Codes and Standards for Carbon Neutral Buildings Initiative Year 5 Market Evaluation Report:

Savings Estimates and Progress Toward Goals

Appendices

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Appendix A. CEF Savings Estimates

In Year 5, the market evaluation team calculated the Clean Energy Fund (CEF) savings estimates of the Codes and Standards for Carbon Neutral Buildings (CSCNB) initiative associated with stretch code adoption, and increased code compliance resulting from training and alternative code compliance strategies.

The methodology for calculating these preliminary savings aligned with the methodology of Year 3, in which the team made the following updates:

- Leveraged Pacific Northwest National Lab (PNNL) energy use intensities for building codes at the end-use level, rather than the whole-building level
- Used an adjusted method for estimating energy consumption that assumes that elements of a building project that are not in compliance with current code are 100% compliant with the previous code version

The team also updated code compliance estimates with results from the aggregation of the compliance-focused Delphi panels from Year 1, Year 3, and Year 5 and the Year 5 independent expert panel. While the methodology established for the Year 5 estimates had anticipated including savings associated with the adoption of a new statewide energy code, the team did not analyze that category because the state did not adopt a new statewide energy code within this timeframe.

In Year 5, the evaluation team refreshed and finalized the savings estimates with Dodge data on construction square footage provided by NYSERDA. With total square footage identified as not yet complete for 2023 and 2024, the most recently complete Dodge data from 2022 was applied to 2023 and 2024. by calculated square footage segment (by market segment and project type for estimates of training and alternative compliance strategies savings, and by jurisdiction and project type for stretch code savings).

Table 1 shows the estimated savings for 2020, 2021, 2022, 2023, and 2024 for electric, electric demand, and fossil fuel savings.

Table 1. Initiative Savings Estimates

	Electric Savings (GWh)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	5.37	9.84	14.71	14.79	14.68	59.38
Training	47.49	44.08	61.06	50.05	48.21	250.88
Alternate Compliance Strategies	0.00	0.00	0.00	1.41	1.64	3.05
Total	52.85	53.92	75.77	66.25	64.52	313.31

	Demand Savings (MW)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	1.49	2.77	4.19	4.20	4.15	16.79
Training	12.53	11.75	16.25	13.30	12.80	66.64
Alternate Compliance Strategies	0.00	0.00	0.00	0.37	0.43	0.80
Total	14.02	14.52	20.44	17.87	17.38	84.24

	Fossil Fuel Savings (Billion BTU)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	5.58	11.49	18.63	19.34	19.85	74.90
Training	96.15	89.57	111.40	91.77	88.22	477.11
Alternate Compliance Strategies	0.00	0.00	0.00	2.85	3.34	6.18
Total	101.73	101.06	130.03	113.96	111.41	558.19

Because two sources provided funding for the initiative in 2020, the CEF and the Technology and Market Development (T&MD), the team estimated 2020 CEF savings based on the percentage of funding coming from the CEF. The revised 2020 estimate is shown in Table 2.

Table 2. Initiative Savings Estimate – CEF Only

	Electric Savings (GWh)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	5.31	9.84	14.71	14.79	14.68	59.33
Training	47.01	44.08	61.06	50.05	48.21	250.41
Alternate Compliance Strategies	0.00	0.00	0.00	1.41	1.64	3.05
Total	52.32	53.92	75.77	66.25	64.52	312.79

	Demand Savings (MW)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	1.47	2.77	4.19	4.20	4.15	16.78
Training	12.41	11.75	16.25	13.30	12.80	66.52
Alternate Compliance Strategies	0.00	0.00	0.00	0.37	0.43	0.80
Total	13.88	14.52	20.44	17.87	17.38	84.10

	Fossil Fuel Savings (Billion BTU)					
	2020	2021	2022	2023	2024	Cumulative
Stretch Code Adoption	5.52	11.49	18.63	19.34	19.85	74.84
Training	95.19	89.57	111.40	91.77	88.22	476.15
Alternate Compliance Strategies	0.00	0.00	0.00	2.85	3.34	6.18
Total	100.71	101.06	130.03	113.96	111.41	557.18

1.1. Stretch Code Adoption

To calculate the impacts of stretch code adoption, the market evaluation team used the following variables: jurisdictions that have adopted NYStretch, the building square footage affected by NYStretch adoption, and the change in energy use intensity per square foot affected. The team also applied a factor to estimate the percentage of energy savings from jurisdictions' stretch code adoption found to be a direct result of the CSCNB initiative. Table 3 provides the data inputs and sources for the stretch codes savings calculation.

Table 3. Data Inputs for Stretch Code Savings Calculation

Variable	Source/Notes
Affected Square Footage	• Dodge data provided by NYSERDA: Assumed square footage is evenly distributed throughout the year and assumed compliance upon adoption of the code • Assumed 2023 and 2024 construction to be the same as in 2022 • Adjusted county-level Dodge data to jurisdictions based on census information
Impact of NYSERDA	• Independent expert panel–based review of Year 5 Stretch Code jurisdiction data and NYSERDA outreach and technical assistance
Energy Use Intensity Change Per Square Footage	• Pacific Northwest National Laboratory: Residential and Commercial Prototype Building Models: www.energycodes.gov/prototype-building-models • NYSERDA 2020 NYStretch Energy Code Commercial Cost-Effectiveness Analysis: July 2019 • NYSERDA Energy Savings and Cost-Effectiveness Analysis of the 2020 NYStretch Energy Code Residential Provisions: July 2019

The market evaluation team conducted an independent panel of experts in Year 5 to estimate the attribution of energy savings that the initiative should receive based on its stretch code adoption. Based on the responses from the independent panel, Table 4 details the likelihood (expressed as a percentage) that the jurisdiction would have adopted the stretch code without NYSERDA support (funding, NYStretch template, technical assistance, and other). The market evaluation team identified 44 jurisdictions that have adopted NYStretch. New York City (NYC), which accounts for more than 90% of the affected square footage and energy savings of code adoption, adopted NYStretch in May of 2020.

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.

Table 4. Local Impacts of New York Stretch Code Adoption, Based on the Independent Panel

Jurisdiction	Adoption Date	Region	Population	Likelihood jurisdiction would have adopted this stretch code without NYSERDA support
New York, City of	5/12/2020	New York City	8,804,190	89%
Niskayuna, Town of	4/27/2021	Capital District	23,278	29%
New Lebanon, Town of	6/14/2022	Capital District	2,514	28%
Athens, Village of	7/28/2021	Capital District	1,668	29%
Philmont, Village of	8/9/2021	Capital District	1,377	29%
Baldwinsville, Village of	1/1/2023	Central New York	7,898	28%
Tully, Village of	11/3/2021	Central New York	904	29%
Henrietta, Town of	1/1/2023	Finger Lakes	47,096	31%
Canandaigua, City of	9/2/2021	Finger Lakes	11,109	37%
Geneva, Town of	9/21/2021	Finger Lakes	3,291	28%
Lima, Village of	4/27/2021	Finger Lakes	2,139	28%
Sodus, Village of	4/12/2022	Finger Lakes	1,819	29%
Pittsford, Village of	1/30/2022	Finger Lakes	1,419	29%
Southampton, Town of	12/14/2021	Long Island	58,314	41%
East Hampton, Town of	11/18/2021	Long Island	21,457	41%
Oyster Bay Cove, Village of	2/7/2022	Long Island	2,197	37%
New Rochelle, City of	4/20/2021	Mid-Hudson	82,292	39%
Orangetown, Town of	11/30/2021	Mid-Hudson	49,212	39%
Cortlandt, Town of	7/20/2021	Mid-Hudson	42,545	38%
Mamaroneck, Town of	6/16/2021	Mid-Hudson	29,563	38%
Ossining, Town of	5/11/2021	Mid-Hudson	25,086	38%

Jurisdiction	Adoption Date	Region	Population	Likelihood jurisdiction would have adopted this stretch code without NYSERDA support
Kingston, City of	4/6/2021	Mid-Hudson	24,069	29%
Somers, Town of	1/13/2022	Mid-Hudson	20,668	38%
New Castle, Town of	12/7/2021	Mid-Hudson	17,862	38%
Bedford, Town of	2/2/2021	Mid-Hudson	17,309	38%
Beacon, City of	4/20/2020	Mid-Hudson	13,769	39%
Dobbs Ferry, Village of	11/10/2020	Mid-Hudson	11,070	38%
Philipstown, Town of	5/5/2022	Mid-Hudson	9,831	37%
Esopus, Town of	12/16/2021	Mid-Hudson	9,041	37%
Croton-on-Hudson, Village of	5/16/2022	Mid-Hudson	8,327	37%
Hastings-on-Hudson, Village of	6/16/2020	Mid-Hudson	7,921	38%
Nyack, Village of	1/26/2023	Mid-Hudson	7,265	37%
Irvington, Village of	9/20/2021	Mid-Hudson	6,652	37%
Marbletown, Town of	6/1/2021	Mid-Hudson	5,668	37%
North Salem, Town of	9/14/2021	Mid-Hudson	5,136	37%
Bethel, Town of	5/12/2021	Mid-Hudson	3,959	37%
Remsen, Town of	1/1/2023	Mohawk Valley	1,929	28%
Dryden, Town of	5/20/2021	Southern Tier	14,029	28%
Newfield, Town of	8/12/2021	Southern Tier	5,179	28%
Danby, Town of	6/29/2022	Southern Tier	3,457	28%
Montour Falls, Village of	2/18/2021	Southern Tier	2,714	28%
Humphrey, Town of	11/8/2021	Western New York	659	29%

One goal of the CSCNB initiative was for 26 jurisdictions to adopt stretch codes by 2024. To date, the market evaluation team has identified 44 jurisdictions that have adopted stretch codes. Of these jurisdictions, 40 have received grant funding through NYSERDA's Clean Energy Communities (CEC) program, which allocates funds based on points awarded for the adoption of a stretch code, and which stretch code jurisdictions interviewed in earlier evaluation years have identified as a motivating factor for stretch code adoption. Table 5 presents a breakdown of jurisdictions by New York State region that have received funding and other assistance from NYSERDA.

Table 5. Municipalities Receiving Stretch Code Support and Adopting Stretch Codes 2020-2024

	Total	Western NY	Finger Lakes	Southern Tier	Central NY	Mohawk Valley	North Country	Capital Region	Mid-Hudson	NYC	Long Island
Munis receiving NYSERDA outreach, tech assistance	**187**	15	13	21	16	1	4	18	73	1	10
Munis that received grant funding from NYSERDA [a]	**40**	1	5	4	2	0	0	4	20	1	3
Munis that adopted stretch codes	**42**	1	6	4	2	1	0	4	20	1	3
Percentage of stretch code adopters that received NYSERDA outreach, technical assistance	**100%**	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percentage of stretch code adopters that received NYSERDA grant funding [a]	**95%**	100%	83%	100%	100%	0%	n/a	100%	100%	100%	100%
Percentage of munis receiving NYSERDA outreach and technical assistance that are stretch code adopters	**22%**	7%	46%	19%	13%	100%	0%	22%	27%	100%	30%

[a] Grant funding (action and points-based grants through the CEC program) were not required to be used in support of NYStretch adoption or implementation. Rather, grants can be used to support any clean energy project.

1.2. Training Impacts

To calculate the impacts of trainings, the market evaluation team used the following variables: the building square footage affected by trained code officials and building professionals, the percentage of increased compliance resulting from training activities, and the change in energy use intensity per square foot affected. Table 6 identifies the source for each of these variables.

Table 6. Data Sources for Training Impacts Validation

Variable	Source/Notes
Affected Square Footage	Market square footage according to Dodge data provided by NYSERDA: Square footage estimates reduced to account for above-code new construction based on initial NYSERDA estimates of 15% for residential new construction and 30% for commercial new construction
Change in Compliance Due to Initiative	Assessed by Year 5 independent expert panel. Data on past assumptions and analysis was shared through a Data Compilation (referencing findings from Massachusetts TXC47 Non-Residential Code Compliance Support Initiative Attribution and Net Savings Assessment, July 26, 2018, NMR Group and Cadmus)
Energy Use Intensity Change Per Square Footage for Percentage of Change in Code Compliance	Pacific Northwest National Laboratory: Residential and Commercial Prototype Building Models: www.energycodes.gov/prototype-building-models

As described in the Year 3 and Year 4 reports, the market evaluation team intended to base affected square footage on follow-up survey responses with training participants and then calculate an average impact to the population of trainees. However, the average square footage estimates applied to training participants would have yielded an impacted area that was greater than the total market. This high square footage estimate from training surveys probably resulted from code officials and building professionals working on the same projects.

Table 7 shows the preliminary energy savings impacts from trainings for 2023. Because conversations with NYSERDA staff indicated that complete square footage estimates for 2023 were not yet available, the team used the 2022 square footage for 2023 and 2024. The table shows the various building segments, market square footages, and final electric and fossil fuel savings. The final estimated 2024 energy savings is 48,209 MWh, the demand savings estimate is 12.8 MW, and the fossil fuel savings estimate is 88,219 MMBTU.

Table 7. Estimated 2024 Energy Savings Impacts from Training

Segment	Market Square Footage (thousand sq-ft) [a]	Energy Savings (MWh)	Energy Savings (MW)	Energy Savings (MMBTU)
Statewide Total	**96,366**	**48,209**	**12.8**	**88,219**
Commercial New Construction	64,364	36,769	9.5	55,659
Commercial Major Alteration and Additions	6,518	5,825	1.4	10,144
Residential New Construction	25,384	5,586	1.8	22,349
Residential Major Alteration and Additions	100	29	0.0	67

[a] Dodge data provided by NYSERDA: Square footage estimates reduced to account for above-code new construction based on initial NYSERDA estimates of 15% for residential new construction and 30% for commercial new construction

Appendix B. Code Compliance Additional Details

In the first quarter (Q1) of 2024, the market evaluation team convened a Delphi panel of 13 building energy codes and code compliance experts (panelists) working across New York State (NYS). The Delphi panel process used the judgment of this group of experts to develop estimates and compile informed opinions on energy code compliance across the state. The team used these Year 5 Delphi panel findings, supported by longitudinal panel and relevant training survey results, to help calculate the savings estimates.

The Appendix D: Evaluation Methodologies section provides details on the Delphi panel and independent panel methodology and panel makeup.

As shown in Table 8, seven of the 13 Delphi panelists had expertise in both residential and commercial energy codes, four had only residential expertise, and one had only commercial expertise. One panelist selected "non-applicable," because their occupation is a third-party energy professional.

Table 8. Delphi Panel Participant Energy Code Expertise

Category	Count
Commercial energy code expertise only	1
Residential energy code expertise only	4
Both commercial and residential energy code expertise	7

For the independent panel, four participants had expertise in the commercial sector only and three participants had expertise in both the commercial and residential sectors, as seen in Table 9.

Table 9. Independent Panel Participant Energy Code Expertise

Category	Count
Commercial energy code expertise only	4
Residential energy code expertise only	0
Both commercial and residential energy code expertise	3

The team worked to ensure that the Delphi panel and independent panel respondents represented work experience in a wide range of geographic regions, with two Delphi panel respondents reporting having significant work experience in multiple regions.

1.3. Compliance Delphi Panel Summary

Four compliance-focused Delphi panels informed the evaluation's final compliance estimates, including one panel conducted in 2015 by Energy & Resource Solutions (ERS) and three conducted by the market evaluation team in 2020, 2022, and Q1 of this evaluation year (2024). (The estimates of the independent panel, which were also a key input to the final estimates, are discussed in a later section.) The first three panels were conducted under a different version of the Energy Conservation Construction Code of New York State (ECCCNYS). These panels estimated compliance levels by sector and construction project type discussed above, and also for key specific building components that affect energy usage. While Year 5 panelists estimated that in both sectors compliance for additions and alterations have either the same or less compliance than for new construction, the residential sector was estimated to have a larger variance in compliance between these two categories. The panel found that in the commercial sector, thermal bridging, continuous air barrier installation quality, envelope insulation installation quality, and continuous air barrier—all building envelope requirements—are at or below 80% compliance. In the residential sector, areas the panel identified as needing focused attention to improve compliance rates (compliance at or below 80%) include documentation, air sealing, insulation installation quality, distribution systems, hot water pipe insulation, and duct testing.

Compliance estimates from the Delphi panel were one component of the final estimates used in the initiative. The team aggregated the estimates of the compliance Delphi panels with the multi-year review of the Year 5 independent panel and validated these with data from the longitudinal jurisdictional interviews to assess code compliance over the years. Table 10 compares the compliance-focused Delphi panel energy code compliance estimates in 2015, 2020, 2022 and 2024 for commercial and residential construction as well as the model code versions on which each ECCCNYS version is based.

Table 10. Delphi Panel Estimated Code Compliance, Before Independent Panel Estimates

Building Type	New Construction				Additions and Alterations			
		Year 1	Year 3	Year 5		Year 1	Year 3	Year 5
Study Year	2015	2020	2022	2024	2015	2020	2022	2024
ECCCNYS Version	2010	2016	2020	2020	2010	2016	2020	2020
Based on:	2009 IECC & ASHRAE 90.1-2007	2015 IECC & ASHRAE 90.1-2013	2018 IECC & ASHRAE 90.1-2016	2018 IECC & ASHRAE 90.1-2016	2009 IECC & ASHRAE 90.1-2007	2015 IECC & ASHRAE 90.1-2013	2018 IECC & ASHRAE 90.1-2016	2018 IECC & ASHRAE 90.1-2016
Date Code Implemented	December 2010	October 2016	May 2020	May 2020	December 2010	October 2016	May 2020	May 2020
Estimated Commercial Compliance	74%	83%	85%	87%	59% to 68%[a]	70%	84%	82%
Estimated Residential Compliance	77%	77%	85%	83%	62% to 71%	71%	81%	80%

[a] 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%–15% worse than new construction compliance. Using this range, addition and alteration compliance increased by 2%–11%.

1.4. Independent Panel Summary

1.4.1. Introduction to Year 5 Evaluation Independent Panel

The market evaluation team conducted an independent panel to assess code compliance impacts in New York State and guide strategic developments in supporting programming. As established by the methodology put forth in the T&MD savings memo (found in Appendix F), in this final year of the five-year evaluation the market evaluation team established a panel of independent code experts to assess the market impacts of specific initiative activities, based on a careful and systematic review of the evidence, and to determine the program-induced effects. The independent panel included a mix of experts from not

just New York State but also other parts of the country, to understand relationships between program activities and code compliance.

1.4.1.1. Impact of Training

Independent panelists estimated the impact of the NYSERDA-sponsored training on compliance rates. On average, panelists estimated that training would impact energy code compliance by 5%. Although estimates were relatively similar across sectors and project types, the panelists estimated that training would have the biggest impact on compliance for commercial additions and alterations, with an average impact of 6%. One panelist noted: "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." Table 11 presents the independent panel's average estimates of the impact of training on energy code compliance.

> *"Since the only energy code update over this time frame was in May 2020, it is logical that the more significant improvements due to training were seen in the earlier years of a new code adoption."*
>
> - Independent panel respondent

Table 11. Estimates of the Contribution of Training to Energy Code Compliance Rates

Project Type	Sector	2020	2021	2022	2023	2024
New Construction	Single Family	6%	5%	6%	5%	4%
	Multifamily Low Rise	5%	5%	5%	4%	4%
	Multifamily Mid/High Rise	5%	4%	5%	4%	4%
	Commercial	5%	5%	6%	5%	5%
Addition or Alteration	Single Family	5%	5%	5%	4%	4%
	Multifamily Low Rise	5%	5%	5%	4%	4%
	Multifamily Mid/High Rise	5%	5%	6%	5%	5%
	Commercial	6%	5%	6%	6%	5%

Panelists estimated that training would affect residential compliance more than commercial compliance. Most agreed that the impact on compliance decreased in 2024 compared to previous years. Some panelists thought this was because the trainings would have the most impact in the years directly following the adoption of a new code; others noted that 2024 had held fewer trainings to date compared to previous years. Panelists had mixed opinions about the potential impact of trainings on additions and alterations compliance versus new construction. Some panelists said that given the complexity of additions and alterations projects, training could have more impact. Others thought the trainings typically had better coverage of

> *'"I believe training is more impactful when the code changes are more significant."*
>
> - Independent panelist

new construction and, thus, the impact on compliance for addition and alteration projects would be lower. One panelist did not think there would be a difference in the impact on compliance between the project types.

