ECCCNYS-2010	December 2010	2009 IECC	ASHRAE 90.1-2007
ECCCNYS-2016	October 2016	2015 IECC	ASHRAE 90.1-2013
ECCCNYS-2020	May 2020	2018 IECC	ASHRAE 90.1-2016

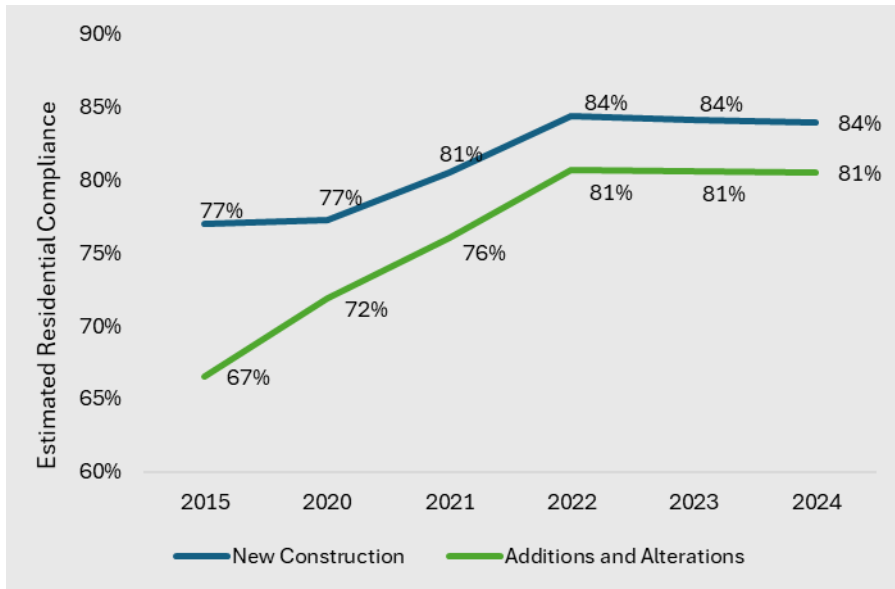
<sup>11</sup> In 2015, ERS utilized a Delphi panel as part of an impact evaluation of the Energy Code component of the Advanced Energy Codes and Standards program, determining compliance rates for the 2010 ECCCNYS. This evaluation uses compliance rate estimates of this study as a baseline against which to measure progress.

Figure 1 and Figure 2 illustrate the change in estimated commercial and residential compliance rates for these segments from 2015 through 2024, respectively.<sup>12</sup>

**Figure 1. Commercial Compliance Estimates by Project Type, 2015-2024**



**Figure 2. Residential Compliance Estimates by Project Type, 2015-2024**



<sup>12</sup> Incremental increases to commercial new construction compliance are seen in each year. A mix of increases and decreases of less than 1% are present in commercial additions and alterations and residential new construction.

Qualitative feedback from New York state code experts discussed in Section 3.3 validates the estimates shown in Figure 2 and Figure 3.

### 3.2. Code Compliance Delphi Panel Estimates

Four Delphi panels informed estimates on compliance, including a panel conducted in 2015 by Energy & Resource Solutions (ERS) that established the evaluation baseline, and three panels conducted by the market evaluation team in 2020, 2022, and Q1 of 2024. These panels estimated compliance levels by sector and construction project type and by key specific building components that affect energy usage. The Year 5 Delphi panel estimated that commercial sector compliance for new construction increased and additions and alterations stayed about the same. The most compliant commercial building elements include fenestration (windows, skylights, and doors), equipment efficiency, exterior building lighting power, and exterior lighting controls—all estimated to be above 90% compliance for both new construction and additions and alterations. The least compliant commercial building elements, estimated to be less than 80% compliance for both project types, are limited to thermal bridging and continuous air barrier installation quality. For the residential sector, the Year 5 panelists estimated that compliance for both new construction and additions and alterations has stayed about the same since 2022. The most compliant residential building elements were estimated to include programmable thermostats and individual unit lighting metering—both estimated to be at or above 90% compliance for both project types. The least compliant residential building components, estimated to be at or below 75% for both project types, are limited to duct sealing and hot water pipe insulation. Further results on building systems are in Appendix B.

### 3.3. Longitudinal Cross-Jurisdiction Expert Panel Assessment

The market evaluation team interviewed six energy code experts, including building professionals and code officials, from six jurisdictions, with a mix of representation from rural, suburban, and urban areas and residential and commercial experience. Interviews focused on code experts' experiences with energy code compliance and enforcement and their perception of different code compliance strategies. To understand how market trends and opinions change over time, the team interviewed these experts in each of the five years of the evaluation.

Interviewees concluded that compliance has increased across the years of the evaluation and projected that overall it will continue to increase but at a decreasing rate. Interviewees estimated that compliance was

*“There is no uniform enforcement across the state. Some jurisdictions are understaffed or inexperienced, others go overboard.”*

- Delphi Panel Respondent

higher in commercial projects than in residential projects and higher in new construction versus additions and alterations. These experts said that because commercial projects are typically larger and have more project management than residential projects, they are more likely to have the resources to handle the administrative requirements of reviewing energy code requirements successfully. Interviewees also said commercial contractors are more likely than residential contractors to have experience that supports higher rates of compliance (e.g., the latest code requires weather barriers of a certain thickness; commercial contractors likely have experience with these barriers, whereas residential contractors may be new to weather barriers). Interviewees also said that new construction projects include a more comprehensive review and have requirements that are perceived as easier to communicate (e.g., some applicants do not understand why it is important to have a new wall of a room insulated to the latest code when other walls are not).

All interviewees said that increasing compliance becomes more challenging as the energy code becomes more stringent. Interviewees said that many people consider the level of effort to comply with certain elements of the latest code requirements onerous and a barrier to compliance. Several respondents offered the perspective that further compliance provided “diminishing returns,” and that people in their jurisdiction considered buildings to already be efficient enough (one respondent said that trying to compare “overall energy efficiency now to efficiency levels 10 years ago is like night and day,” and that the “big stuff is already taken care of”). One interviewee shared their perception that compliance with the energy code imposed additional costs as high as \$50,000 and had too long of a payback. This respondent characterized compliance as a “real tough sell,” and proposed supporting compliance with incentives. Other interviewees also stressed that in order to further increase compliance, there would likely need to be increased support with material costs (insulation or higher-quality products) and/or labor costs (education and training time requirements and documenting and ensuring compliance). When asked what support would be needed, interviewees specifically mentioned money, accessible expertise, trainings, and a convincing value proposition to help builders and code officials with limited bandwidth understand the benefit of energy code compliance. All interviewees listed training activities supported by NYSERDA as important to energy code compliance rates.

*“I think most code officers are overworked. I’m just one guy that does everything on his own. And what [the] state requires you to do, I’m supposed to take a 75-page blueprint and check all the formulas... no code guy has time. The more stringent it gets the less people want to do this. it’s not a high paying job. For the level of responsibility, 30 hours a year of continuing education. And everything else, for small municipalities... to be a one man band it’s a lot.”*

- Longitudinal jurisdictional respondent

### 3.3.1. Panel Feedback on Department of State (DOS) Trainings

The market evaluation team asked the longitudinal panel’s code officials about the energy code trainings available through the basic training, and in-service training, provided by the DOS. Two of three interviewed code officials said they were familiar with the trainings.<sup>13</sup> The two code officials who were familiar with the trainings said the instructors seemed very knowledgeable. They also shared having difficulty staying engaged on the calculations discussed in the trainings (one official mentioned blower door and ventilation requirements and mentioned that this was primarily in the in-service training), though they understood the calculations were a critical component of the training. One code official suggested the value of integrating relevant pictures, real-world examples, and case studies. Another code official appreciated that the trainings were now available through a regional builders association; this same person had previously taken approved trainings from industry organizations but said they “really enjoyed code enforcement training from the guys whose job it is to interpret the code – my team really gets a lot out of that.”

*“As the State considers higher levels of code make sure [decision makers] include those actually doing work in existing buildings. If people are too upset, code officials will not enforce.”*

- Longitudinal jurisdictional respondent

### 3.4. Training Survey Results for Code Compliance Trends

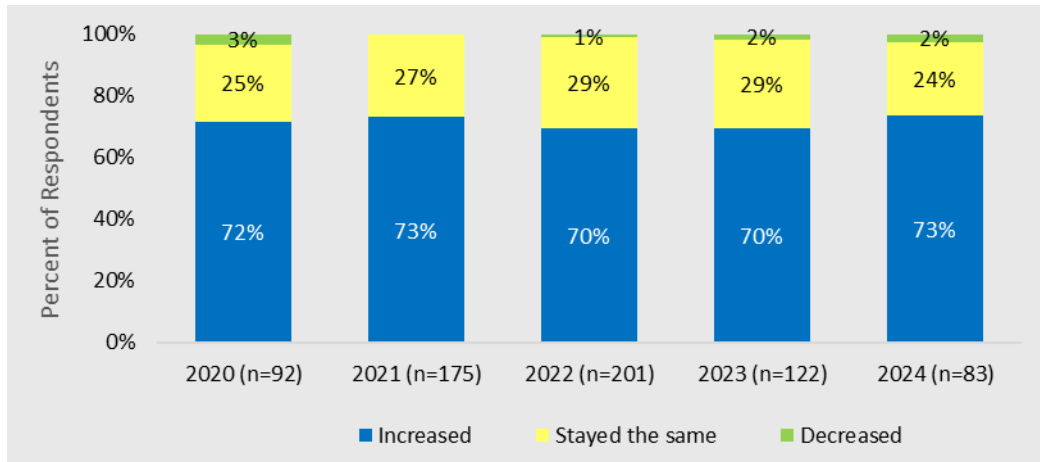
In each year of the evaluation, the team surveyed participants in NYSERDA’s code compliance trainings and asked whether they thought compliance with the energy code had increased, decreased, or stayed the same in the last 12 months. As shown in Figure 3, 70% to 73% reported compliance increases in each year, with only 1% to 3% saying compliance had decreased.

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<sup>13</sup> The basic training program, which is the program a person must complete to become a code enforcement official, and in-service training, which is for completing the annual continuing education requirements for code enforcement officials, is not designed for or marketed to any other professions.

### Figure 3. Estimates About Changes in Energy Code Compliance by Year, 2020-2024

Source: Follow-Up Survey Question: "In the last year or so, do you think compliance with the energy code in New York State has:" October 2024.



The survey asked respondents who had reported an increase in energy code compliance in the state to identify other factors they thought had contributed. Respondents identified several factors, including more focus on the energy code in planning and permitting (25%), market demand for greater energy efficiency (18%), improved builders' knowledge about code requirements (18%), and increased code enforcement activities (13%). Appendix E includes further detail, including the full list of other factors respondents identified and a breakdown of respondents by job category.