1.4.1.2. Impact of Third-Party Support

In Year 3 of the CSCNB Initiative, NYSERDA invited applications to Program Opportunity Notice (PON) 4600: Third-Party Support and Advancing Code Compliance Technology Pilot Program. The overall goals of the pilot program are to support improved technical and online capacities in authorities having jurisdiction (AHJs) in relation to residential and commercial buildings plan reviews and inspections as well as energy code compliance.

The independent panel was asked to estimate the likely impact of third-party support on the code compliance rates of jurisdictions participating in the PON 4600 pilot, by project type and building sector. Panelists estimated that third-party support would cause an increase in compliance rates of an average of 10%, though responses varied by jurisdiction and category; impacts on residential and commercial compliance were estimated at 6% to 12% and 7% to 15%, respectively. Across the board, the panelists anticipated that third-party support would improve compliance, and that the improvement would be greater for smaller, rural communities. One panelist mentioned that the impact of third-party resources would also be greater in communities more frequently processing complex projects. Another panelist emphasized that the impact may vary significantly by jurisdiction, depending on local interest in and resources for energy code compliance. Table 12 presents the independent panel's average estimates of the impacts of third-party support on energy code compliance.

Table 12. Estimates of the Impact of Third-Party Support on Energy Code Compliance

Project Type	Sector	Range	Average
New Construction	Single Family	7%–12%	10%
	Multifamily Low Rise	7%–12%	10%
	Multifamily Mid/High Rise	8%–12%	10%
	Commercial	8%–15%	13%
Addition or Alteration	Single Family	6%–10%	8%
	Multifamily Low Rise	6%–10%	8%
	Multifamily Mid/High Rise	7%–11%	9%
	Commercial	7%–11%	9%

1.4.1.3. Impact of Code Compliance Technology

The panel was similarly asked to estimate the impact of code compliance technology adoption on code compliance rates in each jurisdiction. Panelist responses estimated an increase in compliance rates by an average of 6%; impacts on residential and commercial compliance were estimated at 4% to 8% and 3% to 9%, respectively. Table 13 presents the independent panel's average estimates of the impacts of code compliance technology adoption on energy code compliance.

Table 13. Estimates of the Impact of the Adoption of New Code Compliance Technology on Energy Code Compliance

Project Type	Sector	Range	Average
New Construction	Single Family	5%–8%	7%
	Multifamily Low Rise	5%–7%	6%
	Multifamily Mid/High Rise	6%–9%	8%
	Commercial	6%–9%	8%
Addition or Alteration	Single Family	4%–6%	5%
	Multifamily Low Rise	4%–6%	5%
	Multifamily Mid/High Rise	3%–5%	4%
	Commercial	3%–5%	4%

1.4.2. Independent Panel Parameters and Inputs to Indirect Savings

The independent panel was asked questions to support the updates of inputs to the evaluation's indirect savings calculations across three activities. The fourth activity, assessing NYSERDA's impact on code adoption, could not be evaluated in 2024 because of the new schedule for adoption of next statewide energy code (anticipated, as of the writing of this report, in 2025). The specific inputs that the panelists contributed to are summarized in Table 14. Table 15 lists the parameters that panelists assessed.

Table 14. Independent Panel Inputs to Initiative Indirect Savings Calculations

Savings Calculation Component	Input of Independent Panel
Training	• Panelists were asked about the effect of training on compliance rates in different building sectors and project types • Panelists were asked about the effect of training on compliance rates in different years of the code cycle
Stretch Code	• Panelists were asked about the effect of NYSERDA's stretch code support to jurisdictions on different jurisdiction's adoption • Panelists were asked about the change in compliance rates that might be anticipated following adoption of a stretch code
Alternative Code Support	• Panelists were asked about the effect of third-party support on compliance rates • Panelists were asked about the effect of adoption of new compliance technology on compliance rates • Panelists were asked about the effect of NYSERDA's support on specific jurisdictions piloting use of third-party support and/or new compliance technology

Table 15. Parameters Assessed by Independent Panelists

Parameter Category	Parameter Assessed	Contribution to Indirect Savings
General Compliance	Overall estimates of NYS energy code compliance for new construction and additions and alterations in distinct building sectors and segments	Calibration and processing of independent panel training, stretch code and alternate code compliance strategies responses
	Estimates of change in compliance over time	
	Effect of climate zone on compliance rates	
Training	Effect of NYSERDA-supported trainings on energy code compliance rates in different building sectors and segments	Percentage of compliance influenced by training in different project types, segments and years of initiative
Stretch Code Adoption	Significance of different types of technical and other support for stretch code adoption	Calibration and processing of savings stretch code
	Significance of stretch code adoption on neighboring jurisdictions	
	Influence of assistance provided by NYSERDA on stretch code adoption	Percentage of indirect savings influenced by NYSERDA
	Effect of stretch code adoption on short-term and long-term compliance rates	Calibration and processing of savings stretch code
Alternative Code Compliance Strategies	Effect of strategies on energy code compliance rates	Percentage of compliance influenced by alternative strategies in different project types, segments and years of initiative
	Influence of assistance provided by NYSERDA on alternative code compliance strategies adoption	Percentage of indirect savings influenced by NYSERDA

1.5. Energy Code Compliance

The market evaluation team asked Delphi panel and independent panel participants to estimate statewide compliance with the 2020 ECCCNYS, the energy code in effect during this evaluation year. The panels provided estimates of the overall compliance rate and compliance rate by component for both new construction and additions and alterations in the commercial and residential sectors. The Delphi panel estimated compliance rate by building system. For this study, the *overall compliance rate* is the average percentage of requirements that are in compliance for the entire building. The *compliance rate* for building systems is the average percentage of requirements that are in compliance for specific systems.

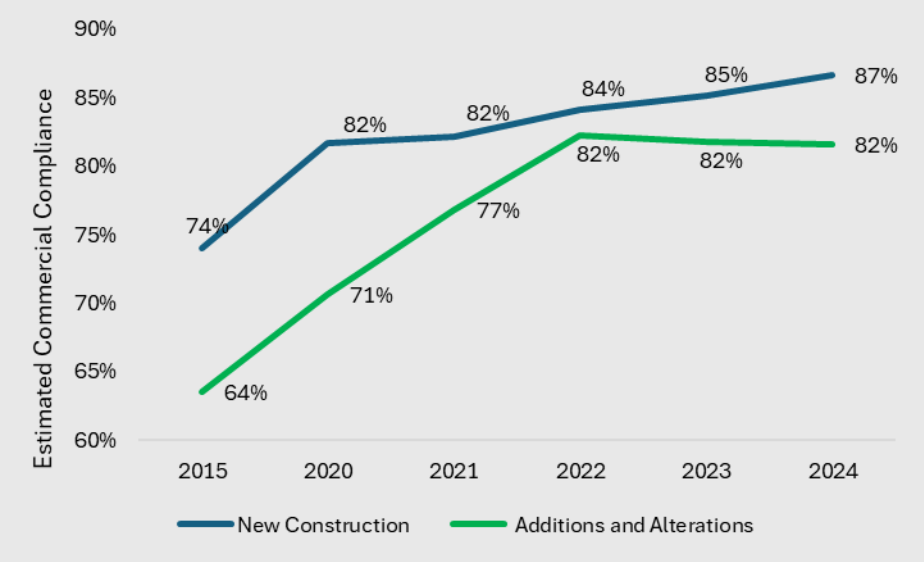
The market evaluation team combined the compliance rates the Delphi panel and the independent panel provided to create a final estimate of commercial and residential compliance rates for new construction and additions and alterations, as seen in Table 16 and Figure 1.

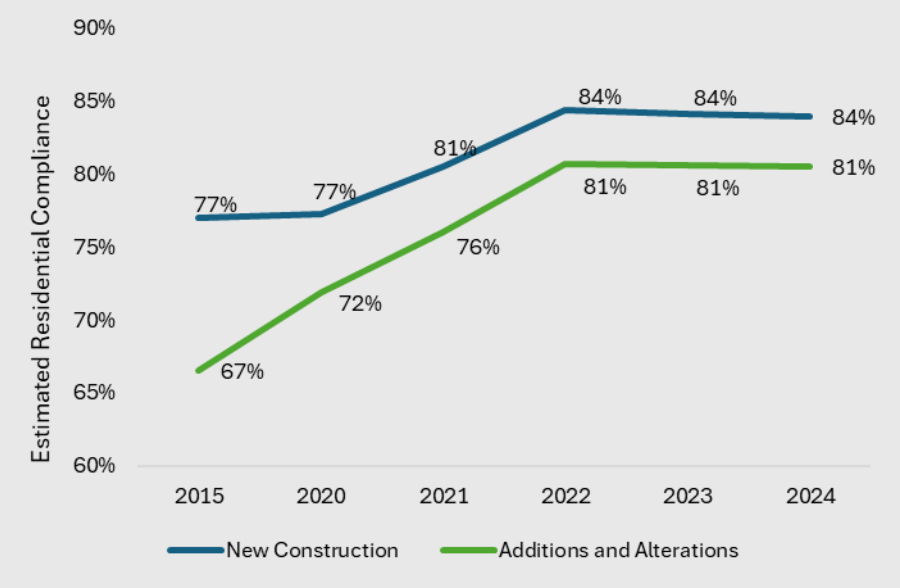
Table 16. Estimated Compliance Rates from Delphi Panel and Independent Panel by Study Year and Code Version

	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%[a]	71%	77%	82%	82%	82%
Estimated Residential Compliance	77%	77%	81%	84%	84%	84%	62% to 71%	72%	76%	81%	81%	81%

[a] 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%–15% worse than new construction compliance.

Figure 1: Compliance Estimates by Sector and Project Type Over Time, 2015–2024





1.5.1. Commercial Energy Code Compliance

The overall weighted panelist estimate of energy code compliance for commercial new construction in New York in 2024 was 87%, which is more than the estimate of 74% in 2015. The overall estimate of compliance for alterations and additions in 2024 was 82%, which increased from an estimated 64% in 2015 but has been the same rate as in 2022 and 2023. Table 17 shows the breakdown for each year a Delphi panel was conducted.

Table 17. Commercial Compliance Rates by Code and Study Year, from Panels

	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%[a]	71%	77%	82%	82%	82%

[a] 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%–15% worse than new construction compliance.

The market evaluation team also asked the Delphi panel to consider for commercial new construction the effect of moving to a new version of the energy code on overall compliance. Panelists estimated that compliance would decrease by 7% at the beginning of a new code cycle (estimates ranged from no impact to a 15% decrease in compliance).

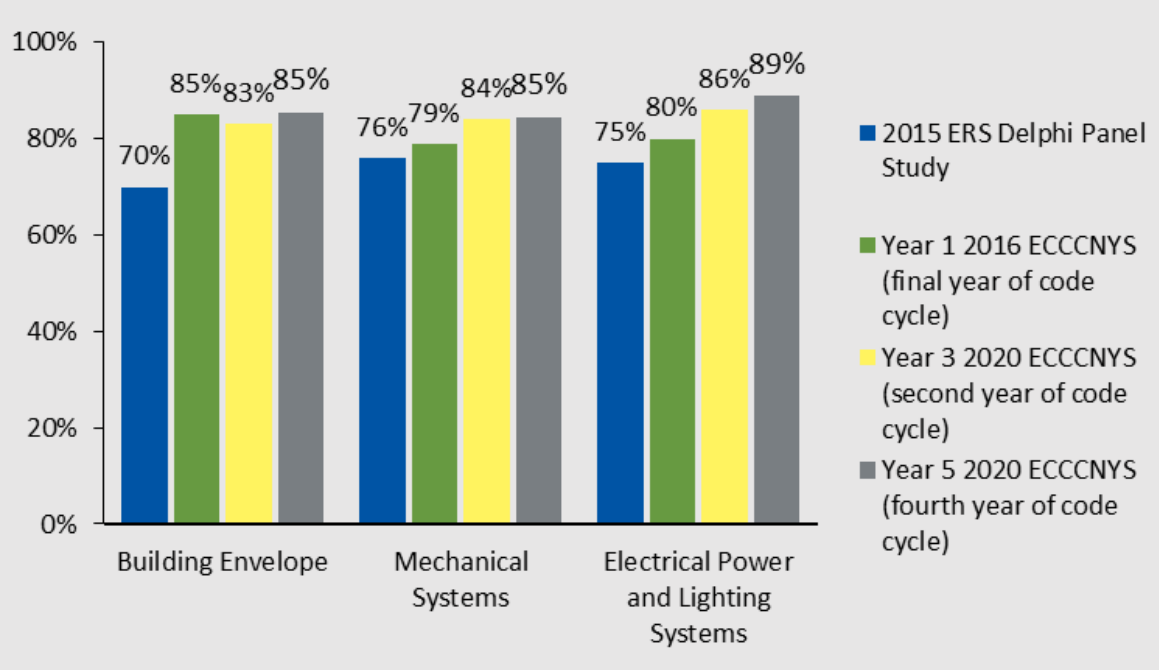
Delphi panelists also estimated the compliance rate for each major building system (the building envelope, mechanical systems, and electrical power and lighting systems). For both new construction and alterations and additions, panelists identified lighting and electrical systems as having the highest compliance (89% and 87%, respectively). The building envelope in additions and alterations was estimated to have the lowest compliance rate (78%). Table 18 shows that the compliance estimates for additions and alterations were consistently lower than their new construction counterparts.

Table 18. Commercial Compliance Rate by System

System	New Construction	Additions and Alterations
Building Envelope	85%	78%
Mechanical Systems	85%	81%
Electrical Power and Lighting Systems	89%	87%

Figure 2 provides a comparison of panel estimates of commercial new construction compliance rates by system for the current study, the Year 1 and 3 studies, and the 2015 ERS Delphi panel study. Compared to the Year 3 Delphi panel study, the current Delphi panel study found an increase in all elements of the systems. Building envelope had a slight decrease from the Year 1 to the Year 3 Delphi panel (85% to 83%). However, the Year 5 compliance assessment returned to 85%, the same rate as Year 1.

Figure 2. Comparison of New Construction Commercial System Compliance Rates by Year, Delphi Panel



1.5.1.1. Commercial New Construction Component-Level Compliance

The Delphi panelists estimated the compliance rate for key building components affecting energy use that the market evaluation team identified in Year 1. Table 19 shows the average of the panelists' compliance rate estimates for each building component in new construction. Individual component compliance rate estimates may help NYSERDA and training implementers decide which topics to focus on with energy code training and other technical assistance.

Table 19. 2020 ECCCNYS Commercial New Construction Compliance Rate by Component

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Thermal bridging	Continuous insulation in use for commercial projects to mitigate thermal bridging	66%	74%	76%
Continuous air barrier installation quality	Air barrier installed well with no gaps and all openings sealed continuously	70%	76%	78%
Continuous air barrier	Air barrier meets the code requirements for materials, assembly, or testing	70%	78%	80%
Envelope insulation installation quality	Envelope insulation is installed per manufacturer's requirements	67%	78%	80%
Daylighting controls	Day-lit spaces have separate controls from general lighting controls or are automatically controlled with daylight sensors	80%	84%	85%
Distribution systems	Ductwork and piping meet required insulation levels	85%	89%	86%
Interior lighting controls	Manual and automatic lighting controls installed and functioning properly	86%	88%	86%

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Mechanical commissioning	HVAC system completion, including air and hydronic system balancing and functional performance testing; documentation and reporting requirements met	66%	84%	86%
Demand controlled ventilation (DCV)	DCV provided in all spaces > 500 sq ft with average occupant load of 25 people per 1000 sq ft	69%	81%	86%
Energy recovery ventilation (ERV)	ERV provided for fan systems that exceed values specified in the code; exhaust air recovery efficiency is ≥ 50%	58%	84%	87%
Economizers	Economizers are provided where required, meet the design requirements for capacity, and have appropriate controls	85%	86%	87%
Equipment sizing	Equipment meets sizing requirements	80%	87%	87%
Envelope insulation	Meets envelope insulation requirements	67%	85%	88%
Lighting power density (LPD)	Meets space-specific LPD requirements	91%	89%	88%
Additional efficiency package options	Projects meet the additional efficiency requirements of C406.	62%	84%	89%
Mechanical controls	Mechanical controls provided – programmable thermostat to provide heating and cooling to each zone, with capability for automatic setback and shutdown	92%	89%	89%
Vertical fenestration (Windows and doors)	The vertical fenestration area is less than 30% of the gross above-grade wall area or up to 40% with automatic daylighting controls.	71%	85%	90%
Multiple HVAC systems	Multiple zone HVAC systems have supply air temperature reset controls and limit simultaneous heating and cooling to each zone	90%	87%	90%
Variable Air-Volume (VAV) systems	VAV fan motors ≥ 10 HP are driven by variable speed drive, have a vane-axial fan with variable pitch blades, or have controls or devices to limit fan motor demand	88%	90%	90%
Fenestration (windows, skylights and doors)	Windows and doors meet U-factor and SHGC requirements	88%	90%	91%
Exterior building lighting power	Exterior lighting does not exceed the exterior lighting power allowance	89%	89%	92%
Exterior lighting controls	Exterior lighting controlled by either motion sensor or time clock	91%	89%	92%
Equipment efficiency	Installed equipment meets efficiency requirements	95%	93%	94%

From Year 3 to Year 5, panelists agreed that the two components with the lowest compliance rates are thermal bridging and continuous air barrier installation quality, respectively. There were also notable differences between the studies where Delphi panelists identified changes around code requirements compliance. The Year 1 Delphi panel gave the lowest commercial new construction compliance scores to energy recovery ventilation (ERV) and additional efficiency package options; however, the Year 3 study saw a notable increase in reported compliance for both (from 58% and 62% respectively, to 84%). In Year 5, the panelists indicated that ERV had improved, giving it the tenth

> *"Thermal bridging continues to remain an issue… There is a lack of construction knowledge on energy code compliant envelope detailing."*
>
> - Delphi panel respondent

lowest score, and estimated that from Year 1 to Year 5 there was a 29% increase in compliance. From Year 3 to Year 5, panelists estimated that compliance rates for distribution systems had decreased by 3% and interior lighting controls had decreased by 2%.

Two of the jurisdictional respondents specifically noted agreement with the panel results showing improved compliance with ERV requirements. However, they were not as sure if they had seen the same improvement with additional efficiency package options compliance as estimated by the Delphi panel. Equipment efficiency remained at the highest level of compliance, likely because items in the state are already manufactured to required standards.

1.5.1.2. Commercial Additions and Alterations Component-Level Compliance

The panelists also estimated the compliance rate for select building components for additions and alterations. Table 20 shows the average of the panelists' compliance rate estimates for each of these building components.