## 4. Code Compliance Support

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The CSCNB Initiative has supported code compliance through the Third-Party Support and Advancing Code Compliance Technology Pilot Program and the Stretch to Zero pilots. The market evaluation team reviewed the progress reports for these alternate code compliance pilot activities, as well as feedback from the longitudinal cross-jurisdiction panel, independent expert panel, and trainings on the potential impact of alternative code compliance resources and utilization. The team also notes NYSERDA's coordination with DOS on development and implementation of a survey held during this evaluation year about compliance processes in jurisdictions across the state. NYSERDA has worked to optimize the development of a statewide energy code compliance platform designed to serve all jurisdictions through findings on compliance processes and capacity.<sup>14</sup>

### 4.1. Initiative Progress

NYSERDA continues to work with 20 communities through the PON 4600 pilot; eight of these communities are engaged in the third-party support component of the pilot and 10 are engaged in the code compliance technology component. The overall goals of the pilot are to support improved technical and online capacities in jurisdictions in relation to residential and commercial building plan reviews and inspections, as well as energy code compliance and enforcement. The pilots have delivered at least 35% of their funding to disadvantaged communities (DACs). Through the pilots, NYSERDA has learned more about which systems work best in different communities, adoption costs, and where third-party resources are most easily deployed (and where they may need to address gaps). NYSERDA will leverage these learnings in the launch of a \$14 million expansion of the pilot, planned for 2025, for which they have received \$3 million in funding from the U.S. Department of Energy.

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<sup>14</sup> NYSERDA and DOS commissioned an Internal Survey Report by KSV entitled "New York State Code Compliance Technology: Resource Assessment For Authorities Having Jurisdiction Survey" (2024).

The Stretch to Zero pilot program evolved with the FY2024 State Budget’s requirements for zero emission new construction and the consideration of a statewide energy code that was expected to be similar to future stretch codes. Against this backdrop, NYSERDA’s Stretch to Zero pilots have transitioned into support for pilot communities focused on best practices and training that can help their preparation for compliance while supporting community-driven goals. NYSERDA continues to engage with the three pilot communities through the Stretch to Zero pilots. NYSERDA hosted two roundtables in Year 5 to support communities in their stretch code administration and prepare for the coming code cycle. Another series of in-person events helped developers, trade allies, and other permit applicants to focus on learning what is needed to bring successful, code-compliant projects to code offices.

*“Smaller jurisdictions have fewer commercial projects and thus would have less experience with these provisions; a third-party is like getting additional staff with specific knowledge and experience.”*

- Independent panel expert

#### 4.2. Impact of Alternative Code Compliance Strategies

The market evaluation team consulted cross-jurisdictional code experts via longitudinal interviews and the Year 5 independent panel to estimate the impact that third-party support and code compliance technologies have had on code-adopting jurisdictions. Both interviewees and panelists expected the impact of support and technologies to vary based on the jurisdiction’s resources and agreed that smaller jurisdictions would likely benefit the most from both types of support. Respondents mentioned that the effectiveness of third-party support and the adoption of code compliance technology depended on how

*“Digitization plays an important role in increased code compliance; however, I would not expect it to have the same impact as a third-party. I think the greater impact will be to small jurisdictions that are likely over-hauling their entire processes, but this could also be true for larger jurisdictions.”*

- Independent panel expert

support was provided.

Panelists estimated that third-party support would increase compliance rates by an average of 10%. They estimated impacts on residential and commercial compliance at 6% to 12% and 7% to 15%, respectively.

Across the board, panelists anticipated that this impact would be greater on smaller, rural communities. One panelist said the impact of third-party resources would also be greater in communities that more frequently process complex projects. Another panelist stated that impact would vary significantly with local interest in and resources for compliance. Panelists estimated adoption of code compliance technology would increase compliance rates by an average of 6%, and residential and commercial compliance would increase by 4% to 8% and 3% to 9%, respectively.

The team asked the independent panel to estimate the likelihood that jurisdictions engaged in the alternative code compliance pilots would have adopted the use of third-party support or new technologies without support from NYSERDA. Panelists estimated that without NYSERDA's funding and technical support, on average, jurisdictions would only be 25% likely to adopt a third-party support system and 32% likely to adopt code compliance technology.

Panelists and longitudinal jurisdictional interviewees offered ideas for making support for code enforcement most effective, which may be considered in expansions of the PON or development of other code enforcement support:

- **Tailor support for the local context:** One respondent emphasized that local offices and builders want to maintain "local control" and would not appreciate support if it had the feeling of a mandate. Another respondent shared that connecting energy efficiency to climate change immediately triggered politics and a sense of choosing sides, which was not welcome in the respondent's jurisdiction, and as a result they thought communicating other values of energy efficiency would be more desirable.

Two respondents mentioned that third-party support entities would need guidelines to ensure that their comments were clear and concise and offered specific recommendations for changes, since unclear review feedback could provide undesirable project slowdowns and time burdens on officials and developers. These respondents also said that third-party support would benefit from a process to make sure it aligned with local laws and local details.

- **Offer a clear value proposition to jurisdictions:** Panelists and interviewees anticipated that third-party support would be very helpful, even "a game changer" for some jurisdictions, but without funding would likely not reach the jurisdictions that would benefit the most. Three of seven jurisdictional interviewees said that in most cases, jurisdictions would not have the time or financial resources to seek out new strategies without a locally compelling value proposition and that a financial case would need to be made. Five interviewees shared that in small and rural communities, the status quo feels acceptable.

Four of seven jurisdictional interviewees asserted that financial support was critical, and three stressed that support would be needed to develop a compelling value proposition. When asked what would be needed for the adoption of such strategies, four of five interviewees from upstate jurisdictions said financial support and/or support from NYSERDA.