Table 20. 2020 ECCCNYS Commercial Additions/Alterations Compliance Rate by Component

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Thermal bridging	Continuous insulation in use for commercial projects to mitigate thermal bridging	49%	71%	72%
Continuous air barrier installation quality	Air Barrier installed well with no gaps and all openings sealed continuously	57%	72%	72%
Continuous air barrier	Air barrier meets the code requirements for materials, assembly, or testing	62%	74%	76%
Envelope insulation installation quality	Envelope insulation is installed per manufacturer's requirements	65%	74%	78%
Mechanical commissioning	HVAC system completion, including air and hydronic system balancing and functional performance testing; documentation and reporting requirements met	53%	78%	81%
Distribution systems	Ductwork and piping meet required insulation levels	83%	84%	82%
Daylighting controls	Day-lit spaces have separate controls from general lighting controls or are automatically controlled with daylight sensors	63%	79%	83%
Economizers	Economizers are provided where required, meet the design requirements for capacity, and have appropriate controls	72%	81%	84%
Energy recovery ventilation (ERV)	ERV provided for fan systems that exceed values specified in the code; exhaust air recovery efficiency is ≥ 50%	62%	73%	84%
Equipment sizing	Equipment meets sizing requirements	64%	83%	85%
Demand controlled ventilation (DCV)	DCV provided in all spaces > 500 ft2 with average occupant load of 25 people per 1000 ft2	58%	73%	85%
Additional efficiency package options	Projects meet the additional efficiency requirements of C406.	33%	75%	86%
Interior lighting controls	Manual and automatic lighting controls installed and functioning properly	80%	80%	86%

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Envelope insulation	Meets envelope insulation requirements	78%	83%	87%
Vertical fenestration (Windows and doors)	The vertical fenestration area is less than 30% of the gross above-grade wall area or up to 40% with automatic daylighting controls.	75%	79%	88%
Mechanical controls	Mechanical controls provided – programmable thermostat to provide heating and cooling to each zone, with capability for automatic setback and shutdown	79%	85%	88%
Lighting power density (LPD)	Meets space-specific LPD requirements	80%	82%	88%
Multiple HVAC systems	Multiple zone HVAC systems have supply air temperature reset controls and limit simultaneous heating and cooling to each zone	78%	81%	88%
Variable Air-Volume (VAV) systems	VAV fan motors ≥ 10 HP are driven by variable speed drive, have a vane-axial fan with variable pitch blades, or have controls or devices to limit fan motor demand	80%	81%	90%
Fenestration (windows, skylights and doors)	Windows and doors meet U-factor and SHGC requirements	79%	86%	91%
Exterior building lighting power	Exterior lighting does not exceed the exterior lighting power allowance	77%	81%	91%
Exterior lighting controls	Exterior lighting controlled by either motion sensor or time clock	84%	82%	91%
Equipment efficiency	Installed equipment meets efficiency requirements	94%	86%	93%

Panelists from Year 3 and Year 5 agreed that thermal bridging and continuous air barrier installation quality had the lowest compliance rates. However, although thermal bridging was consistently rated as the least compliant component, across the three studies panelists estimated that compliance increased by 23% from Year 1 to Year 5. There were other notable changes between the studies. In Year 5, panelists estimated that distribution system compliance had decreased by 2% from Year 3. Additional efficiency package options saw the largest increase overall from Year 1 to Year 5, with compliance estimates increasing by 53% since Year 1.

In this study year, commercial new construction and additions and alterations had the same four components with the lowest compliance (thermal bridging, continuous air barrier installation quality, continuous air barrier, and envelope insulation installation quality). Most additions and alterations components had lower compliance estimates than their new construction counterparts. Only two components—lighting power density and interior lighting controls—were given the same compliance

> *"[The building envelope for commercial additions and alterations have] limited compliance reviews and inspections."*
>
> - Delphi panel respondent

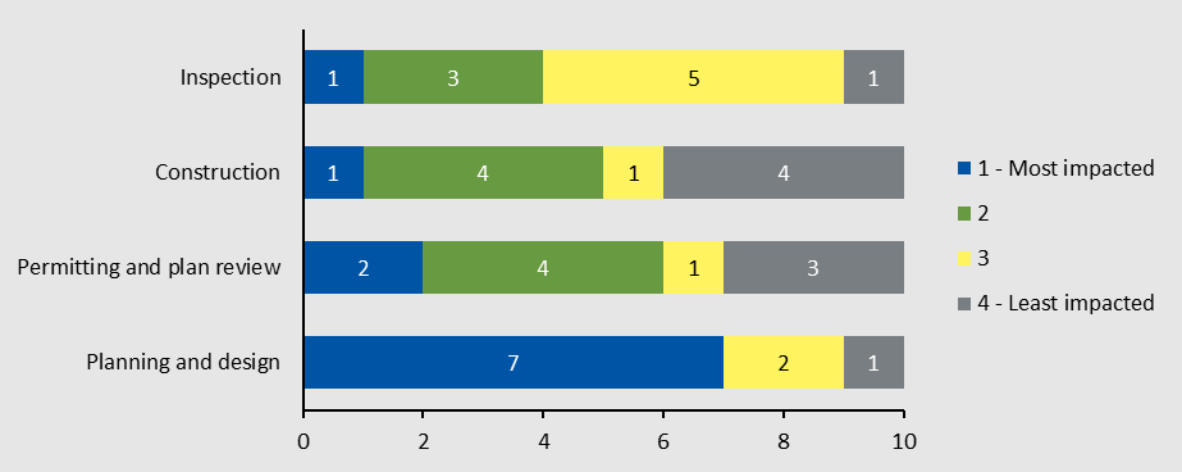
ratings in both additions and alterations and new construction, with estimates of 88% and 86% compliance, respectively.

1.5.1.3. Impact of Commercial Code Compliance Activities

In addition to estimating compliance with certain commercial energy code provisions, the Delphi panelists were asked to rank the phase of a commercial new construction project at which energy compliance is most impacted. As shown in Figure 3, panelists most commonly cited the planning and design phase as having the greatest impact on compliance. One respondent noted that "Improving the design of commercial buildings would have the greatest impact. Quality installation training for envelope measures would also greatly help versus finding the problems after the fact." Respondents were not in complete agreement, but they most commonly ranked commercial inspection and construction as having the lowest impact on compliance (a 3 or 4 on the 4-point scale).

Figure 3. Project Phase for Commercial New Construction Most Impacting Code Compliance (n=10)

Source: Delphi Panel Question: "At which phase of a commercial new construction project is energy code compliance most significantly impacted?" May 2024.



1.5.1.4. Overarching Commercial Findings

Panelists identified four key challenges the commercial building market must overcome when complying with the energy code:

- The complexity of the energy code
- The cost of implementing energy code requirements
- Lack of education for contractors and code officials
- A disconnect between the designers and the installers

Panelists and jurisdiction interviewees identified which activities, practices, or support would help increase compliance. Panelists said that increasing quality training, offering more tax incentives, and expanding the use of third parties for plan review and inspection oversight would help increase commercial compliance. One panelist also noted that having architects and engineers promote the value and advantages of energy code compliance would increase commercial building code compliance.

1.5.2. Residential Energy Code Compliance

The panelists' overall weighted estimate of energy code compliance for single-family residential new construction in NYS in 2024 was 84%, and their overall estimate of compliance for single-family alterations and additions was 81%.

As shown in Table 21, compliance estimates for the residential sector remained fairly consistent between the 2015 ERS study and the Year 1 study; however, both estimates for new construction compliance and additions and alterations compliance decreased slightly between the Year 3 and Year 5 Delphi panel studies.

Table 21. Residential Compliance Rates by Code and Study Year, from Panels

	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 Residential Compliance	77%	77%	81%	84%	84%	84%	62% to 71%	72%	76%	81%	81%	81%

[a] 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%–15% worse than new construction compliance.

For the Year 5 study, Delphi panelists estimated the current overall compliance rate for low-rise residential (low-rise multifamily) new construction as 83%, up from 82% in the Year 3 study and 73% in the Year 1 study. Similarly, this study year's panelists estimated that the compliance rate for the residential single-family new construction market was also 83%.

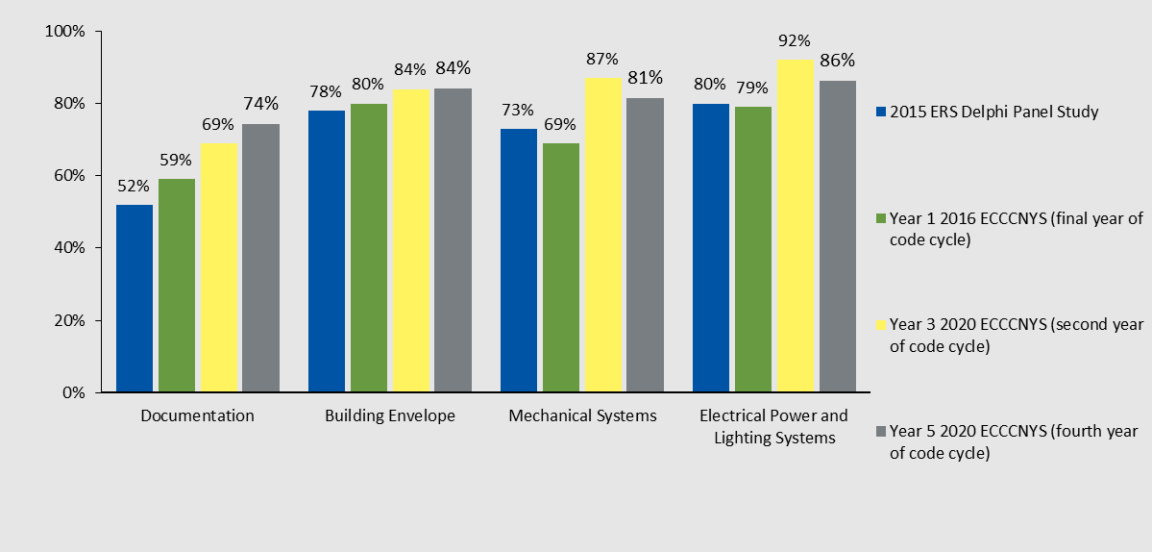
As shown in Table 22, panelists identified the electrical power and lighting system components as having the highest compliance for residential new construction and additions (87% and 85% respectively). They assessed documentation as the least compliant, with both new construction and additions and alterations estimated to be the only category below 80%.

Table 22. Residential Compliance Rate by System or Category

System or Category	New Construction	Additions and Alterations
Documentation	74%	69%
Building Envelope	84%	80%
Mechanical Systems	81%	80%
Electrical Power and Lighting Systems	87%	85%

Figure 4 provides a comparison of estimated residential new construction compliance rates by system over time. Compliance estimates increased for documentation, stayed the same for building envelope, and decreased slightly for mechanical systems and electrical power and lighting systems. Overall, the Year 5 Delphi panel estimated improved compliance levels compared with levels in both the 2015 and Year 1 study.

Figure 4. Comparison of Residential System Compliance Rates by Study Year



1.5.2.1. Residential New Construction Component-Level Compliance

As with commercial construction, the panelists estimated the compliance rate for key residential building components. Table 22 shows the average of the panelists' compliance rate estimates for each of these building components in residential new construction.

Table 23. Residential Compliance Rate by Component – New Construction

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Duct testing	Ducts located in unconditioned spaces tested for air leakage. Total duct leakage does not exceed 4cfm per 100 square feet of conditioned floor area.	62%	78%	75%

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Hot water pipe insulation	R-3 insulation on hot water pipe over ¾ inch when applicable	80%	88%	75%
Documentation	Projects supply enough detail on the construction documents for code official to assess compliance, including air sealing details, duct sealing details, mechanical system design, etc.	58%	72%	76%
Distribution systems	Ductwork and piping insulated and sealed	74%	85%	78%
Air sealing	Building thermal envelope sealed to limit infiltration. All joints and penetrations sealed, as well as windows, doors, attic access, etc.	61%	81%	79%
Insulation installation quality	Envelope insulation is installed per manufacturer's requirements and Table R402.4.1.1	69%	81%	80%
Equipment sizing	Heating and cooling equipment sized per Manual J or similar process	65%	86%	80%
Air barrier and insulation installation	Components of the thermal envelope installed per Table R402.4.1.1, inspected per that same table, and tested with a blower door test.	67%	81%	82%
Tenant separation walls	Fire separations between dwelling units in two-family dwellings and townhouses insulated to R-10 or greater and walls are air sealed	70%	85%	82%
Certificates in panel	Permanent certificates are posted on or in the electrical panel to document code compliance	63%	81%	83%
Inspection stickers	Builders leave window and door certification National Fenestration Rating Council (NFRC) stickers for inspection	78%	88%	83%
Recessed lighting	Recessed fixtures in the building envelope are IC-rated and sealed with gasket or caulk to limit air leakage	64%	76%	84%
Vapor retarders	Vapor retarders provided on interior side of frame walls (zones 5 and 6 only)	94%	91%	85%
Air leakage rate	Air leakage rate does not exceed 3 ACH(50)	79%	82%	86%
Rooms containing fuel burning appliances	Appliance & combustion air opening located outside building thermal envelope or enclosed in a room. Combustion closets insulated to levels not less than the basement wall R-value requirements in Table R402.1.2. Closet is air sealed and door fully gasketed	60%	86%	87%
Envelope insulation, general	Meets or exceeds required envelope insulation levels. This includes roof, above-grade wall, slab, foundation, and floor insulation.	86%	90%	89%
Duct insulation	Supply and return ducts in the attic are a minimum of R-8 (where ≥3-inch diameter) and R-6 (where <3-inch diameter). Supply and return ducts everywhere else are a minimum of R-6 (where ≥3-inch diameter) and R-4.2 (where <3-inch diameter)	90%	91%	89%
Windows and doors	Windows and doors meet U-factor requirements	94%	95%	89%
Interior light fixtures	At least 75% of permanent fixtures have high efficacy lamps	79%	95%	92%
Programmable thermostats	Programmable thermostats installed in each dwelling unit with capabilities for daily schedule control, automatic adjustment based on largest heating/cooling zone, and have temperature range from 55° to 85°F	96%	94%	93%
Individual unit lighting metering	Individual dwelling units separately metered	94%	92%	95%

There were several notable changes between the Delphi panel studies for residential new construction. Although most building components in residential new construction saw an overall increase from Year 1 to Year 5, most of the components decreased from Year 3 to Year 5. The largest increases reported from Year 1 to Year 5 include rooms containing fuel burning appliances (an increase of 27%), and certificates in panel and recessed lighting (both increased by 20%). Hot water pipe insulation had the largest decrease of estimated compliance from Year 3 to Year 5, decreasing by 13% and moving from one of the highest rated components in Year 3 to the second least compliant in Year 5. Recessed lighting in Year 3 was one of the least compliant building components, but in the current study this component had an increased estimate of 8%, the largest increase from Year 3 to Year 5 of all the building components. One of the Delphi panelists said, "thermal bridging and insulation continuity at unique seams and assemblies continues to be an issue for nonstandard residential construction."

> *"There is no uniform enforcement across the state. Some jurisdictions are understaffed or inexperienced, others go overboard."*
>
> - Delphi panel respondent

Areas that need focused attention to improve compliance rates (compliance below 80%) include duct testing, hot water pipe insulation, documentation, distribution systems, and air sealing—many of these are also included in the lowest-rated components of residential additions and alterations, suggesting that NYSERDA might consider focusing outreach and educational resources in these areas.

1.5.2.2. Residential Additions and Alterations Component-Level Compliance

The panelists also estimated the compliance rate for select building components in residential additions and alterations. Table 24 shows the average of the panelists' compliance rate estimates for each building component.

Table 24. Residential Compliance Rate by Component – Additions and Alterations

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Duct testing	Ducts located in unconditioned spaces tested for air leakage. Total duct leakage does not exceed 4cfm per 100 square feet of conditioned floor area.	61%	68%	65%
Air barrier and insulation installation	Components of the thermal envelope installed per Table R402.4.1.1, inspected per that same table, and tested with a blower door test.	49%	74%	70%
Air leakage rate	Air leakage rate does not exceed 3 ACH(50)	44%	81%	71%
Certificates in panel	Permanent certificates are posted on or in the electrical panel to document code compliance	25%	73%	72%

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Documentation	Projects supply enough detail on the construction documents for code official to assess compliance, including air sealing details, duct sealing details, mechanical system design, etc.	41%	65%	73%
Air sealing	Building thermal envelope sealed to limit infiltration. All joints and penetrations sealed, as well as windows, doors, attic access, etc.	44%	74%	75%
Equipment sizing	Heating and cooling equipment sized per Manual J or similar process	58%	76%	77%
Distribution systems	Ductwork and piping insulated and sealed	71%	81%	78%
Tenant separation walls	Fire separations between dwelling units in two-family dwellings and townhouses insulated to R-10 or greater and walls are air sealed	55%	81%	78%
Hot water pipe insulation	R-3 insulation on hot water pipe over ¾ inch when applicable	79%	86%	78%
Recessed lighting	Recessed fixtures in the building envelope are IC-rated and sealed with gasket or caulk to limit air leakage	58%	66%	79%
Insulation installation quality	Envelope insulation is installed per manufacturer's requirements and Table R402.4.1.1	66%	78%	80%
Inspection stickers	Builders leave window and door certification National Fenestration Rating Council (NFRC) stickers for inspection	74%	81%	80%
Rooms containing fuel burning appliances	Appliance & combustion air opening located outside building thermal envelope or enclosed in a room. Combustion closets insulated to levels not less than the basement wall R-value requirements in Table R402.1.2. Closet is air sealed and door fully gasketed	44%	85%	81%
Duct insulation	Supply and return ducts in the attic are a minimum of R-8 (where ≥3-inch diameter) and R-6 (where <3-inch diameter). Supply and return ducts everywhere else are a minimum of R-6 (where ≥3-inch diameter) and R-4.2 (where <3-inch diameter)	88%	87%	85%
Vapor retarders	Vapor retarders provided on interior side of frame walls (zones 5 and 6 only)	94%	88%	88%
Interior light fixtures	At least 75% of permanent fixtures have high efficacy lamps	82%	92%	89%
Envelope insulation, general	Meets or exceeds required envelope insulation levels. This includes roof, above-grade wall, slab, foundation, and floor insulation.	79%	84%	90%
Programmable thermostats	Programmable thermostats installed in each dwelling unit with capabilities for daily schedule control, automatic adjustment based on largest heating/cooling zone, and have temperature range from 55° to 85°F	96%	85%	90%
Windows and doors	Windows and doors meet U-factor requirements	93%	91%	91%

Component	Code Requirement	Compliance Estimate		
		Year 1	Year 3	Year 5
Individual unit lighting metering	Individual dwelling units separately metered	91%	92%	94%

There were several notable changes between the Delphi panel studies for residential additions and alterations. Although most building components saw an increase from Year 1 to Year 5, as with residential new construction, most of the components decreased from Year 3 to Year 5. Significant increases in code compliance were reported from Year 1 to Year 5, with the largest increases for certificates in panel (an increase of 47%) and rooms containing fuel burning appliances (an increase of 37%). The four least compliant building components of Year 5 all saw decreases in compliance from Year 3. Air leakage rate had the largest decrease of estimated compliance from Year 3 to Year 5, decreasing by 10% and changing from one of the higher rated components in Year 3 to the third least compliant in Year 5.

> *"Additions and alterations are more often allowed leniency."*
>
> - Delphi panel respondent

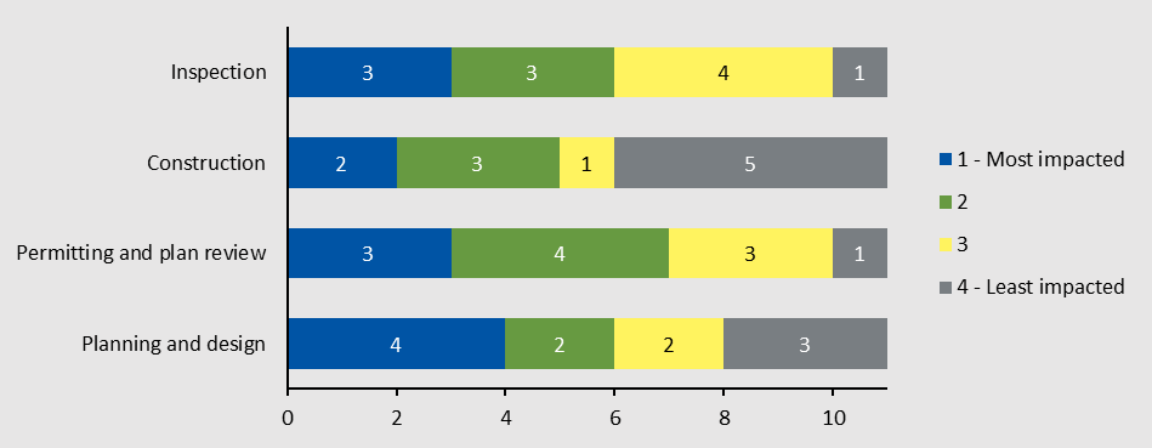
Areas that need focused attention to improve compliance rates (compliance below 80%) include duct testing, air barrier and insulation installation, air leakage rate, certificates in panel, documentation, air sealing, equipment sizing, distribution systems, tenant separation walls, hot water pipe insulation, and recessed lighting.

1.5.2.3. Impact of Residential Code Compliance Activities

The Delphi panelists were asked to identify the phase of a residential new construction project at which energy compliance is most impacted. The eleven respondents with residential code experience most commonly found the planning and design phase to have the greatest impact on overall project compliance, and for the construction phase to have the least impact (see Figure 5). One respondent noted that "architects/design professionals need to get it right from the beginning," and another that "plan/design is critical to establish compliance and performance requirements." Many respondents said they felt the same about residential new construction as they did about commercial projects in terms of which project phases ultimately had the greatest impact on code compliance.

Figure 5. Project Phase for Residential New Construction Most Impacting Code Compliance (n=11)

Source: Delphi Panel Question: "At which phase of a residential new construction project is energy code compliance most significantly impacted?" May 2024.



1.5.2.4. Overarching Residential Findings

Panelists with residential expertise identified several common challenges the residential building market must overcome when complying with energy codes.

- Differing enforcement across jurisdictions
- Keeping up with new regulations and technology
- Costs of implementing energy code requirements—both the perception and the reality
- Contractor, code official, and homeowner education
- Disconnections between different phases of the project
- The complexity and flexibility of energy code compliance

Panelists and jurisdiction interviewees identified activities, practices, and support that would help increase compliance. Panelists and members of representative jurisdictions said that, as with commercial compliance, training was a key factor. Ten of the Delphi panelists also noted that residential compliance challenges differ by geographic region or jurisdiction, with one panelist saying, "there is no uniform enforcement across the state. Some jurisdictions are understaffed or inexperienced, others go overboard." Interviewees also suggested providing more rebates and tax incentives and implementing third-party enforcement more widely.

1.6. Initiative Progress

A key goal of the CSCNB initiative is for energy code compliance to increase by 5% in NYS compared with a business-as-usual case. The current compliance estimate for commercial new construction is 87%,

a small increase over the previous estimate of 85%, but a significant increase compared to the 2015 compliance estimate of 74%. The estimate for residential new construction decreased slightly from the previous estimate of 85% to the current estimate of 83%, but still increased from the 2015 and 2020 estimates of 77%. Importantly, the estimates reflect compliance during different state energy code cycles, and the Delphi and independent panels said that there is usually a drop in compliance when a new code is adopted.[1] Despite these fluctuations, estimated overall code compliance is improving over time, although seemingly at a decreasing rate.

[1] The Year 1 panel study was in the fourth year of the code cycle, the Year 3 panel study was in the second year of the code cycle, and the Year 4 panel study was in the fourth year of the code cycle.

Appendix C. Longitudinal Jurisdictional Interviews

In 2024, the longitudinal panel's code experts from areas across New York State were invited to estimate the potential effect on compliance that the deployment of alternative strategies such as third-party support or provision of code compliance technologies could have. Four interviewees estimated the effect of third-party support on compliance and six estimated the effect of compliance technology, with responses summarized in Figure 6 and Figure 7. Across the board, interviewees shared that they expected the impact to vary based on the resources of jurisdiction, with most interviewees sharing that smaller jurisdictions will likely benefit the most from both types of support.

Figure 6: Effect of Third-Party Support on Compliance Rates, Estimated by Longitudinal Panel

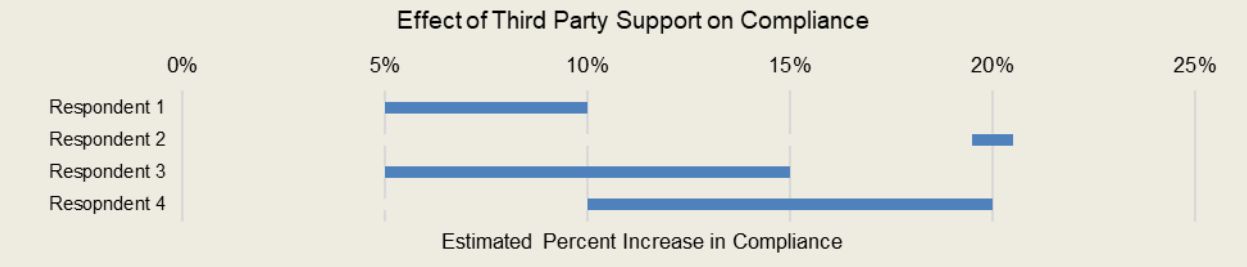
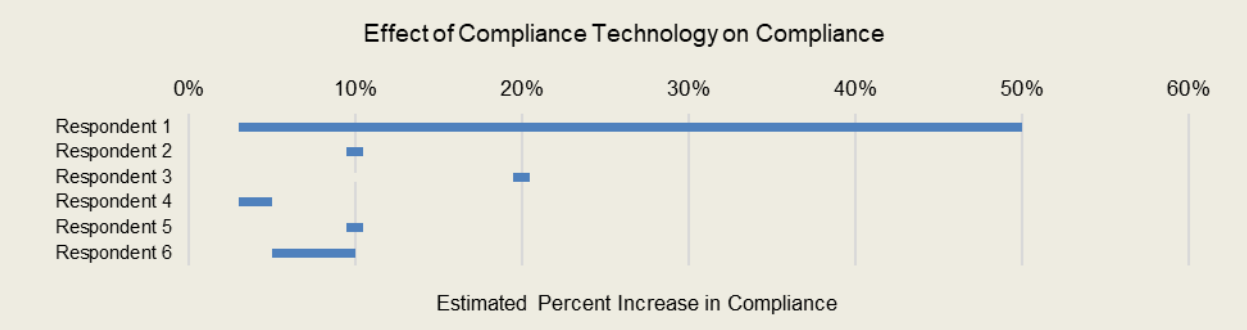


Figure 7: Effect of Compliance Technology on Compliance Rates, Estimated by Longitudinal Panel



Respondents mentioned that the effectiveness of third-party support and of adoption of a code compliance technology both depended on how they were provided:

- Third party support was anticipated to be very helpful, even "a game changer" for some jurisdictions, but would likely not reach jurisdictions that would benefit the most without funding. Two respondents mentioned that third-party support entities would need guidelines to ensure that their comments were useful and actionable, versus nitpicky, in the jurisdiction they were meant to serve and that third-party support would need a process for aligning with local laws and local details. One respondent proposed that a template could be helpful.

- Code compliance technology was anticipated be helpful, but would need to be easy to use, provide clear benefits (such as better access and communication between plan reviewer and application or the ability for compliance staff to perform more activities in the field), and avoid creating more platforms that users would need to be learn. Several respondents asserted that a single centralized platform would avoid procurement, contracting, and budgetary challenges and ensure that applying architects and engineers are not presented with a different platform in each jurisdiction they work in.
- When asked what should be kept in mind when considering how jurisdictions might seek alternative code compliance strategies, respondents shared that in most cases jurisdictions across the state would not have the time or financial resources to seek out new strategies without a compelling value proposition, so jurisdictions would have to make a financial case for compliance.
- Several respondents flagged the need to share a locally compelling value proposition if proposing adoption of new technology or third-party/outside support because for many people in smaller and rural communities the status quo feels acceptable. One respondent emphasized that local offices and builders want to maintain "local control" and that anything with the feeling of a mandate would not be appreciated. Another respondent shared that connecting the need for energy efficiency to climate change immediately triggered politics and choosing sides, which would not be welcome in their jurisdiction, and that communicating other benefits of energy efficiency may be more powerful.

> *"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

Appendix D. Evaluation Methodologies

This appendix provides methodologies for the evaluation of the Codes and Standards for Carbon Neutral Buildings (CSCNB) initiative's research activities. The market evaluation team conducted longitudinal jurisdictional expert interviews; an energy code compliance Delphi panel; an independent panel to assess the impact of CSCNB's activities on compliance; surveys with training participants; and a savings analysis. A compliance-focused Delphi panel in Q1, combined with feedback from a mid-year independent expert panel, were used to estimate the percentage of code compliance in New York State (NYS). An independent expert panel was conducted to estimate the impact of the CSCNB's supported trainings, stretch code adoption, and alternative code compliance activities.

1.7. Longitudinal Jurisdictional Expert Interviews

The market evaluation team combined the opinions from a group of experts engaged in building and code compliance and enforcement-related activities in jurisdictions across NYS, obtained through interactive, in-depth one-on-one phone interviews. The team asked respondents to provide information based on their experiences with the NYS energy code market and as experts in their respective fields.

To ensure geographical, socioeconomic, and building density diversity, the team interviewed professionals who work with the energy code in an urban jurisdiction (NYC), a suburban jurisdiction, and a rural jurisdiction.

The market evaluation team selected jurisdictions in Year 1 by conducting an analysis of new square footage in New York's urban, suburban, and rural counties since 2006. First, the team mapped counties to a census-defined, core-based statistical area (CBSA) by urban, suburban, and rural categories. Then the team assessed the new square footage over time for each CBSA. As expected, the CBSA that included New York City (NYC) consistently had the highest new construction rates for the commercial and residential sectors. The team filtered out the NYC CBSA to determine which suburban and rural counties consistently experienced the most new construction between 2006 and 2017 and used this list to select jurisdictions for participation.

The market evaluation team created a potential sample list of experts for each of the three types of jurisdictions and set a goal to interview three individuals in each jurisdiction. The team developed the sample by researching local energy code experts and building professionals with experience in each jurisdiction, contacting building departments and professional design firms, and asking code officials and other experts for recommendations. To reduce self-selection bias in these interviews, the team recruited respondents who represented a variety of occupations and regional expertise. The interviewees'

occupations complemented the panelists' occupations well by providing greater representation of the construction industry. Table 25 shows respondent types from each region.

Table 25. Longitudinal Jurisdictional Interview Respondent Types

Municipality Type	Code Officials	Construction Firms	Architecture Firms
Urban	1	0	1
Suburban	0	1	1
Rural	2	1	0

1.8. Delphi Panel

The Delphi method, first developed by the RAND Corporation in the 1950s, is widely used to develop informed opinions from a group of experts. Using this method, the implementer has experts reply anonymously to a survey or questionnaire, aggregates the results, and shares the group feedback with those experts, encouraging them to consider insight from other experts and to refine their estimates. The implementer repeats this process with the goal of reducing the range of responses or, in some cases, reaching a consensus.

For this evaluation, the panelists completed three rounds of questionnaires to provide feedback and opinions based on their experiences with the energy code in NYS building construction markets and as experts in their fields. First, the team asked panelists to review background material on the CSCNB initiative, information on the adoption of the Energy Conservation Construction Code of New York State (ECCCNYS) and NYStretch, and information related to energy code compliance and enforcement in NYS. Once familiar with the study intent, panelists completed the first survey round, which included questions on energy code compliance and demographic information on respondents.

The market evaluation team anonymized and aggregated the first-round estimates and rationales from panelists and returned them to the group for a second round of input. Panelists reviewed their own responses alongside the responses of their peers and adjusted or revised their answers based on the results, if desired. The team repeated this process with a third and final survey round, providing experts with one additional opportunity to adjust their input or offer commentary.

1.8.1. Delphi Panel Demographics

The Delphi panel comprised a diverse group of thirteen experts within the community of building code experts in New York. Table 26 shows the distribution of experts by occupation. Several panelists selected

more than one title for their current occupation, noting that it can vary depending on the nature of the work or their role for a specific project.

Table 26. Delphi Panelists by Occupation

Delphi Panelist Occupation	Number of Experts Recruited
Energy or code consultant	6
Architect or engineer	5
Third party energy professional	2
Code official	2
Industry group	2
Other	2

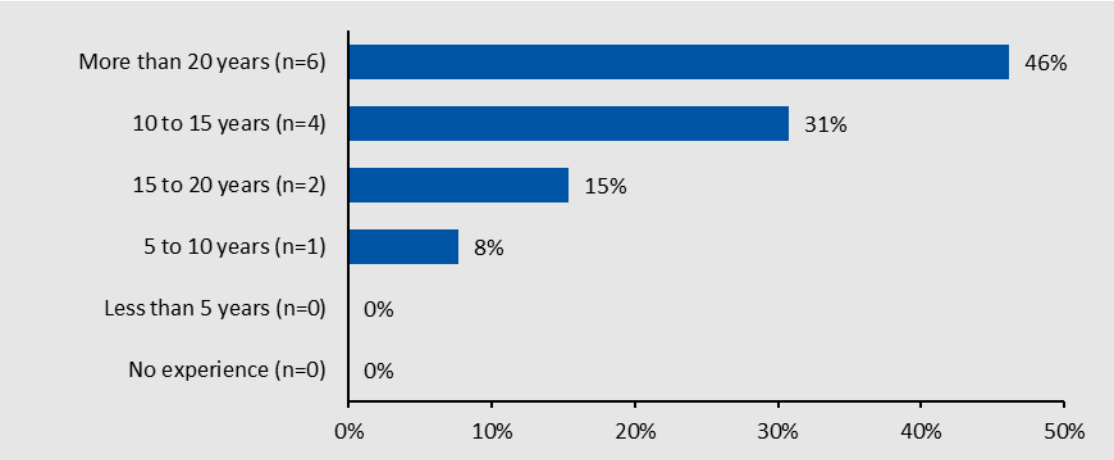
As shown in Table 27, seven of the 13 Delphi panelists had expertise in both residential and commercial energy codes, four had only residential expertise, and one had only commercial expertise. One panelist self-reported "non-applicable" as their occupation is a third-party energy professional.

Table 27. Delphi Panel Participant Energy Code Expertise

Category	Number of Experts Recruited
Commercial energy code expertise only	1
Residential energy code expertise only	4
Both commercial and residential energy code expertise	7

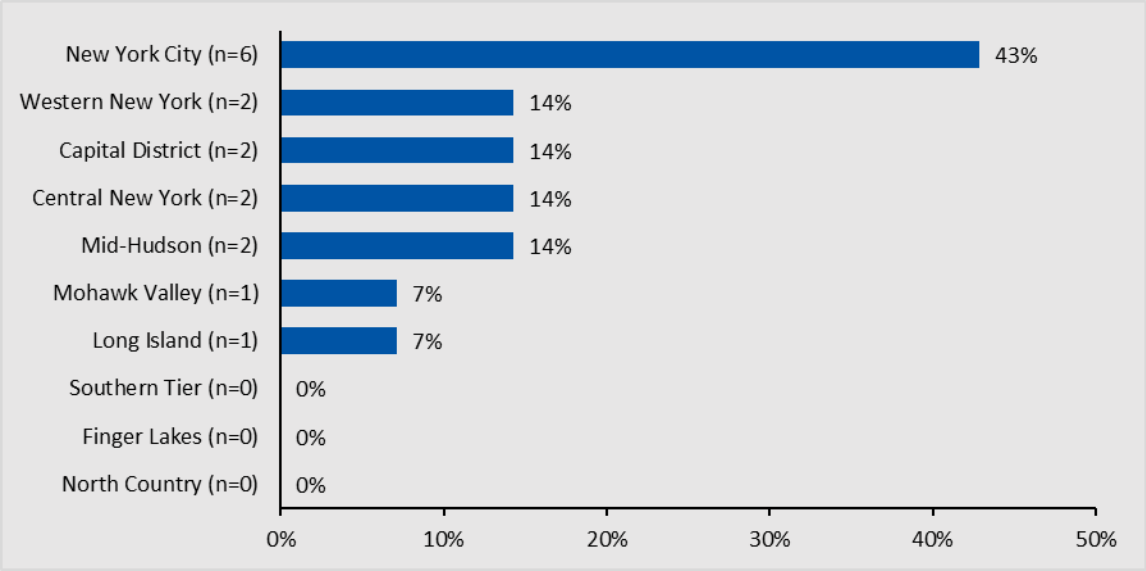
Almost half of the experts have been using or applying the energy code in NYS for over 20 years, and none of the participants had less than five years of experience applying the code (see Figure 8).

Figure 8. Experts' Years of Experience Applying the Energy Code in NYS



Many of the participants have the most experience in NYC, Western New York, Capital District, Central New York, and the Mid-Hudson region (see Figure 9).

Figure 9. Geographic Region where Experts Have the Most Experience Applying the Energy Code



Because panel participation was voluntary, one limitation of the Delphi panel process is the possibility of self-selection bias. To mitigate self-selection bias from a predominance of one or a few respondent types, the market evaluation team strategically recruited panelists that represented a variety of occupations and regional expertise.

1.8.2. Energy Code Compliance Assessment Methodology

Delphi panelists estimated the overall commercial and residential compliance rates, compliance rates by system or category, and compliance rates by component for both new construction and additions and alterations.

The market evaluation team calculated overall compliance rates by weighting each panelists' individual system estimates by relative energy impact in accordance with the distribution of weighting used in the 2015 ERS Delphi panel study. The energy impact weights were based on the Score + Store compliance tool developed by the U.S. Department of Energy with the Pacific Northwest National Laboratory, which assigned a weighted value to energy code provisions based on their energy impact, and modified by ERS based on research and experience. The team reviewed the Score + Store tool, past and current compliance methodologies, and significant changes to the 2015 IECC, and concluded that the weights developed and used by ERS in the *Advanced Energy Codes Impact Evaluation Interim Report: First Delphi Process*

Results report are still accurate. Table 28 shows the weight applied to each system for residential and commercial compliance rating.

Table 28. Distribution of Compliance Rating Weights by System

System	Commercial Weight	Residential Weight
Building Envelope	39%	62%
Mechanical Systems	39%	22%
Electrical Power and Lighting Systems	23%	11%
Documentation	-	5%

The market evaluation team used this weighted methodology for overall compliance to ensure consistency with the 2015 ERS Delphi panel study. A comparison of these two studies could be used to claim savings attributable to NYSERDA's code compliance enhancement efforts. The team also reported unweighted average responses from the Delphi panel to use for determining compliance estimates by system and component.

1.9. Independent Panel

For the independent panel, the market evaluation team used the Delphi Method, combining the opinion of experts through an interactive, iterative process. During September of 2024, the market evaluation team interviewed seven experts with a background in architecture, engineering, energy or code consultancy, and energy nonprofits. These interviewees were recruited through collaboration with research from the team and feedback from NYSERDA. The team focused its outreach on organizations and staff with multiple years of expertise in residential and commercial code compliance, and code change impacts. The team interviewed experts with backgrounds both in NYS and around the country. First, the team provided a background webinar and a data compilation for panelists to review on the CSCNB initiative. The background information contained an introduction to the initiative, an overview of the energy codes and compliance in NYS, and the impact on code compliance from the initiative's training efforts, stretch code support, and alternative code compliance strategies. Once familiar with the study intent, panelists completed the first survey round, which included questions on energy code compliance and demographic information on respondents.

Per the methodology, the independent panel members reviewed the compiled information for initiative activities they assessed and estimated the parameters required to calculate the indirect energy impacts of the initiative for each activity (as specified in the component-specific sections of this document). The market evaluation team estimated values for all parameters required to calculate the indirect energy impacts for all initiative components that are not estimated by the independent panel (as described in the

component-specific sections of this document) and then used the estimated parameter values for specific activities to calculate the estimated indirect energy impacts.