These respondents explained that their jurisdictions' offices were overworked, the status quo was acceptable, and they did not see a financial case or requests from their stakeholders for adoption of new strategies; as such, they were unlikely to adopt without significant resources.

- **Offer easy-to-implement solutions:** All panelists and interviewees anticipated that code compliance technology would be helpful, but three interviewees said it would need to be easy to use and provide clear benefits, such as better access and communication between plan reviewer and application. They also said compliance staff would benefit from new technology that would enable them to perform more activities in the field. Several asserted that technology adoption should avoid creating more platforms that code officers and applicants would have to learn, mentioning that jurisdictions having distinct processes is particularly difficult for applicants working across jurisdictions. Several recommended use of a single centralized platform to avoid confusion and cited procurement and budgetary challenges.

## 5. Code Adoption Support

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As a part of the initiative, NYSERDA seeks to further code adoption through its support provided to the NYS DOS for development of the statewide uniform code and energy code, and by developing stretch code materials to support jurisdictions' adoption of energy codes that go beyond state code.

### 5.1. Initiative Progress

NYSERDA developed and delivered the NYStretch-2020 template for code adoption by jurisdictions and provided outreach and technical assistance to support stretch code adoption.<sup>15</sup> The market evaluation team identified 44 jurisdictions that have adopted stretch codes, including 40 jurisdictions tracked by NYSERDA as having received financial support through NYSERDA's Clean Energy Communities program.<sup>16</sup>

NYSERDA also made progress in Year 5 toward the adoption of the next statewide energy code. This included development of a Final Rule to update the cost-effectiveness methodology for analyzing updates to the statewide energy code. As directed by New York State,<sup>17</sup> NYSERDA developed updates to code cost-effectiveness analysis that converted the previous 10-year simple payback analysis to a life-cycle cost analysis and incorporated the valuation of greenhouse gas reductions and societal/non-energy benefits. NYSERDA engaged with stakeholders through four public meetings and a 60-day public comment period to inform the development of the Final Rule, which was published in June of 2024;<sup>18</sup> the rule is adopted and in effect for use by the Code Council process to evaluate proposed statewide codes.

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<sup>15</sup> NYStretch2020 is a voluntary, locally adoptable stretch energy code that is approximately 19% more energy efficient than the residential provisions of the 2020 ECCCNY, and roughly 7% more energy efficient than the commercial provisions of the 2020 ECCCNY.

<sup>16</sup> Of the 44 jurisdictions, four adopted codes in 2020, 28 in 2021, eight in 2022, four in 2023, and none in 2024.

<sup>17</sup> The FY 2024 state budget requires electrification of major building sectors by December 31, 2025. The Advanced Building Codes, Appliance and Efficiency Standards Act of 2022 amends existing energy law, and requires the Code Council to use its best efforts to adopt amendments to State Energy Code that achieve energy savings greater than the then most current editions of the International Energy Conservation Code (residential buildings) and ASHRAE Standard 90.1 (commercial buildings), at levels recommended by NYSERDA. The budget requires advancement of zero emission construction in new buildings seven stories or lower, except large commercial and industrial buildings, by December 31, 2025, and all other new buildings by December 31, 2028. <https://www.nyserda.ny.gov/About/Newsroom/2023-Announcements/2023-05-03-Governor-Hochul-Announces-FY-2024-Budget-Investments-in-Energy-Affordability>

<sup>18</sup> NYSERDA. Accessed 28 October 2024. <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Clean-Resilient-Building-Codes/Final-Rule.crdownload>.

NYSERDA contributed to the Notice of Rule in Development released by the DOS in July 2024, which proposed a new statewide uniform building code and accompanying statewide energy code. These codes are informed by the 2024 edition of the International Code Council and ASHRAE 90.1-2022. NYSERDA was also part of the review of the IECC2024 (of which the residential and commercial provisions were finalized on March 20, 2024) to support the development of the new NYS statewide energy code and amendments to the uniform code.<sup>19</sup>

## 5.2. Impact of Initiative Activities on Stretch Code Adoption

The team provided the independent panel with a summary of materials developed by NYSERDA to support stretch code adoption, data on jurisdictions having adopted the stretch code, and feedback from adopting jurisdictions and code experts gathered during the course of this evaluation. Independent panelists considered this data and provided influence factors (the percentage likelihood that a jurisdiction would not have adopted the stretch code without NYSERDA) for New York City and other jurisdictions separately.

The panel provided separate influence factors for stretch code adoption for New York City and the rest of the state because of the magnitude of construction and renovation activity in New York City (approximately 50% of the construction in the state) and New York City's unique policy directives to adopt stretch codes. The following panelist rationales for these estimates note New York City's additional resources, motivations and policy requirements compared with those of other jurisdictions:

- “New York City is required to adopt an equivalent stretch code by local law.”
- “While New York City received in-depth consultations and staffing support, NYC has a great deal of both motivation and resources that I believe would have led to a stretch code without NYSERDA support. For all other jurisdictions without NYSERDA support, I believe the likelihood is 35% or below. [The data showing that] ...100% of all stretch code jurisdictions received [NYSERDA outreach or non-financial support], even when no funding was provided, indicates great reliance on NYSERDA.”
- “I think other respondents are significantly overestimating the likelihood of a smaller jurisdiction adopting a stretch code without an available template. So, the percent likelihood should be very low for the vast majority of these localities.”

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<sup>19</sup> This includes NYSERDA's analysis and development of proposed code requirements for energy code and certain provisions that would be added or amended to the uniform code to support electrification, EV charging, and resilience.