1.9.1. Panel Recruitment

A list of panelists was developed through consultation with energy code development and compliance experts, exploration of lead organizations conducting work in energy code development and compliance, and a literature review. Panelists were selected with reference to the following criteria:

1. Has the individual's experience and/or contributions to energy code development and/or compliance received national recognition? This may take the form of circulated publications and presentations on energy code development/compliance, and/or leadership roles related to energy code development/compliance at nationally recognized institutions or in government, with a focus on the breadth of the influence the individual has had and the timeframe of that influence.
2. If not, has the individual's experience and/or contributions to energy code development/compliance received New York State-level recognition? This may take the form of experience representing builder, designer, code official and/or community interests in New York State energy code compliance issues.

Once an individual was considered to rank highly with regard to the above criteria, the individual was reviewed for potential conflicts of interest. Specifically, the market evaluation team considered whether the individual was in a position to respond to all of the questions of the independent panel questionnaire without bias, with specific consideration of any affiliations their organization may have with NYSERDA and NYSERDA's investments in NYS code compliance, and whether an independent panel result had a likelihood of positively or negatively affecting them. A list of top panelist candidates was developed with focus on a diverse makeup representing both national and NYS-specific expertise, and from this list outreach was conducted via email over the course of several weeks. Panelists were asked to confirm their expertise and their availability for the anticipated schedule and hours involved and were offered a $300 gift card as a token of appreciation for their participation.

1.9.2. Independent Panel Demographics

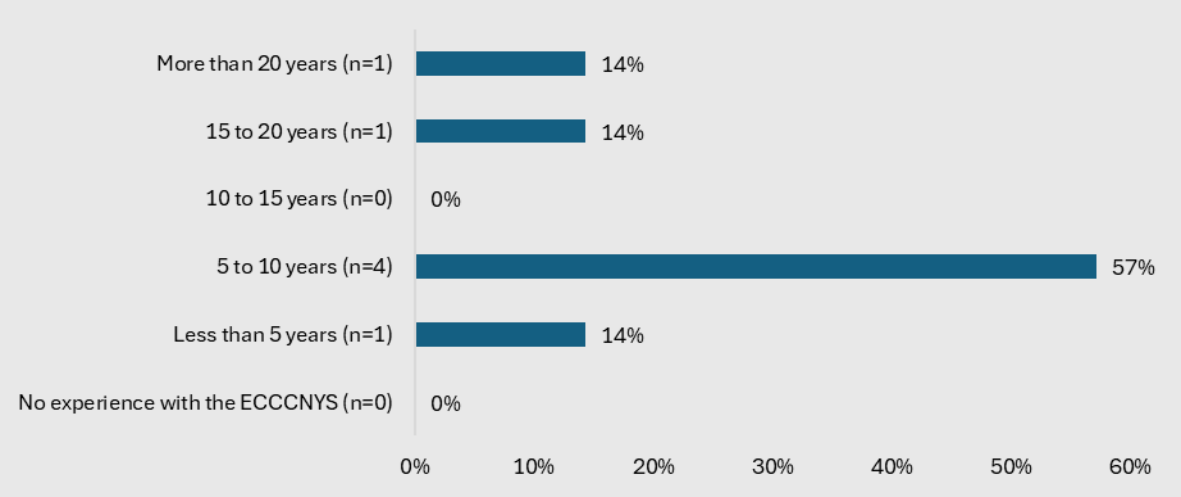
The independent panel comprised a group of seven experts within the community of building code experts in New York. Table 29 shows the distribution of experts by occupation. Several panelists selected more than one title for their current occupation.

Table 29. Independent Panelists by Occupation

Independent Panelist Occupation	Number of Experts Recruited
Energy or code consultant	3
Architect or engineer	3
Other	3

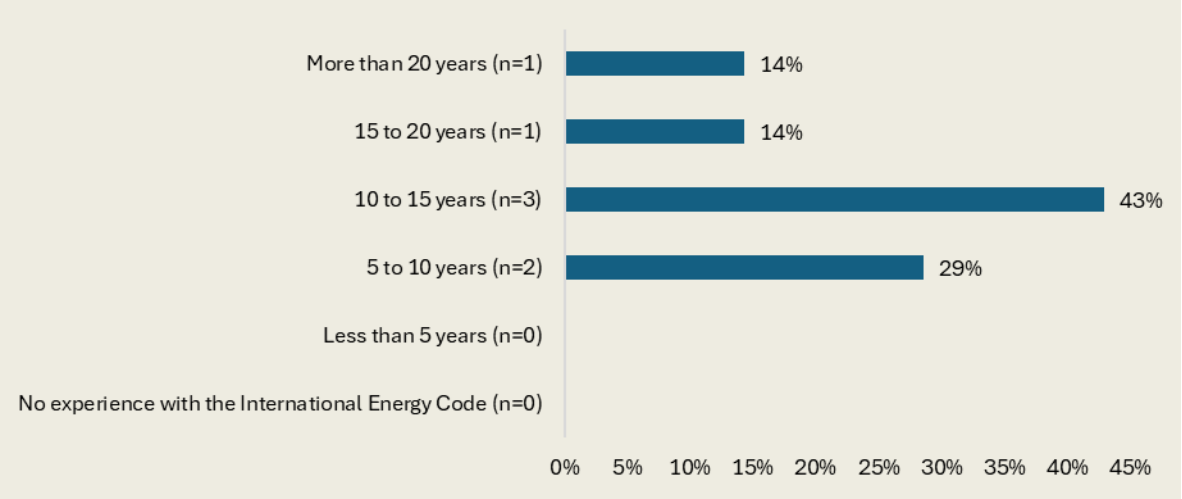
Most of the experts have been using or applying the ECCCNYS for five to ten years, and none of the participants had less than five years of experience applying the ECCCNYS (see Figure 10).

Figure 10. Number of Years' Experience with the ECCCNYS



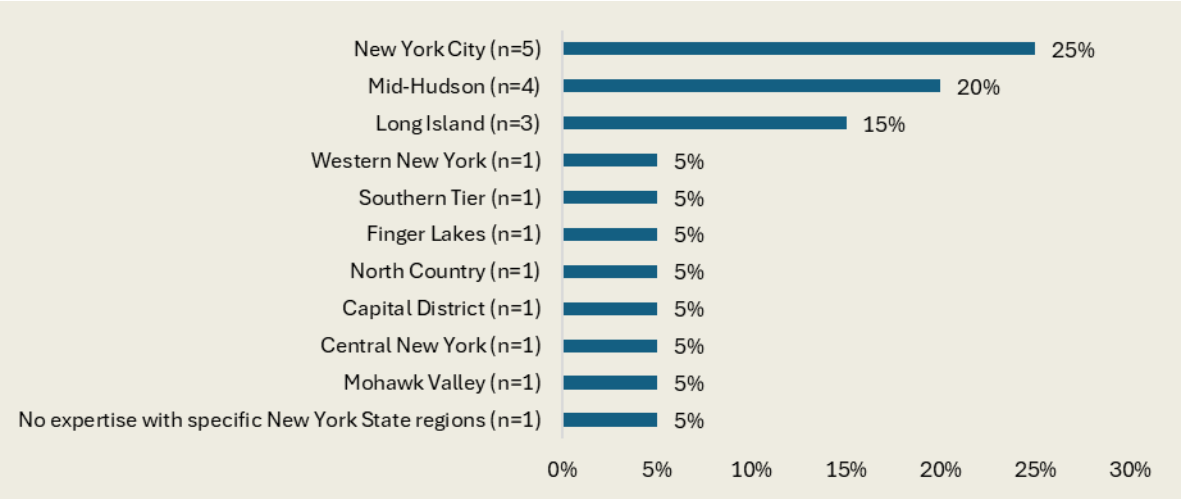
Most of the experts have been using or applying the international energy code for 10 to 15 years, and none of the participants had less than five years of experience using or applying the international energy code (see Figure 11).

Figure 11. Number of Years' Experience with the International Energy Code



Many of the participants have the most experience in NYC, Mid-Hudson, and Long Island (see Figure 12).

Figure 12. Geographic Region with the Most Experience



Most of the panelists have experience with the commercial sector, as seen in Table 30.

Table 30. Independent Panel Sector of Expertise

Sector	Number of Experts Recruited
Commercial energy code expertise	4
Residential energy code expertise	0
Both commercial and residential energy code expertise	3

1.10. Training Participant Surveys

Starting in June 2020, the market evaluation team sent surveys to training participants immediately after training sessions. Participants received a survey invitation for every training session they attended, which allowed the team to gather feedback on multiple training topics for each attendee. Approximately six months after attending trainings, the team sent a follow-up survey to attendees.

The first round of surveys sent immediately after participation were primarily intended to gather feedback about the classes, such as the relevance of topics and overall satisfaction with the training. The follow-up survey was designed to provide insight about how participants applied the information from the trainings in their work and what changes they made after participating. Training survey results are key inputs into the final indirect savings evaluation, as these inputs are used to estimate the degree to which the CSCNB initiative training activities have impacted overall code compliance in New York.

1.10.1. Survey Research Objectives

The immediate survey results address the following topics:

- Review of courses offered, number of respondents, and mean training score
- Geographic representation of respondents' jurisdictions
- Impacts of training on respondents' work in energy code implementation

The follow-up survey results provided information about these topics:

- Geographic representation of respondent jurisdictions
- Square footage of respondents' work since participating in trainings
- Impact of education on respondents' work in energy code implementation
- Dissemination of educational content beyond NYSERDA-sponsored events

1.11. Initiative Savings Analysis

In Year 2, the market evaluation team began conducting a preliminary calculation of the energy savings from the CSCNB initiative under the Clean Energy Fund (CEF) budget. The full preliminary savings calculation methodology aligns with the methods for the multiyear indirect impacts methodology.

1.11.1. Stretch Code Adoption

The market evaluation team first determined the building areas enhanced by a jurisdiction's adoption of NYStretch through Dodge data. Because conversations with NYSERDA staff indicated that complete

square footage estimates for 2023 were not yet available, the team used 2022 construction square footage to represent 2023 and 2024. To calculate the areas affected by a jurisdiction's midyear adoption of NYStretch, the team assumed construction was evenly distributed throughout the year. For example, if the code was adopted on June 30, the permitted areas were assumed to include half of the year's permitted construction.

To estimate the energy impacts of NYStretch, the team used the energy-use intensities (EUI) from the cost-effectiveness analysis of the commercial[2] and residential[3] codes. The team analyzed the energy use intensities for residential and commercial buildings by climate zone (and separately for NYC because it has a separate baseline code) for electricity and fossil fuels.

The team estimated the energy savings for NYStretch to exclude energy savings from expected participation in other above-code programs, including ENERGY STAR® and utility-sponsored programs. The team also assumed that compliance with NYStretch was comparable to the 2020 statewide and NYC energy codes.

1.11.2. Increased Code Compliance Due to Training

To estimate the impacts of training, the team first began analyzing survey data to determine the average square footage affected by code officials and building professionals after they attended training. The team then applied these per-trainee effects to the number of overall training participants and found that the total building square footage affected would have exceeded the total market square footage, as shown in the Dodge data. The likely reason for this discrepancy is that training participants were double counted when multiple training participants, such as code officials, were working in the same building department. Therefore, based on the significant number of trainees, the team assumed that the initiative training touched the entire New York market and applied training effects to the entire market as determined by Dodge data. The team adjusted the Dodge data to account for homes that are built to higher standards than specified by the code.

The Year 5 evaluation determined the percentage of compliance change directly impacted by the CSCNB initiative through the independent expert panel. The independent expert panel was presented with findings from the evaluation, and also determined an average of 5% impact from CSCNB initiative training on code compliance. The preliminary savings estimation relied on a benchmarked value from a code

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2 NYSERDA 2020 NYStretch Energy Code Commercial Cost Effectiveness Analysis (July 2019).

3 NYSERDA Energy Savings and Cost-Effectiveness Analysis of the 2020 NYStretch Energy Code Residential Provisions (July 2019).

compliance study conducted in Massachusetts, [4] which estimated that a similar program effected a 5% compliance increase in that state. The team applied this percentage to preliminary savings for previous reports. The percentage increase is a primary driver of the savings estimate. A 5% benchmarked value was used in the preliminary estimates.

To calculate the change in EUI for each percentage of change in code compliance, the team gathered the code EUI from ASHRAE 90.1-2016 and ASHRAE 90.1-2013 for commercial building and the IECC 2015 and IECC 2018 for residential buildings in each of the three climate zones. The team then calculated a baseline EUI for each zone using the following equation:

$$Baseline\ EUI = (ASHRAE\ 90.1 - 2016\ or\ IECC\ 2018\ EUI * Compliance\ Rate) + (ASHRAE\ 90.1 - 2013\ or\ IECC\ EUI * (1 - Compliance\ Rate))/Compliance\ Rate$$

To determine the EUI from one percentage increase of code compliance the team used the following equation:

$$Increased\ Compliance\ EUI = (ASHRAE\ 90.1 - 2016\ or\ IECC\ 2018\ EUI * Compliance\ Rate) + (ASHRAE\ 90.1 - 2013\ or\ IECC\ EUI * (1 - Compliance\ Rate))/(Compliance\ Rate + 1\%)$$

The energy savings for one percentage point increase in compliance was calculated as the difference between the baseline EUI and the increased compliance EUI. This formula is adjusted slightly from the Year 2 evaluation. The Year 5 method assumes that building elements that are not fully compliant with current code are fully compliant with the preceding code. In Year 5 the team also adjusted the code compliance estimates based on Year 5 Delphi panel and independent panel results.

Table 31 shows the changes in EUI that each percentage change in code compliance achieves for each building sector and climate zone. To calculate the initiative savings estimates, the market evaluation team multiplied these EUI by five percentage points by the statewide building square footage from Dodge.

[4] Massachusetts TXC47 Non-Residential Code Compliance Support Initiative Attribution and Net Savings Assessment: July 26, 2018: NMR and Cadmus

Table 31. Change in Energy Use Intensity per Percentage Change in Code Compliance

Building Type	Building Type	Code Compliance	Climate Zone	Change in Energy Use Intensity per % Change in Compliance		
				kWh/sq ft	kW/sq ft	Million BTU/ sq ft
Single Family	Addition and Alteration	76%	4A	0.05632	0.00002	0.00023
Single Family		76%	5A	0.06077	0.00002	0.00029
Single Family		76%	6A	0.06741	0.00002	0.00035
Multifamily Low Rise		76%	4A	0.07394	0.00002	0.00016
Multifamily Low Rise		76%	5A	0.07764	0.00002	0.00019
Multifamily Low Rise		76%	6A	0.08387	0.00003	0.00022
Multifamily Mid/High Rise		77%	4A	0.14345	0.00004	0.00018
Multifamily Mid/High Rise		77%	5A	0.14128	0.00004	0.00024
Multifamily Mid/High Rise		77%	6A	0.14809	0.00004	0.00031
Commercial		77%	4A	0.19678	0.00005	0.00028
Commercial		77%	5A	0.18626	0.00004	0.00037
Commercial		77%	6A	0.19196	0.00005	0.00048
Single Family	New Construction	81%	4A	0.05021	0.00002	0.00021
Single Family		81%	5A	0.05419	0.00002	0.00026
Single Family		81%	6A	0.06010	0.00002	0.00031
Multifamily Low Rise		81%	4A	0.06593	0.00002	0.00014
Multifamily Low Rise		81%	5A	0.06924	0.00002	0.00017
Multifamily Low Rise		81%	6A	0.07479	0.00002	0.00020
Multifamily Mid/High Rise		82%	4A	0.12508	0.00004	0.00015
Multifamily Mid/High Rise		82%	5A	0.12322	0.00003	0.00021
Multifamily Mid/High Rise		82%	6A	0.12917	0.00004	0.00027
Commercial		82%	4A	0.17127	0.00004	0.00025
Commercial		82%	5A	0.16210	0.00004	0.00032
Commercial		82%	6A	0.16706	0.00004	0.00043

Appendix E. Detailed Survey Results of Energy Code Training

1.12. Introduction

This section provides detailed results from the market evaluation team's evaluation of the energy code training provided in a series of instructional sessions through NYSERDA's Code and Standards for Carbon Neutral Buildings (CSCNB) initiative. This appendix presents analysis of data collected from the immediate and follow-up surveys (conducted approximately six months after trainees attended a session) and expands on the summarized results of immediate surveys that were provided to NYSERDA in quarterly summary memos.

The energy code training sessions are delivered to participants by the Urban Green Council (UGC), Newport Ventures, Performance Systems Development (PSD), and Karpman Consulting. Feedback on the training sessions is captured primarily through an immediate survey administered via email after each course. The immediate survey collects key information about training attendees and their experience with the training sessions. A quarterly memo submitted to NYSERDA summarizes results from the following immediate survey topics:

- Participant demographics and regions in which they work
- Participant knowledge of the Energy Conservation Construction Code of New York State (ECCCNYS) before and after attending the training
- Participant knowledge of the New York City Energy Conservation Code (NYCECC) before and after attending the training
- Participant knowledge of NYStretch before and after attending the training
- Participant satisfaction with key training aspects
- Participant perception of the usefulness of training topics and suggestions for areas of improvement

Follow-up surveys focus on actions taken by training attendees after the sessions as well as on general activities and knowledge of code compliance and code adoption. The quarterly memo summarizes results from the following follow-up survey topics:

- Work procedures that have changed as a result of participation in NYSERDA trainings
- Participant and jurisdiction energy code characteristics
- Information filed with code officials for different project types
- Perceived changes in code compliance over time, and the potential impact of NYSERDA webinars on those changes

- Participants' perception of the value of webinars after six months

Table 31 provides the current immediate and overall survey response rates for each implementer. A list of specific courses for which surveys were distributed is included at the end of this appendix (Table 40). The data provided in this appendix reflect the cumulative responses received from training participants across the project year (survey responses that were received between September 1, 2023 and November 1, 2024).

Table 32. Immediate Survey Response Rate for Trainings that Occurred between September 1, 2023 and November 1, 2024

Implementer	Surveys Sent	Responses Received	Response Rate
UGC	1,700	230	14%
Newport Ventures	134	14	10%
PSD	5,053	427	8%
Karpman Consulting	2,941	83	3%
Total	**9,786**	**754**	**8%**

The first round of follow-up surveys was distributed in March 2021 to participants in trainings in September 2020. Those who completed a follow-up survey did not receive another invitation to avoid double-counting experience and feedback. Responses shown in Table 33 are from participants who attended a training between September 2020 and April 2024.

Table 33. Follow-Up Survey Respondents through October 2024

Month Attended	Year Attended	Invites Sent	Responses [a]	Response Rate
September	2020	1,011	74	7%
October	2020	1,239	80	6%
November	2020	241	12	5%
December	2020	678	35	5%
January	2021	408	44	11%
February	2021	385	26	7%
March	2021	498	45	9%
April	2021	393	22	6%
May	2021	353	19	5%
June	2021	297	30	10%
July	2021	239	14	6%
August	2021	256	14	5%
September	2021	1,187	77	6%
October	2021	296	12	4%
November	2021	498	19	4%
December	2021	470	16	3%
January	2022	530	30	6%

Month Attended	Year Attended	Invites Sent	Responses [a]	Response Rate
February	2022	488	24	5%
March	2022	1,017	190	19%
April	2022	382	59	15%
May	2022	321	53	17%
June	2022	349	37	11%
July	2022	225	26	12%
August	2022	335	52	16%
September	2022	225	18	8%
October	2022	509	42	8%
November	2022	303	21	7%
December	2022	283	14	5%
January	2023	429	61	14%
February	2023	234	43	18%
March	2023	316	66	21%
April	2023	427	73	17%
May	2023	286	33	12%
June	2023	260	33	13%
July	2023	265	43	16%
August	2023	390	77	20%
September	2023	210	33	16%
October	2023	287	40	14%
November	2023	144	20	14%
December	2023	178	25	14%
January	2024	219	29	13%
February	2024	159	31	19%
March	2024	283	79	28%
April	2024	482	65	13%
Total		**17,985**	**1,856**	**10%**

[a] Responses include both partial and fully completed responses.

Of those who received a survey invite, 706 respondents completed the survey, with an additional 503 partial respondents (answered at least one question but did not complete the survey) (Table 34).

Table 34. Follow-Up Survey Response Rate

Attendance Month	Surveys Sent	Completed Surveys	Partially Completed Surveys	Response Rate
September 2020	1,011	31	43	7%
October 2020	1,239	40	40	6%
November 2020	241	7	5	5%
December 2020	678	24	11	5%

Attendance Month	Surveys Sent	Completed Surveys	Partially Completed Surveys	Response Rate
January 2021	408	21	23	11%
February 2021	385	12	14	7%
March 2021	498	23	22	9%
April 2021	393	11	11	6%
May 2021	353	10	9	5%
June 2021	297	26	4	10%
July 2021	239	9	5	6%
August 2021	256	11	3	5%
September 2021	1,187	34	43	6%
October 2021	296	7	5	4%
November 2021	498	14	5	4%
December 2021	470	8	8	3%
January 2022	530	22	8	6%
February 2022	488	19	5	5%
March 2022	1,017	101	89	19%
April 2022	382	29	30	15%
May 2022	321	26	27	17%
June 2022	349	18	19	11%
July 2022	225	23	3	12%
August 2022	335	48	4	16%
September 2022	225	16	2	8%
October 2022	509	35	7	8%
November 2022	303	19	2	7%
December 2022	283	13	1	5%
January 2023	429	29	32	14%
February 2023	234	20	23	18%
March 2023	316	32	34	21%
April 2023	427	32	41	17%
May 2023	286	14	19	12%
June 2023	260	15	18	13%
July 2023	265	21	22	16%
August 2023	390	36	41	20%
September 2023	210	15	18	16%
October 2023	287	15	25	14%
November 2023	144	8	12	14%
December 2023	178	9	16	14%
January 2024	219	13	16	13%
February 2024	159	14	17	19%
March 2024	283	32	47	28%
April 2024	482	25	40	13%

Attendance Month	Surveys Sent	Completed Surveys	Partially Completed Surveys	Response Rate
Total	**17,985**	**987**	**869**	**10%**

1.13. Courses Provided in 2024

Between September 2023 and November 2024, four implementers (PSD Consulting, Urban Green Council, Karpman Consulting, and Newport Ventures) worked with NYSERDA to deliver energy code training webinars to code officials, builders, contractors, and others in the field. The implementers offered courses for the updated ECCCNYS, the NYCECC, and NYStretch-2020.

Table 35 shows the training topics offered by each implementer and the number of survey invites sent and received. For the immediate survey, participants could receive multiple invites and provide feedback for multiple trainings, as each participant received a survey link for each training they attended. The market evaluation team sent invites promptly after the training was conducted to obtain feedback as close as possible to the day participants attended the training.

Table 35. Training Participants and Immediate Survey Respondents from September 2023 through November 2024

Implementer	Course Title	Invitations Sent	Survey Responses Received [a]	Response Rate
Karpman Consulting	110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	42	5	12%
	210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	68	11	16%
	213: Integrating Performance-Based Compliance into the Design Process	38	0	0%
	A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	141	0	0%
	Documenting and Modeling Variable Refrigerant Flow Systems Part 1	144	1	1%
	Documenting and Modeling Variable Refrigerant Flow Systems Part 2	114	2	0%
	Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 1	27	0	0%
	Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 2	16	0	0%
	eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	900	42	5%
	eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	508	10	2%
	eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	180	1	1%
	eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	122	2	2%
	Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	84	0	0%
	The Ins and Outs of Building Envelope — Part 1	298	6	2%
	The Ins and Outs of Building Envelope — Part 2	140	0	0%
	The Ins and Outs of Building Envelope — Part 3	119	3	3%
Newport Ventures	2020 ECCCNYS for Commercial Buildings: Overview	62	6	10%
	2020 ECCCNYS for Residential Buildings: Overview	62	7	11%
	Energy Code Enforcement Training	10	1	10%
PSD Consulting	A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	242	21	9%

Implementer	Course Title	Invitations Sent	Survey Responses Received [a]	Response Rate
	A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	263	30	11%
	Air Sealing to 3 ACH50	20	3	15%
	Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	122	13	11%
	Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	120	12	10%
	ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	71	4	6%
	ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	70	5	7%
	Efficient Forced Air Distribution	319	23	7%
	Electrifying the Energy Code - Commercial Part 1	196	13	7%
	Electrifying the Energy Code - Commercial Part 2	203	16	8%
	Electrifying the Energy Code - Residential	189	15	8%
	Foam without Flames Part 1: Thermal Bridging	75	6	8%
	Foam without Flames Part 2: Fire Rated Assemblies	75	5	7%
	Multifamily Air Sealing	318	24	8%
	Multifamily Thermal Bridging	167	13	8%
	NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	192	22	11%
	NY Energy Codes for Simple Buildings- Part 1: Retail Building	206	31	15%
	NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	261	8	3%
	NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	261	11	4%
	NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	21	9	43%
	NYStretch Overview and Thermal Envelope Requirements Part 1	19	14	74%
	Other IECC Envelope Requirements	18	1	6%
	Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	14	1	7%
	Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	16	0	0%
	Put a Lid On It Part 1: Unvented Attics	273	19	7%
	Put a Lid On It Part 2: Unvented Crawlspaces	177	9	5%

Implementer	Course Title	Invitations Sent	Survey Responses Received [a]	Response Rate
	The Energy Code and Existing Buildings (Commercial) - Part 1	174	11	6%
	The Energy Code and Existing Buildings (Commercial) - Part 2	166	14	8%
	The Energy Code and Existing Buildings-Residential Part 1 Additions	195	18	9%
	The Energy Code and Existing Buildings-Residential Part 2 Alterations, repairs and changes of occupancy or use	195	19	10%
	Whole-house Mechanical Ventilation	415	37	9%
Urban Green Council	Crushing the Code NYS: Commercial Building Systems	218	31	14%
	Crushing the Code NYS: Commercial Envelope	176	20	11%
	Crushing the Code NYS: Demonstrate Compliance	228	30	13%
	Crushing the Code NYS: Energy Code 101	226	36	16%
	Crushing the Code NYS: Residential Building Systems	228	30	13%
	Crushing the Code NYS: Residential Envelope	265	32	12%
	Crushing the NYC Energy Code (Residential)	129	22	17%
	Crushing the NYC Energy Code: Commercial	156	27	17%
	Crushing the NYC Energy Code: Residential	47	0	0%
	What's New in the 2020 New York Energy Code	27	2	7%

[a] These responses include both fully and partially completed online surveys.

Immediate survey respondents were asked 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. As shown in Table 36, most trainings were rated highly by respondents for all elements, with "quality of information" rated more highly on average ($M = 6.44$) than "likelihood to recommend" ($M = 6.26$) and "relevancy to work" ($M = 6.12$). None of the elements for any of the trainings got lower than an average rating of 4.

Table 36. Training Scores by Topic from September 2022 to August 2023

Implementer	Course Title	Quality of Information	Relevancy to Work	Likelihood to Recommend
Karpman Consulting	110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	6.60	6.60	6.80
	210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	6.71	6.43	6.86
	Documenting and Modeling Variable Refrigerant Flow Systems Part 1	6.00	6.00	7.00
	Documenting and Modeling Variable Refrigerant Flow Systems Part 2	NR	NR	NR
	eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	6.89	6.68	6.53
	eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	6.86	6.86	6.00
	eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	NR	NR	NR
	eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	NR	NR	NR
	The Ins and Outs of Building Envelope — Part 1	7.00	5.33	7.00
	The Ins and Outs of Building Envelope — Part 3	7.00	6.50	6.50
Newport Ventures	2020 ECCCNYS for Commercial Buildings: Overview	7.00	6.33	6.67
	2020 ECCCNYS for Residential Buildings: Overview	6.75	6.25	6.50
	Energy Code Enforcement Training	7.00	7.00	7.00
PSD Consulting	A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	6.28	6.06	6.17
	A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	6.38	6.06	6.31
	Air Sealing to 3 ACH50	6.67	7.00	7.00
	Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	6.55	6.27	6.36
	Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	6.00	5.88	5.78
	ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	6.67	6.67	6.33
	ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	6.67	5.67	7.00
	Efficient Forced Air Distribution	6.35	5.82	5.88
	Electrifying the Energy Code - Commercial Part 1	6.57	6.31	5.29
	Electrifying the Energy Code - Commercial Part 2	6.60	5.80	6.20
	Electrifying the Energy Code - Residential	6.29	5.79	6.14
	Foam without Flames Part 1: Thermal Bridging	5.50	5.00	5.50

Implementer	Course Title	Quality of Information	Relevancy to Work	Likelihood to Recommend
	Foam without Flames Part 2: Fire Rated Assemblies	6.00	5.00	6.00
	Multifamily Air Sealing	6.56	6.24	6.38
	Multifamily Thermal Bridging	5.89	6.00	6.33
	NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	6.59	6.13	6.50
	NY Energy Codes for Simple Buildings- Part 1: Retail Building	6.42	6.16	6.25
	NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	6.86	5.57	4.40
	NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	6.60	6.10	5.88
	NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	6.50	5.50	6.17
	NYStretch Overview and Thermal Envelope Requirements Part 1	6.70	6.20	6.00
	Other IECC Envelope Requirements	7.00	7.00	7.00
	Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	4.00	6.00	6.00
	Put a Lid On It Part 1: Unvented Attics	6.47	5.84	6.32
	Put a Lid On It Part 2: Unvented Crawlspaces	6.33	5.50	6.50
	The Energy Code and Existing Buildings (Commercial) - Part 1	6.25	5.75	6.20
	The Energy Code and Existing Buildings (Commercial) - Part 2	6.80	6.10	6.11
	The Energy Code and Existing Buildings-Residential Part 1 Additions	6.33	5.81	6.50
	The Energy Code and Existing Buildings-Residential Part 2 Alterations, repairs and changes of occupancy or use	6.69	6.15	6.38
	Whole-house Mechanical Ventilation	6.32	5.88	6.09
Urban Green Council	Crushing the Code NYS: Commercial Building Systems	6.64	6.60	6.58
	Crushing the Code NYS: Commercial Envelope	6.43	6.14	6.46
	Crushing the Code NYS: Demonstrate Compliance	6.00	5.70	6.05
	Crushing the Code NYS: Energy Code 101	6.28	6.22	6.23
	Crushing the Code NYS: Residential Building Systems	6.19	6.43	6.10
	Crushing the Code NYS: Residential Envelope	6.21	6.29	6.35
	Crushing the NYC Energy Code (Residential)	6.61	6.61	6.53
	Crushing the NYC Energy Code: Commercial	6.50	6.23	6.57
	What's New in the 2020 New York Energy Code	6.50	5.50	6.50

1.14. Immediate Survey Participant Characteristics

To understand who is participating in the sessions, the market evaluation team asked respondents to identify if they were code officials or building professionals (which includes architects, engineers, builders, contractors, building operators, building owners, plans examiners, and utilities). As shown in Table 37, code officials represented less than half of respondents (41%).

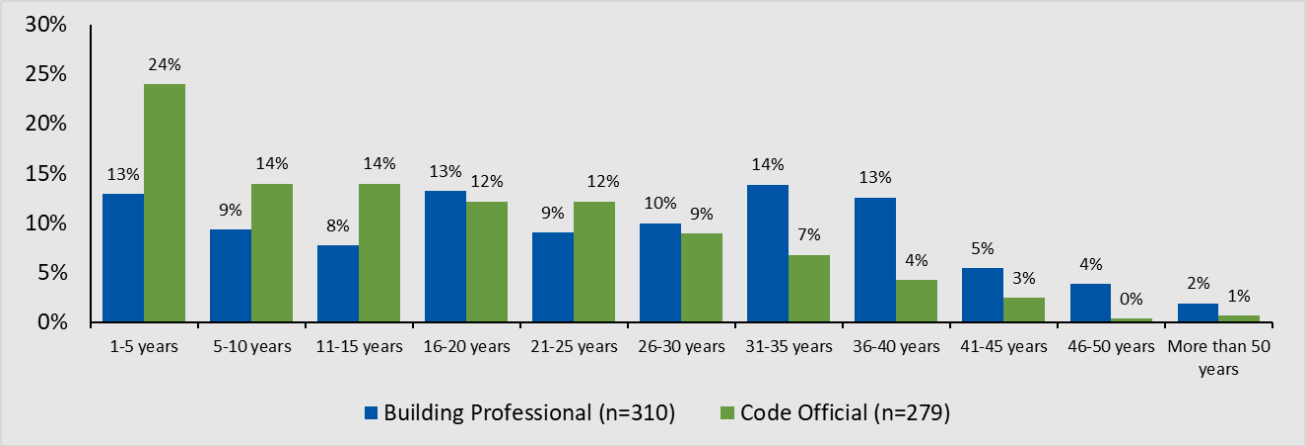
Table 37. Immediate Survey Occupation Type

Participant Type	Number of Participants	Percentage of Participants
Building Professionals	478	59%
Code Officials	328	41%
No Response Provided	0	0%
Total	**806**	**100%**

Participants' years of experience working in their position (or a similar position) ranged widely for both code officials and building professionals. As shown in Figure 13 code officials were more likely to have less than 21 years of experience in their job (64%) compared to building professionals (43%).

Figure 13. Years of Experience for Code Officials and Building Professionals

Source: Immediate Survey Question: "Years of experience in this (or similar) position."

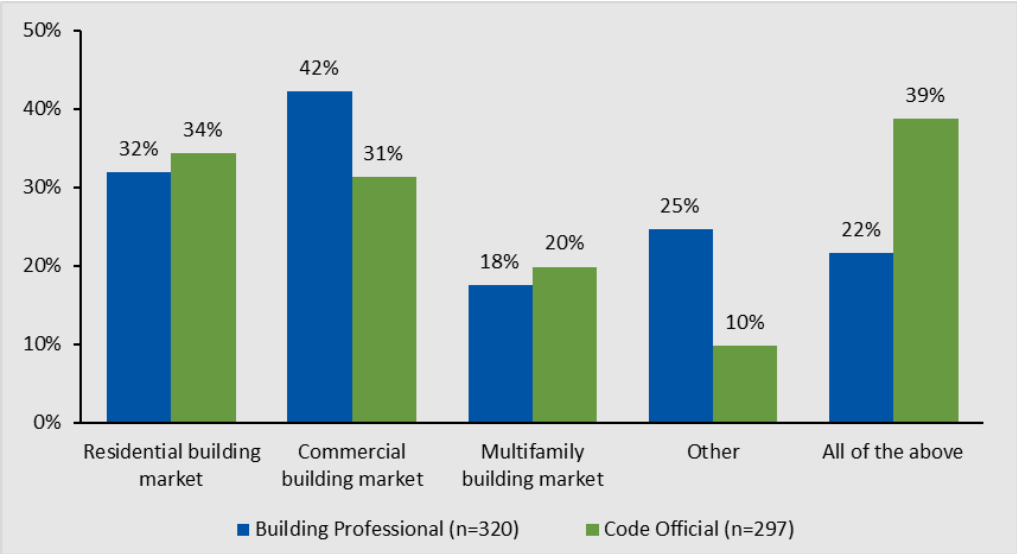


Overall, 40% of building professional and 26% of code official respondents said they worked in a jurisdiction that has adopted NYStretch-2020, whereas 25% of building professionals and 42% of code officials said they do not work in a stretch code jurisdiction. The remaining respondents were not sure.

The market evaluation team also collected information on the markets participants work in and the types of work they do professionally. As shown in Figure 14, training is reaching participants in both residential and commercial markets, with 39% of code officials saying they work in all construction markets.

Figure 14. Market to Which Participants' Work Applies

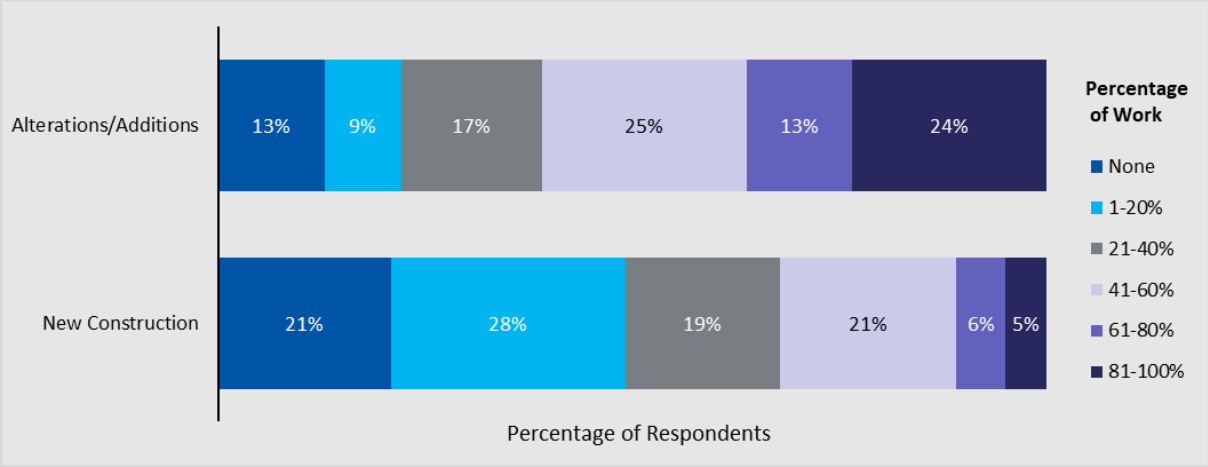
Source: Immediate Survey Question: "Please select the market to which your work applies."



Participants also reported on the percentage of their work that was new construction versus additions and alterations. As shown in Figure 15, 36% of respondents said that more than 60% of their work is in alterations and additions. Only 11% said that more than 60% of their work is new construction.

Figure 15. Breakdown of Participants' Time by Work Type (n=624)

Source: Immediate Survey Question: "About what percentage of your work is …?"