Following a review of the independent panel assessments and panelist rationales, the market evaluation team modified the panel's evaluation of NYSERDA influence on New York City code adoption. The team made this modification to reflect information that it had access to through direct conversations with program staff that showed that NYSERDA had a critical role in enabling the City's policy. Following this adjustment the market evaluation team estimated influence factors on stretch code adoption of 50% for New York City and 68% for other jurisdictions in New York State.

## 6. Energy Code Training and Education

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### 6.1. Initiative Progress

As of November 2024, NYSERDA had completed a total of 88,942 trainings (seats filled) through the CSCNB Initiative, training at least 11,026 individual local code officials and building professionals (such as contractors, architects, and energy professionals). Appendix E includes more details about trainings, including trainees by training type.<sup>20</sup>

*"Studies from various sources, in particular from DOE/PNNL field studies across many states, confirm that training has a positive effect on energy code compliance."*

- Independent panelist

### 6.2. Trainings and Trainees Over Five-Year Evaluation Period

Since March 2020, four implementers have taught 52 unique courses. These implementers held 1,857 trainings over the course of the five evaluation years, with 184 trainings held in Year 5 as of November 2024. Table 10 displays the training sessions held and seats filled per year. As a new training this year, one implementor offered a set of asynchronous online courses, allowing participants to complete the courses on their own time. Respondents of post-training surveys shared that they worked in jurisdictions within all 62 of the counties of New York State.

**Table 10. Breakdown of Trainees and Seats Filled Per Year**

Year	2020	2021	2022	2023	2024 <sup>21</sup>	Totals
Training Sessions	290	445	463	475	184	1,857
Seats Filled	13,153	18,443	20,369	24,753	12,224	88,942

### 6.3. Impact of Training on Compliance

*"I believe training is more impactful when the code changes are more significant."*

- Independent panelist

The independent panel estimated that the trainings increased energy code compliance by 4.2% to 5.9%, with this estimate varying by building sector, project type, and evaluation year. Panelists estimated that training would affect residential compliance more than commercial compliance. Most agreed that the impact on compliance decreased in 2024 compared to that of previous

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<sup>20</sup> For more details on training types please see Appendix E Table 40. Energy Code Trainings Held by Topic Category (2020-2024).

<sup>21</sup> 2024 numbers and totals are as of November 1, 2024.

years. Some panelists said this was because the trainings have the most impact in the years directly following the adoption of a new code.

## 6.4. Training Surveys

The initiative has provided training to code officials and building professionals since March 2020. As part of evaluating this training, the market evaluation team conducted two rounds of online surveys with training participants, the first immediately after the training and the second six months later.

### 6.4.1. Reactions Immediately After Training

This section covers selected survey questions, with the remaining survey questions covered in the report appendix. The analysis includes statistical significance testing, with the results reported as applicable.<sup>22</sup> For this analysis, the market evaluation team analyzed results from Year 5. Training respondents said that their understanding of energy codes had increased after the training and also said that they were satisfied with the training delivery.

#### 6.4.1.1. *Increased Understanding of Energy Codes*

To assess the impact of the training on attendees' understanding of the ECCCNY, NYCECC, and NYStretch, the team asked immediate survey respondents to estimate their level of understanding of the energy code before and immediately after training on a 7-point scale (where 1 is *no understanding* and 7 is *expert understanding*). For individuals attending ECCCNY-specific training, understanding of ECCCNY improved from a mean score of 4.3 to a mean score of 5.3 after attending the training. Those that attended a NYCECC-specific training improved their reported understanding of NYCECC from a mean score of 3.8 to a mean score of 4.8. Respondents that attended a NYStretch training estimated their knowledge of the stretch code as a mean score of 3.5 before the training to a mean score of 4.8 after the training. All mean scores showed a statistically significant ( $p < .001$ ) increased mean improvement of understanding of the code post-training.

#### 6.4.1.2. *Satisfaction with Trainings*

The team asked immediate survey respondents to rate a variety of aspects of the training they had just attended on a scale of 1 to 7, where 7 was the best possible score. Respondents rated trainings highly for all elements, with no elements receiving an average score lower than 6. Respondents ranked the

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<sup>22</sup> This statistical significance testing included paired-sample t-tests for the continuous data, proportions tests for the binary data, and chi-squared tests for the categorical data.

presenters' knowledge of the subject highest, with an average score of 6.60. Respondents also ranked the location and timing of the event highly, with a score of 6.50. The lowest-ranked element was the trainings' relevancy to the respondents' work, with an average score of 6.11. In comments, respondents noted that the trainings were very informative, relevant, and well-presented. One respondent said, "This was the best seminar I've experienced on the subject." Another said, "I found the entire experience very informative and very well formatted. The speaker was fantastic, I really enjoyed his style and how he would engage the participants."

#### *6.4.1.3. Initial Asynchronous Training Feedback*

In Year 5, instead of the typical live trainings, one of the training implementors (Karpman Consulting) began providing prerecorded asynchronous trainings that could be accessed when convenient to the trainee. Initial feedback suggests that participants in asynchronous trainings appreciate the quality of information and relevancy of the training to their work. Using the same scale of 1 to 7, initial results show that for quality of information, asynchronous trainings received an average rating of 6.9 (n=26). When respondents were asked to rate the training's relevance to their work, asynchronous training received an average rating of 6.7 (n=26).

#### *6.4.2. Reactions Six Months After Training*

The market evaluation team sent follow-up surveys to participants six months after they participated in training.<sup>23</sup> The team analyzed results received in Year 5 and throughout the initiative from 2020 to 2024. Respondents said that the trainings had improved their work.

##### *6.4.2.1. Energy Code Implementation from Follow-Up Survey Results in Year 5*

The team asked follow-up survey respondents if, after six months, they had changed or expected to make changes to the way they address code compliance issues compared with their approach before they attended their first training session. Overall, 57% of participants responded affirmatively. Sixty-one percent of code officials and 69% of building professionals were either already addressing compliance differently or expecting to make changes in the future. When asked what the main takeaway from the NYSERDA-sponsored trainings was, respondents most commonly reported a general increase in their knowledge of the energy code (21%) and understanding of existing building requirements (18%).

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<sup>23</sup> No follow-up survey respondent is asked to take an additional survey, even if they participate in additional trainings. This ensures there is no double-counting of results as these findings are used to estimate the overall impact of the training.

### 6.4.2.2. Feedback on Future Training

When asked what sort of training they would find most useful for future trainings, 49% of respondents suggested expanding the list of topics, with multiple people suggesting the following course content:

- The connection between energy code compliance and fire safety codes
- Upcoming energy code updates
- Navigating energy and carbon incentive program and policy
- Solar and geothermal power design and implementation

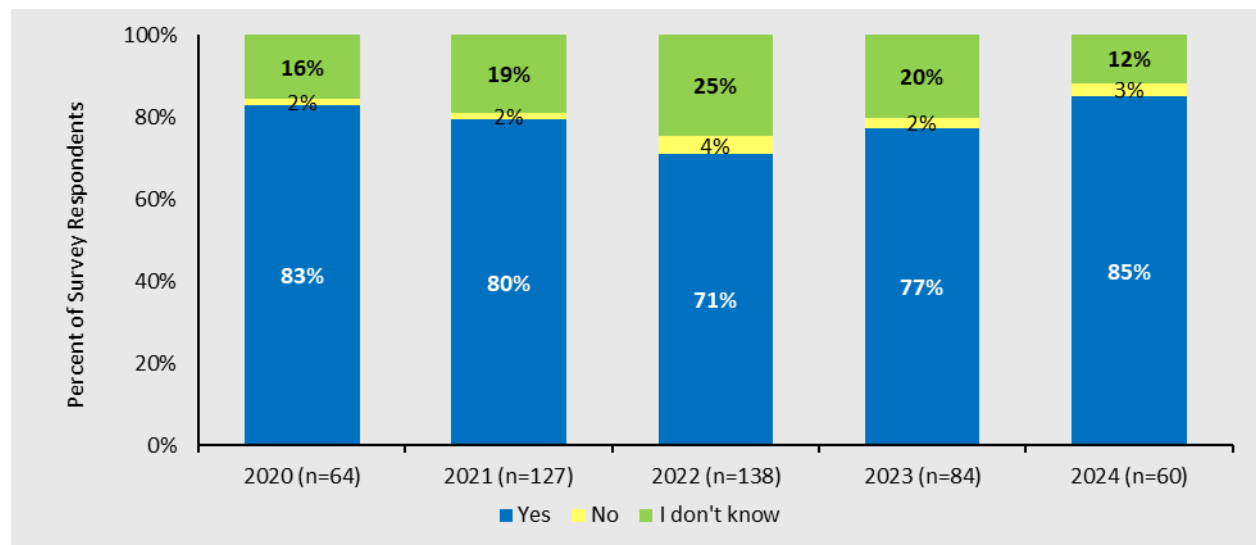
Overall, 71% of follow-up survey respondents rated the value of the trainings they attended as a 6 or 7 on a 7-point scale (with a mean score of 5.98 for all responses), suggesting that respondents remembered the trainings and continued to find them valuable six months after attending. See Appendix E for further details about responses.

### 6.4.3. Five-Year View of Trainee Feedback

The team assessed how respondents felt about the importance of NYSERDA’s role in increasing compliance in each evaluation year. Looking across the five years of data, a total of 78% of respondents who said they observed an increase in code compliance said they thought NYSERDA’s technical support and training activities played a role in this increase. In contrast, 3% said they did not think the NYSERDA initiative was a notable contributing factor, and 19% were undecided. Results by year are presented in Figure 4.

**Figure 4. Percentage of Respondents Who Think NYSERDA Services Affected Code Compliance**

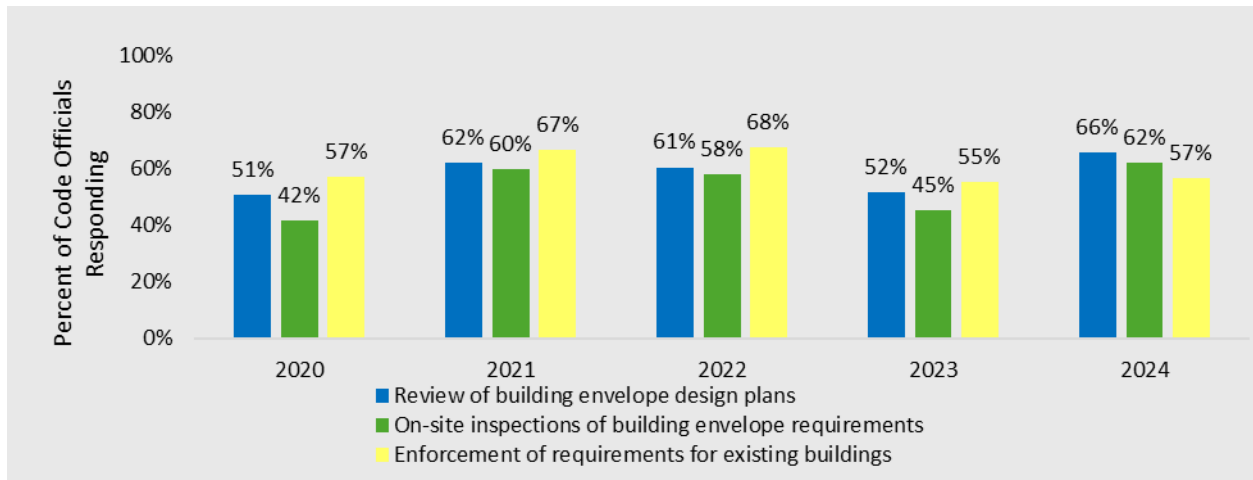
*Source: Follow-Up Survey Question: “Do you think the services provided by the NYSERDA Initiative, including training and technical assistance, have played a role in this [increased compliance]?” October 2024.*