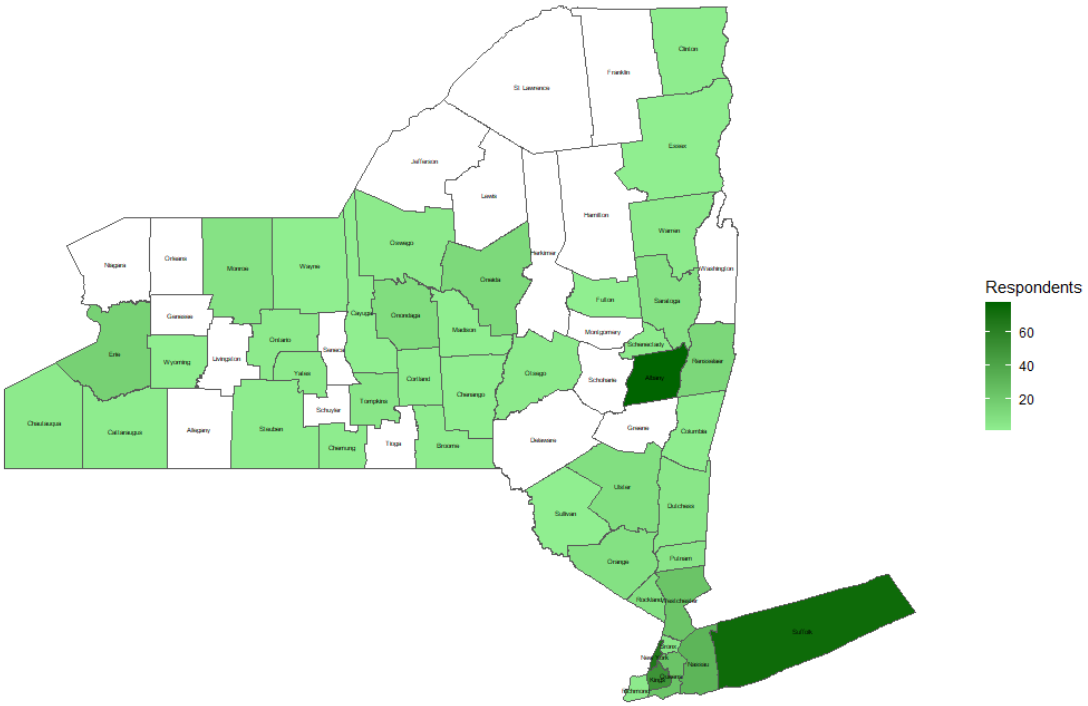
1.14.1.1. Geographical Representation

Immediate survey respondents were asked to list up to three jurisdictions in which they work, so the market evaluation team could ensure that the webinars were reaching attendees across New York State (NYS). While the original intent was to collect the names of towns, a notable number of respondents

specified counties or regions instead; because of this, the team converted all clean responses[5] to county-based entries and applied these to a state map.

As shown in Figure 17, in Year 5, 43 of 62 counties had at least one immediate survey respondent (69% of all state counties).

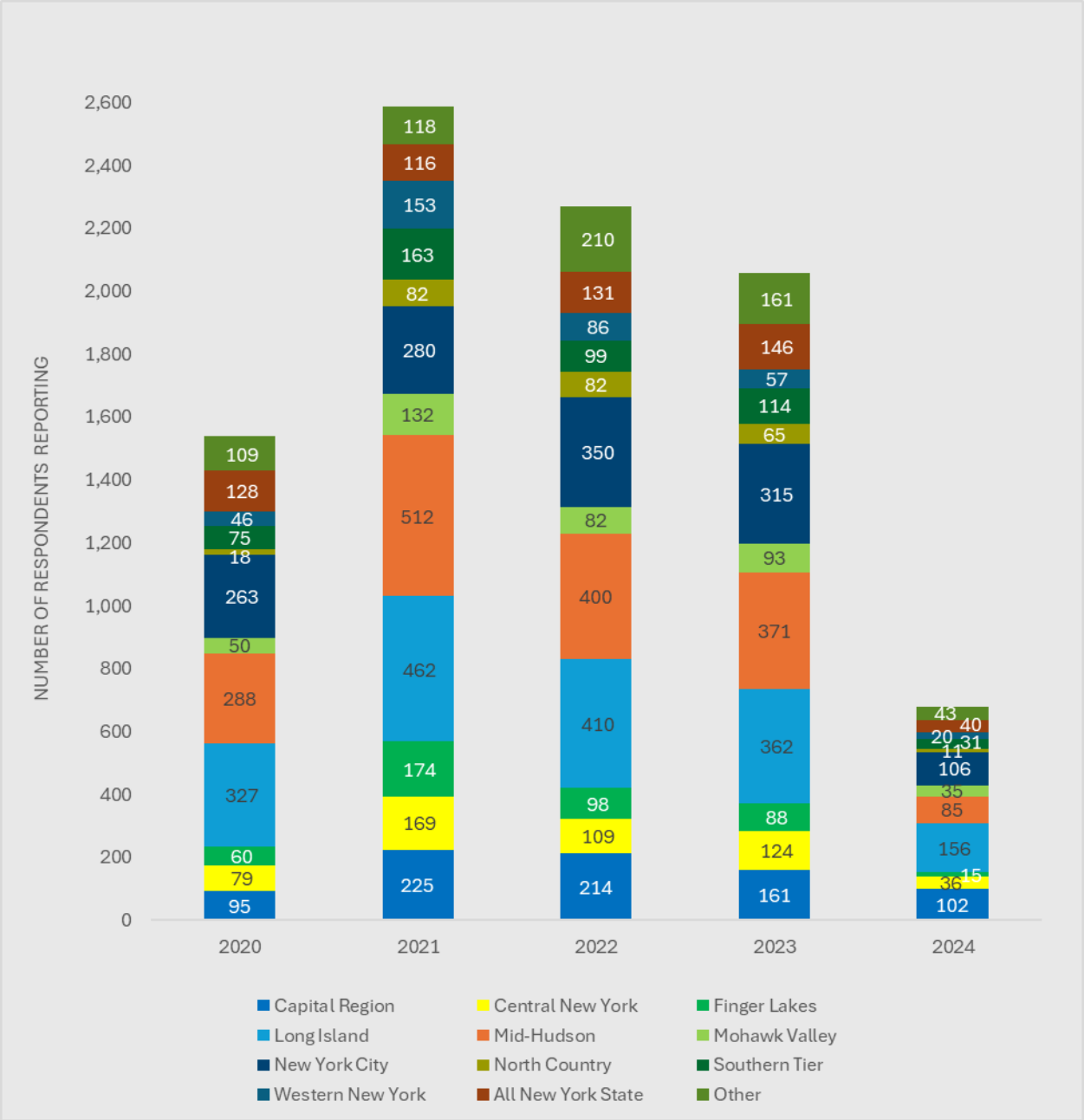
Figure 16. Immediate Survey Representation by County (n=563)



Further data clean up was conducted to combine reported town, county, and regional data across the five years of the evaluation. Figure 16 shows the breakdown by year of where survey respondents reported working according to the findings following this clean up, as of June 2024.

[5] Clean, usable responses amounted to 70% of the total immediate survey responses for Year 5.

Figure 17: Where Respondent Trainees Work 2020–2024



1.14.1.2. Expected Impacts on Implementation

The team asked immediate survey respondents whether they planned to use what they had learned in the training in their work. Ninety-three percent (n=530) said they did plan to use what they had learned, and only 2% said they did not. The remaining 5% said the information they learned was not relevant to their work. The findings were fairly consistent between code officials and building professionals; however,

code officials were more likely to say that the information was not relevant to their work (8%) compared to building professionals (3%), and building professionals were more likely to say they planned to use what they had learned (96%) compared to code officials (89%).

When asked how they planned to apply what they learned, code officials most commonly said they planned to change their inspection process (51%, as shown in Figure 18, compared to 19% of building professionals). Building professionals most commonly said they planned to change their design process (38% compared with 7% of code officials). The difference between responses from code officials and building professionals was statistically significant for three of the five response options (changing their inspection process, changing the materials they use to comply with the energy code, and changing their design process), indicating that, in some cases, code officials and building professionals plan to apply new knowledge to their work in different ways.[6]

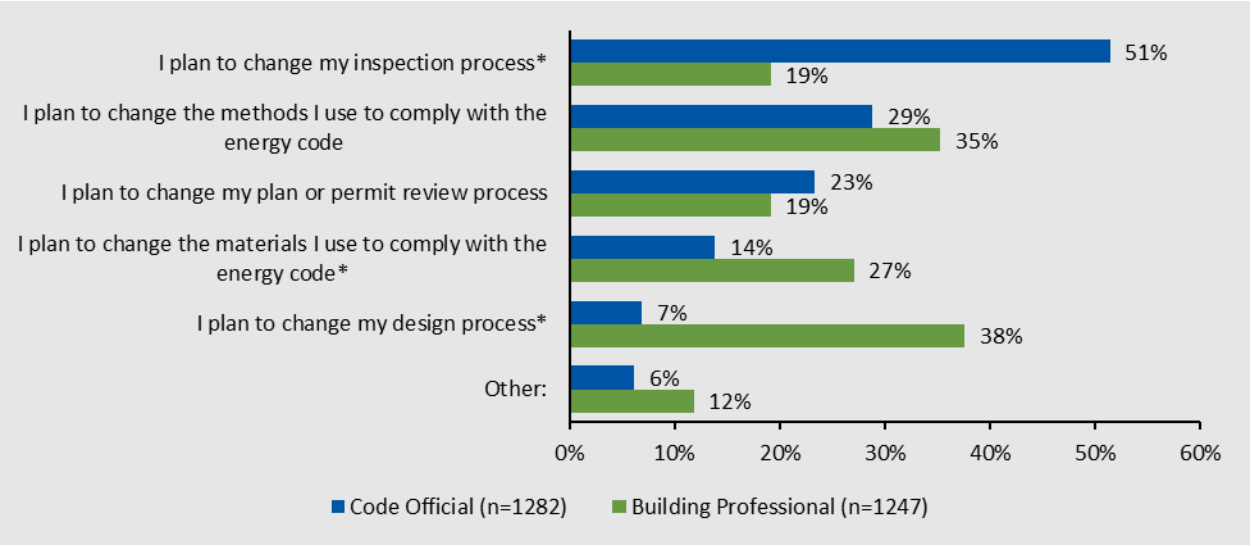
In verbatim comments, respondents noted that the trainings were very informative, relevant, and well-presented:

- "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."
- "This was my second opportunity to become familiar with the stretch code and I found this seminar greatly advanced my familiarity with technical matters."
- "This was the best seminar I've experienced on the subject."
- "Keep up the good work. Increase course offerings. These are the best continuing education courses I have taken in recent years. Thank you."
- "I thought the series was one of the best of its kind I've ever attended."
- "Overall, the training was of exceptional quality and relevance."
- "I learned a lot of valuable information."
- "It was very worthwhile."
- "Course was well presented and very relevant."

[6] This analysis used a proportion test; p-values less than 0.05 indicated statistical significance at 95% confidence.

Figure 18. How Respondents Plan to Apply Knowledge

Source: Immediate Survey Question: "How will you use the training in your work?" October 2024.



* Response options that varied significantly between code officials and building professionals ($p < .05$)

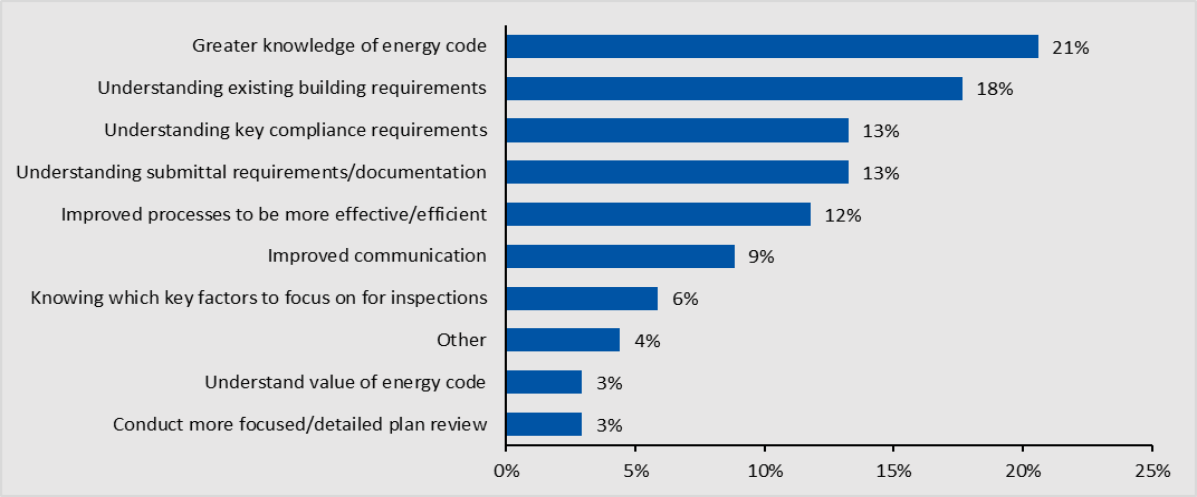
1.14.1.3. Energy Code Implementation from Follow-Up Survey Results in Year 5

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 to describe how they address compliance issues differently based on information learned at NSYERDA-sponsored trainings, respondents most commonly reported a general increase in their knowledge of the energy code (21%) and understanding of existing building requirements (18%). The results are shown in Figure 19.

Figure 19. How Respondents Address Compliance Issues Differently after Training

Source: Follow-Up Survey Question (n=68): "Please describe how you are addressing the compliance issues differently because of the training." October 2024. Multiple responses allowed.



1.14.1.4. 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, such as the following:

- The connection between energy code compliance and fire safety codes
- Insulated concrete forms installation
- Upcoming energy code updates
- Navigating energy and carbon incentive program and policy
- Solar and geothermal power design and implementation
- Decarbonization strategies, planning, and methods
- Modeling for different types of buildings and HVAC systems

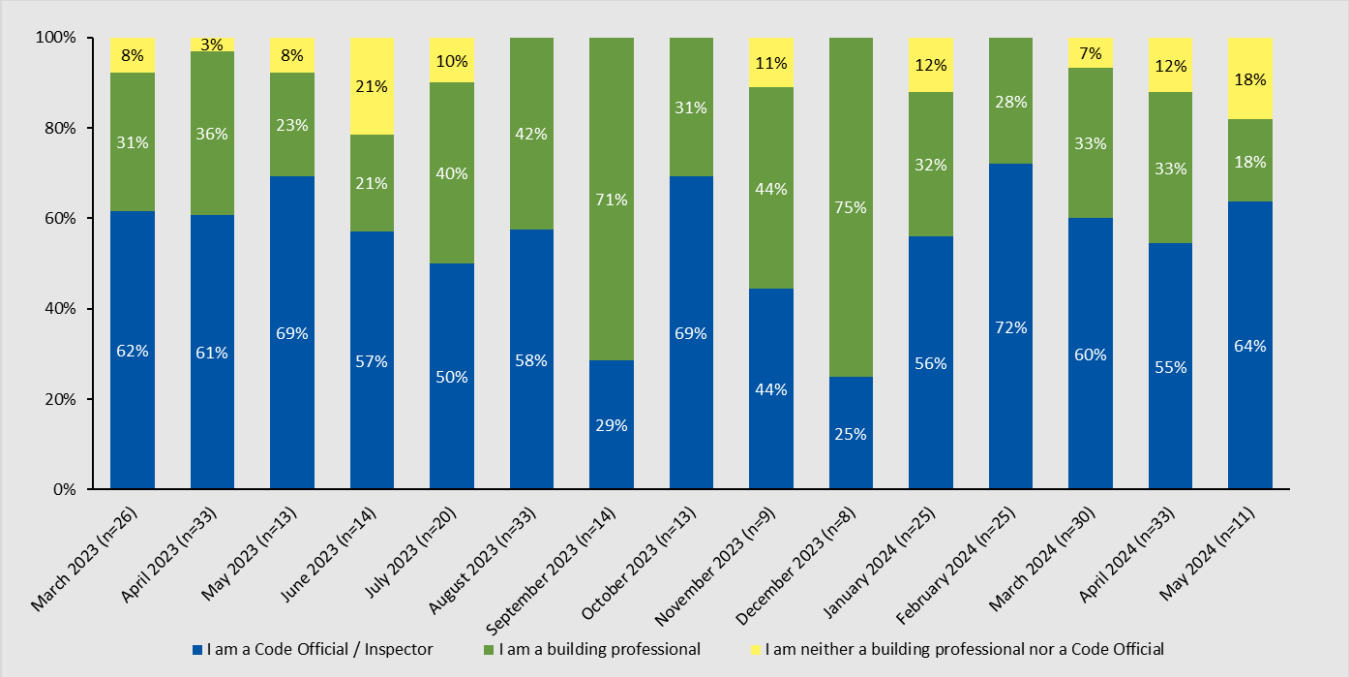
Twenty-three percent of respondents said they wanted the training courses to have a greater focus on new and emerging technology. Fifteen percent said they were satisfied with current options and had no suggestions. Ten percent of respondents said they were interested in the current training topics and wanted the courses to go more in-depth. 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.

1.15. Follow-Up Survey Participant and Jurisdiction Characteristics

For the follow-up survey data collection from March 2023 to May 2024, 57% of respondents were code officials, with 36% building professionals (contractors, architects, etc.). This represents slightly different proportions of respondents by occupation type than the immediate survey respondents. Figure 20 shows the breakdown by month of this evaluation year. Those who said they did not fall into either of the two main categories (code officials and building professionals) self-reported a variety of positions including firefighters, planning board members, building maintenance staff, and health and safety professionals.

Figure 20. Survey Respondent Work Category (n=308)

Source: Follow-Up Survey Question: "Please select your area of work from the categories below."



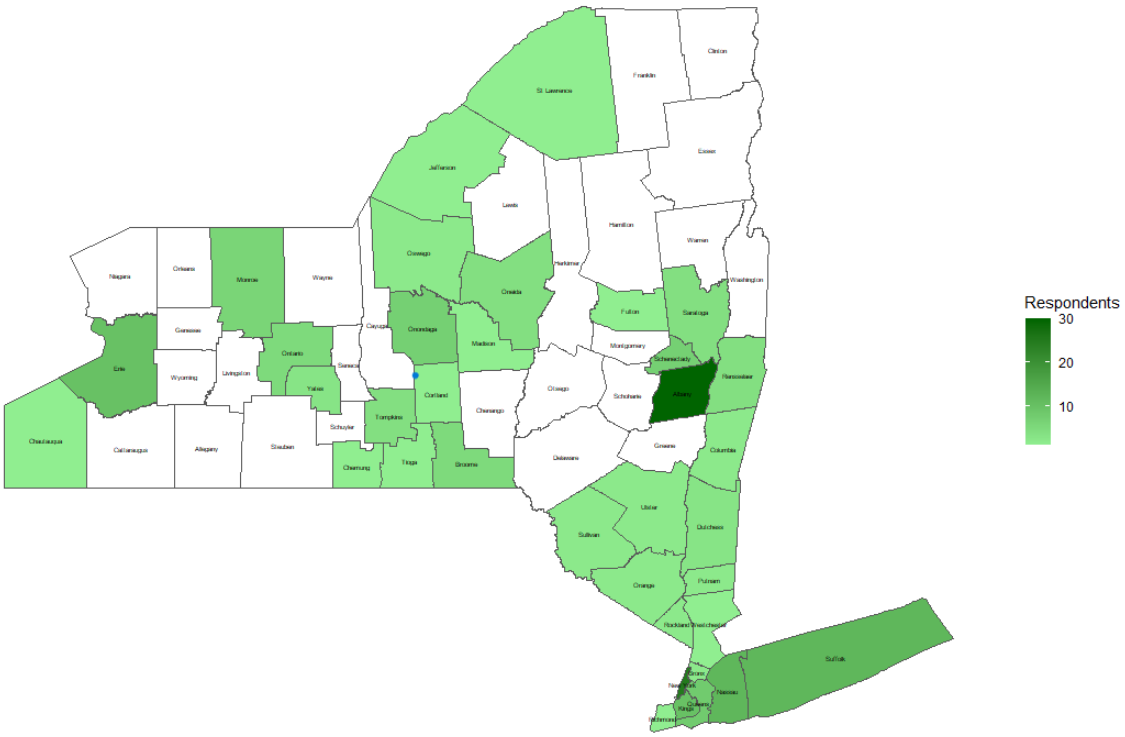
1.15.1.1. Geographical Representation

Follow-up survey respondents were asked to list up to three jurisdictions in which they work, so the market evaluation team could ensure that the trainings were reaching attendees across NYS. While the original intent was to collect the names of towns, a notable number of respondents specified counties; because of this, the team converted all clean responses[7] to county-based entries and applied these to a

[7] Clean, usable responses amounted to 57% of the total follow-up survey responses for Year 5.

state map. As shown in Figure 21, 36 of 62 counties were represented (58% of all state counties) by follow-up survey respondents, with the most representation in the NYC counties and Albany County.