The market evaluation team reviewed reported changes post-training over the course of the evaluation. Survey responses on knowledge gain and related activities post-training remained consistent over the full initiative and did not suggest major upward or downward trends. Overall, over 60% of respondents consistently reported that they were making changes or expecting to make changes to their energy code-related work procedures after attending the training, suggesting that participants still found the information valuable several months after the training. Figure 5 and Figure 6 show the types of changes respondents most commonly reported making or expecting to make in the future in each evaluation year.

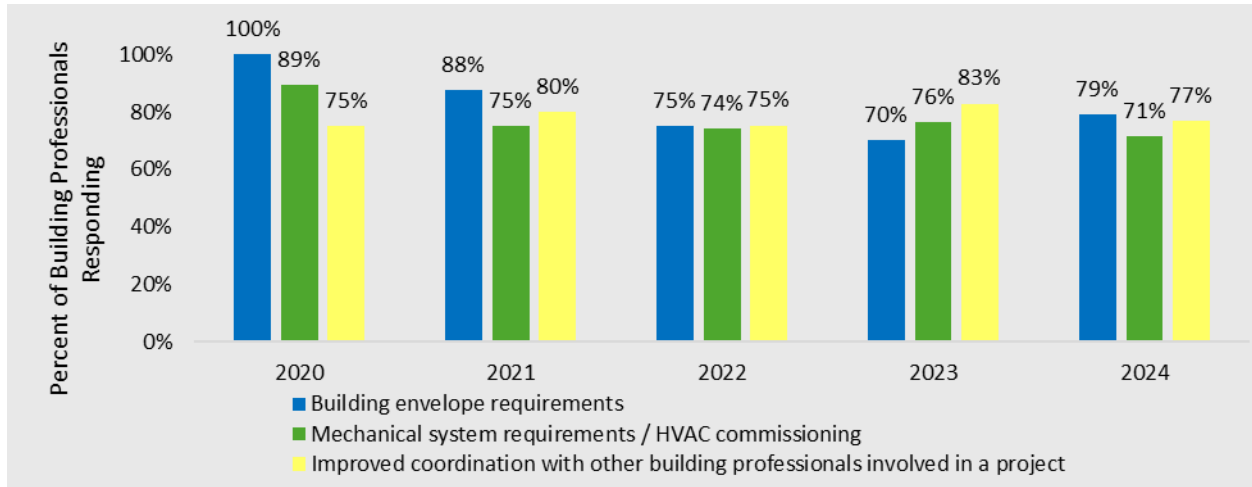
**Figure 55. Percentage of Code Officials Who Changed or Expect to Change Due to Training**

*Source: Follow-Up Survey Question: "For each topic listed below, please identify if the procedures of your work have changed or will change as a result of what you learned at the training you attended?" October 2024.*



**Figure 66. Percentage of Building Professionals Who Changed or Expect to Change Due to Training**

Source: Follow-Up Survey Question: “For each topic listed below, please identify if the procedures of your work have changed or will change as a result of what you learned at the training you attended?” October 2024.



## 7. Findings and Recommendations

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The market evaluation team offers the following findings and recommendations for the CSCNB Initiative activities.

**Finding 1: Estimated code compliance is increasing but at a slower rate in the last years of the current code cycle.** Data show that compliance levels are cyclical. Compliance initially drops following the adoption of a new code, with the greatest increases in the years that follow the code adoption (coinciding with use of compliance resources such as training) and then plateaus in later years.

Delphi panel data and interviews point to an overall trend of energy code compliance increasing over the course of the evaluation period of 2023-2024 by 7% to 22%. These substantial increases in code compliance are a key factor in the initiative exceeding its initial savings targets for this evaluation period. This continued compliance increase is largely driven by commercial new construction; in residential projects and commercial additions and alterations, data suggest that compliance has plateaued. Expert feedback suggests the following reasons for these trends:

- Commercial new construction projects are built by teams that have more resources and higher levels of staff (on average) than in residential new construction, while the actors in the residential new construction market are more fragmented.
- Commercial builders typically have broader experience with building systems and compliance measures (e.g., weather barriers) than residential builders, and can therefore better engage with new requirements. Commercial builders already default to a higher level of review that enables compliance, while market actors in residential and smaller projects are more likely to find the additional costs and time requirements of compliance more challenging.

**Recommendation 1a for NYSERDA program staff:** With NYS at the end of the current code cycle and adoption of a new state code expected in 2025, continue plans to offer increased support to familiarize stakeholders with the upcoming code and minimize the anticipated drop in compliance, to the extent possible. Prioritize support to jurisdictions with limited bandwidth to further energy code compliance by focusing on increasing their understanding of and engagement with new requirements. Continue to provide technical support to larger jurisdictions, such as New York City, to enable collaboration and demonstration. Continue to explore opportunities for engaging building professionals and market actors who can influence the quality of projects brought to code officers.

**NYSERDA Response to Recommendation:** Pending. NYSERDA will contract with training providers to develop and deliver training on the new state Energy Code and intersecting requirements of the state Uniform Code and do so within the context of the state’s pending building electrification rule. NYSERDA will evaluate the impact and effectiveness of this training and adjust as needed. NYSERDA will continue to work with state and regional home builder associations, and regional material suppliers, to inform training and resources aimed at supporting building professionals in advance of and during the next code cycle. NYSERDA will continue to work closely with DOS to provide code compliance support and tools including online code compliance resources to NYS AHJs.

**Recommendation 1b for NYSERDA program staff:** Develop packages of resources specifically focused on residential projects and additions and alterations and explore new ways to market these resources to building professionals with limited bandwidth for compliance activities. When developing compliance resources, ensure that the resources serve market actors of all types of projects (small and large, residential and commercial, new construction and alterations).

**NYSERDA Response to Recommendation:** Pending. Future training will address additions and alterations for residential and commercial buildings. Market research will inform what, if any, other additional resources should be developed and what their potential demand and utility would be.

**Finding 2: Regional variations in resources, staffing, and priorities impact opportunities to improve compliance.** Many experts stressed that jurisdictions have competing priorities, such as easing processes to streamline economic development and using limited staff bandwidth for compliance with safety elements (e.g., fire code) rather than energy consumption. Feedback suggests that compliance levels vary across the state and that rural jurisdictions facing resource and staffing limitations are key drivers of lower compliance rates. Permit application processes vary by jurisdiction, with many jurisdictions still using paper processes that require additional staff hours. These variations add to the burden of applicants who must keep track of different processes and platforms across jurisdictions. Experts estimated that targeted third-party support will have a meaningful impact on compliance in these jurisdictions (average of 10%), as will code compliance technology (average of 6%).

**Recommendation 2a for NYSERDA program staff:** While post-training surveys gather data about where trainees work, survey questions could be structured to require respondents to select one or more cities or counties in a drop-down menu to allow for easier processing and mapping of who has been engaged in each region across the state.

**NYSERDA Response to Recommendation:** Pending. NYSERDA will explore the feasibility of gathering a greater degree of locational granularity in training survey instruments.

**Recommendation 2b for NYSERDA program staff:** Develop a protocol for assessing community capacity for compliance, considering potential inputs such as number of code officials, number of trained building professionals, points of engagement with NYSERDA, and others. Use findings from this analysis to support the development of more opportunities to target specific communities with resources that allow them to pursue energy code compliance without sacrificing already limited bandwidth. Explore opportunities to build local resources that support compliance and limit administrative, procurement, and maintenance requirements for code officials, builders, and other permit applicants.

**NYSERDA Response to Recommendation:** Pending. NYSERDA plans to expand the availability of pilot programs designed to make enforcement easier and more efficient at the building department level.

**Finding 3: Energy code officials' perception of the energy code in some jurisdictions may affect code enforcement and by extension, compliance.** Interviews revealed that some code officials are not motivated to communicate code requirements to other market actors due to the perception that the value of the energy code was tied to concern about climate change, which they consider unnecessarily political and not well received in their jurisdiction. Some code officials also noted that they believed the energy code was becoming unrealistic and infeasible, or that they would alienate developers or political leadership by pursuing compliance. Interviews suggest that the majority of these concerns would be mitigated if energy code compliance was positioned as offering financial benefits such as compelling payback periods.

**Recommendation 3a for NYSERDA program staff:** Develop materials that highlight various benefits of the energy code in state resources and training. Incorporate easily communicated bullets and sound bites into training offerings, so that trainees may communicate benefits within the communities they serve.

**Recommendation 3b for NYSERDA program staff:** Where feasible, leverage existing pilot activities to enhance communication of the value proposition to communities. Given the ways in which compliance and motivating policies vary across jurisdictions, it may be beneficial in some cases to explore working meetings and collaboration with community leadership and stakeholders in select jurisdictions to assess different jurisdictions' needs and provide customized support aligned with their needs and interests.

**NYSERDA Response to Recommendations (3a & 3b):** Pending. NYSERDA will explore the practicality and utility of incorporating additional value propositions of energy code compliance into any future training and resources developed.

**Finding 4: Trainings continue to provide value to attendees and are useful in increasing compliance.** The percentage of code officials and building professionals who reported an increased understanding of energy codes influencing their approach to code compliance has remained consistently high throughout the evaluation period. This evaluation found that trainings have impacted code compliance, representing 80% of the energy savings in this initiative. At least 71% of respondents in all years say that they believe trainings increased compliance. Respondents also reported increased understanding of the energy code post-training in all years at remarkably consistent rates, though data show trainings have a slightly greater impact in the years immediately following code changes. More than 40% of survey respondents reported that they either made changes or expected to make changes to their energy code-related work procedures after attending the training every year. Early data suggest NYSERDA's increased diversification in training offerings has been well received, with surveys showing high ratings for information quality and relevancy to work for the new asynchronous trainings.

**Recommendation 4 for NYSERDA program staff:** As was done ahead of code adoption in 2020, increase training efforts and resources near the upcoming energy code update. Providing additional support in the ramp up and following a code change will support code officials and building professionals with the transition. Continue to explore the impact of diversifying the energy code trainings' reach by experimenting with training formats (e.g., asynchronous online training options). Interview feedback noted that complex technical slides can be overwhelming and that providing real-world examples, pictures, and case studies could help engage trainees.

**NYSERDA Response to Recommendation:** Pending. NYSERDA will support training on the next energy code update, informed in part by this evaluation.