Figure 21. Follow-Up Survey Representation by County (n=198)

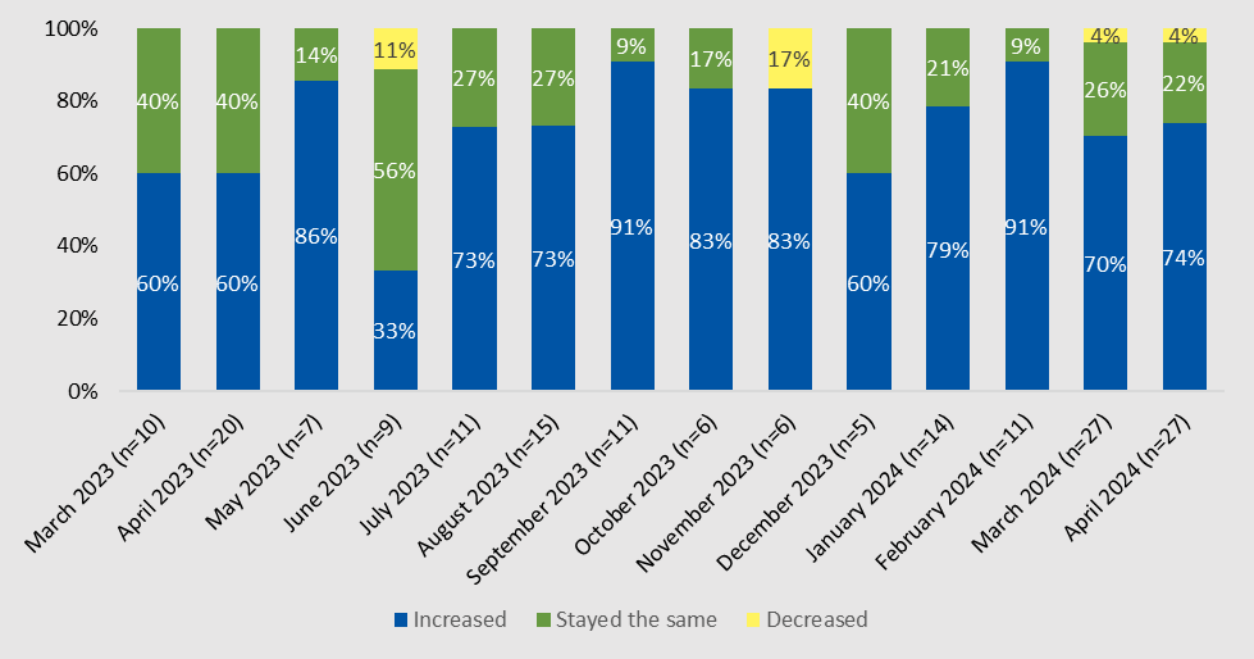


1.16. Trends (Follow-Up Survey)

Survey respondents were asked to consider the past 12 months and indicate if they thought compliance with the energy code in NYS had increased, decreased or stayed the same during that time. Overall, 71% of all respondents said they thought energy code compliance had increased over the past 12 months. As shown in Figure 22, the majority of respondents for each training month said that energy code compliance had increased over the past 12 months.

Figure 22. Change in Energy Code Compliance

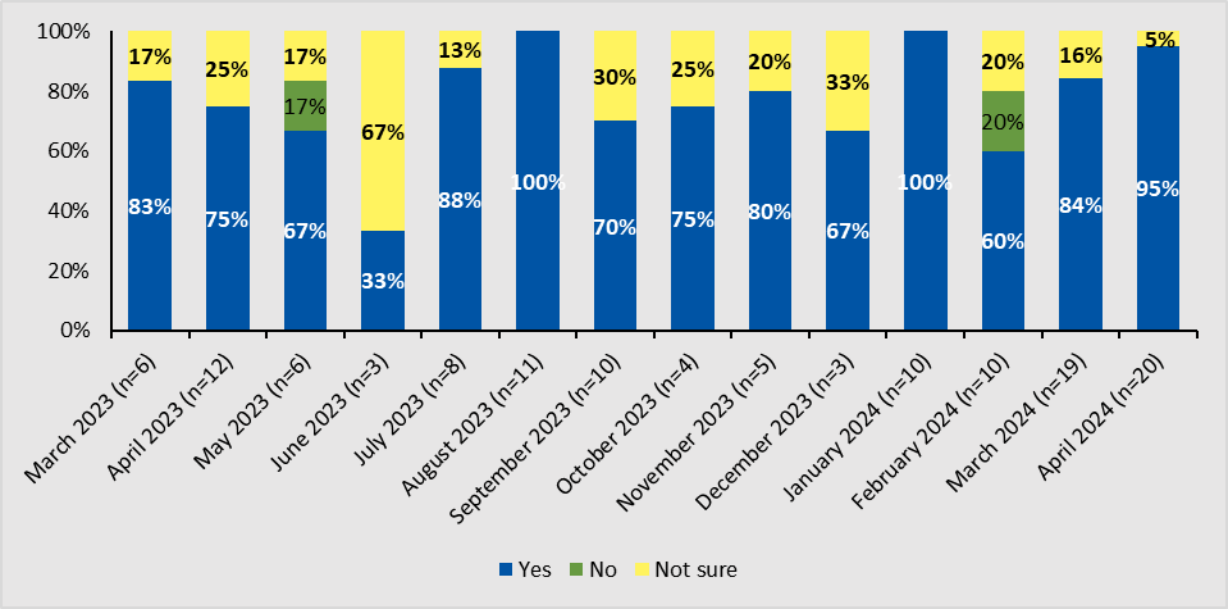
Source: Follow-Up Survey Question: "In the last year or so, do you think compliance with the energy code in New York State has increased, stayed the same, or decreased?"



Of those respondents who said that they had observed an increase in code compliance, 81% said that they thought the services provided by the NYSERDA technical support and training initiatives had played a role in this increase in compliance, with an additional 16% saying they were not sure. Figure 23 shows the breakdown by training month.

Figure 23. Whether NYSERDA-Sponsored Events Impact Compliance Improvements

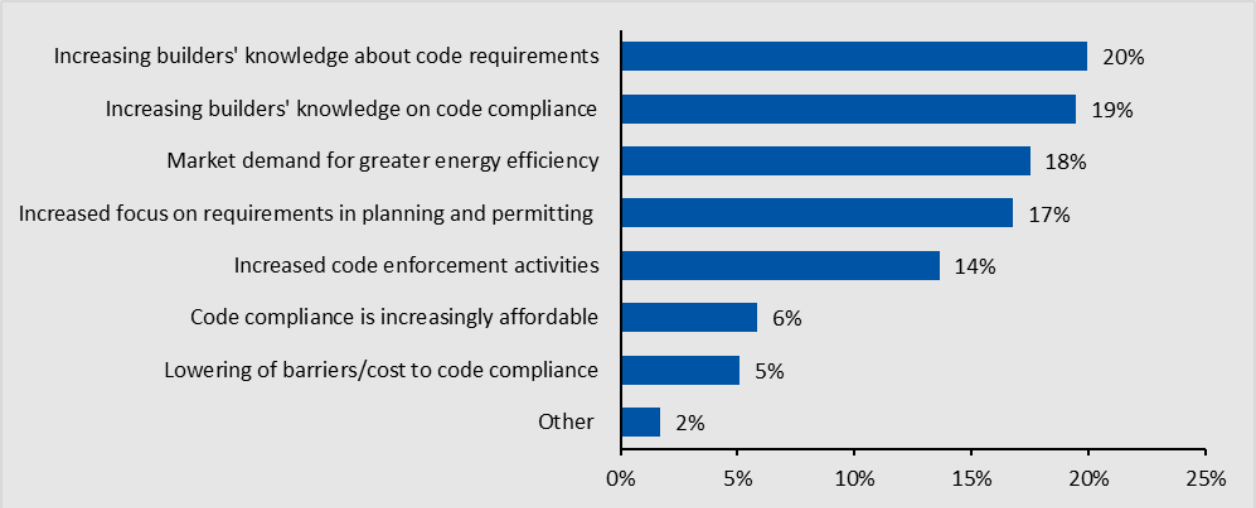
Source: Follow-Up Survey Question: "Do you think the services provided by the NYSERDA initiative, including training and technical assistance, have played a role in this?"



Respondents who reported an increase in energy code compliance were also asked to identify other factors that contributed to the increased code compliance in NYS. As shown in Figure 24, respondents identified several factors, including increased builders' knowledge about code requirements (20%), increased builders' knowledge on code compliance (19%), and market demand for greater energy efficiency (18%).

Figure 24. Other Factors Contributing to Increased Compliance (n=411)

Source: Follow-Up Survey Question: "What factors do you think have contributed to the increase in code compliance other than the NYSERDA initiatives?"



Overall, taking everything into consideration, survey respondents rated the value of the webinars they attended in helping attendees better understand and implement NYS energy code as a 5.98 on a scale of 1 to 7 (with 1 being poor and 7 being outstanding). As shown in Figure 23, the most common rating was a 7, with 38% of respondents giving that score.

1.16.1.1. Information Sharing

The market evaluation team asked follow-up survey respondents to consider with whom they shared information that they learned at the trainings. As shown in Figure 25, code officials most often shared information with other code officials (40%), more than building professionals shared information with code officials (16%). Thirty percent of building professionals reported sharing information with architects. Those who shared information with code officials also estimated how much of what they learned at the trainings they passed on. Seventy percent of respondents (n=38) reported sharing 40% or less of what they had learned with other code officials. Only 20% of respondents said they shared at least 80% of what they learned.

Figure 25. Training Information Shared with Other Professionals

Source: Follow-Up Survey Question: "With which parties listed below have you shared any information from the trainings?" Multiple responses allowed; October 2024.

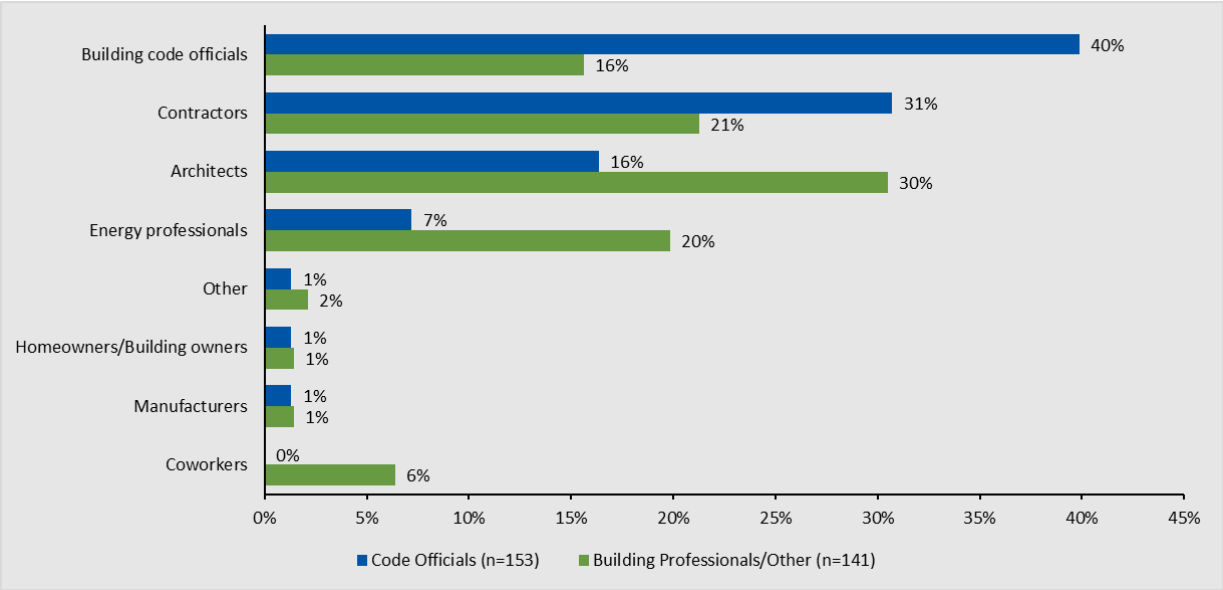
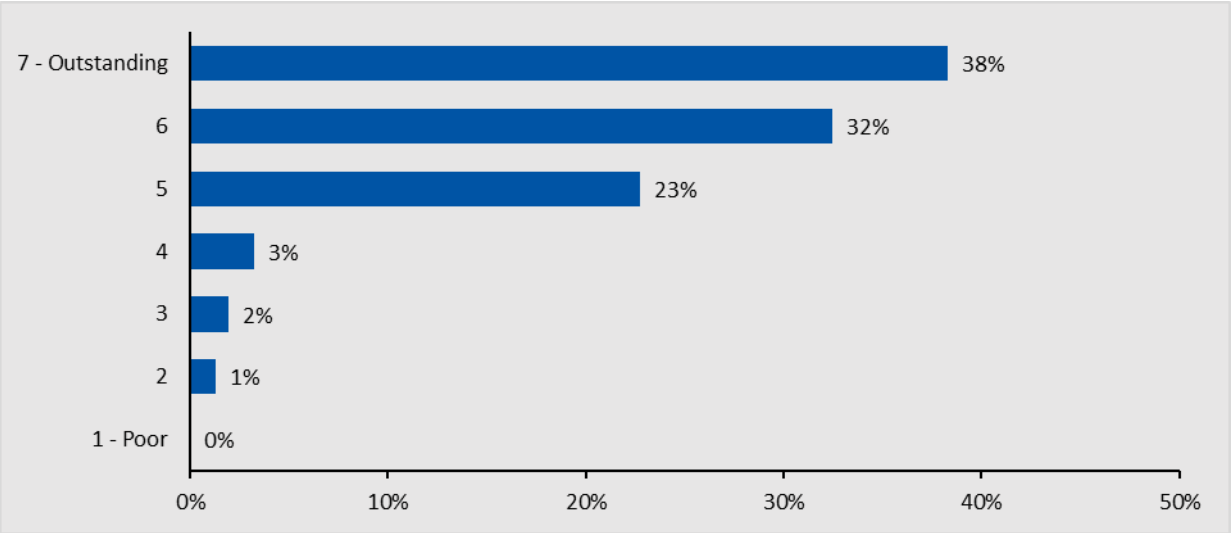


Figure 26. Overall Value of NYSERDA Training Initiative (n=81)

Source: Follow-Up Survey Question: "Taking everything into consideration, how would you rate the overall value of the webinar you attended?"

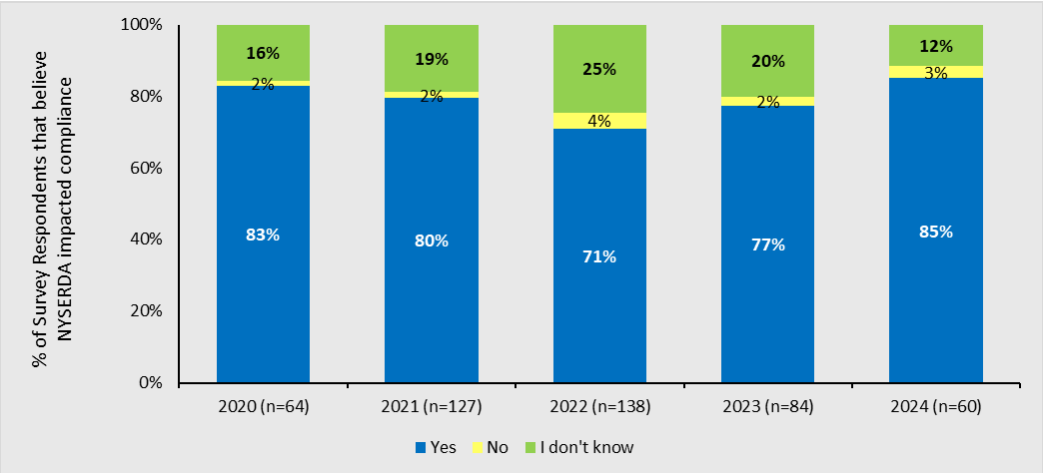


1.16.1. Five-Year View on Trainee Feedback

The team assessed how respondents felt about the importance of NYSERDA's role in increasing compliance in each evaluation year. Overall, 78% percent of respondents who said they observed an increase in code compliance thought NYSERDA's technical support and training activities played a role in this increase. In contrast, only 3% said they did not think the NYSERDA initiative was a notable contributing factor, and the remaining 19% were undecided. Figure 27 shows a breakdown of survey responses by year.

Figure 27. Percent of Survey Respondents that Believe NYSERDA Helped Increase Compliance

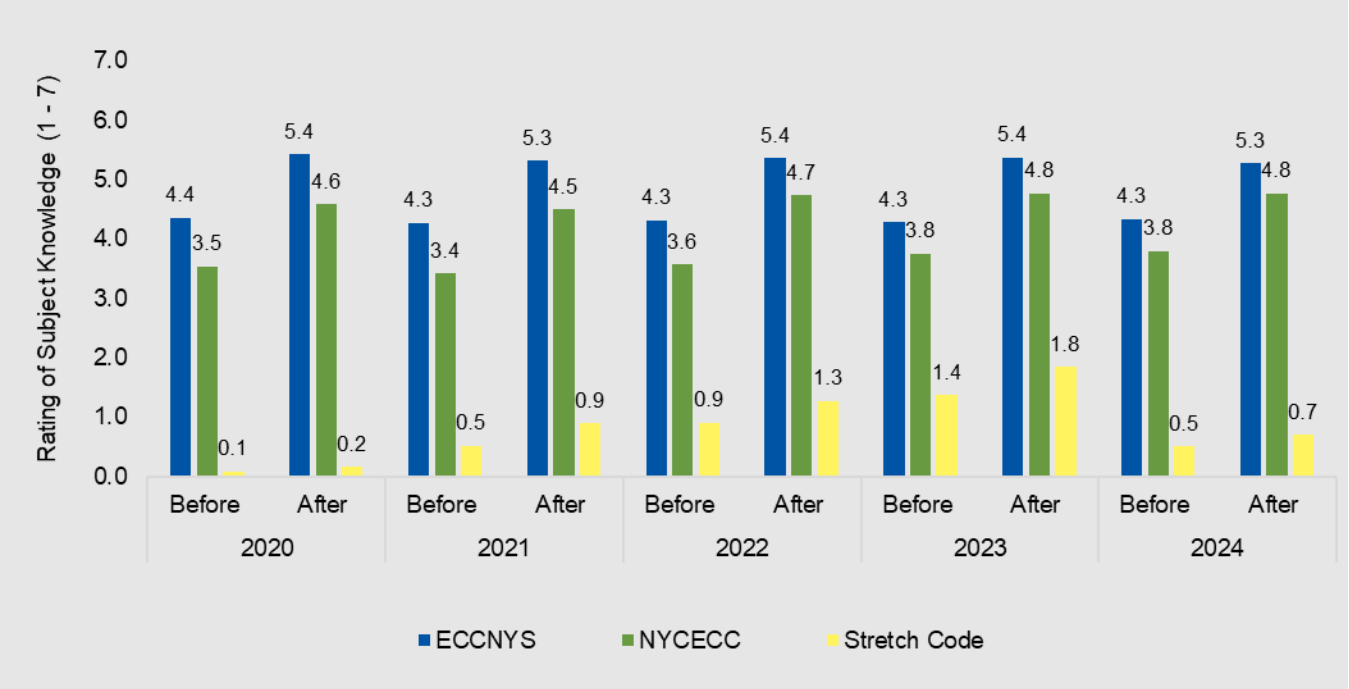
Source: Follow-Up Survey Question: "You said compliance with the energy code has increased. Do you think the services provided by the NYSERDA Initiative, including training and technical assistance, have played a role in this?" October 2024.



For the full initiative, 66% 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 5.88). More than half of follow-up survey participants consistently rated the trainings a 6 or 7. Figure 28 shows the change in participants' understanding of ECCNYS, NYCECC, and NYStretch before and after trainings, with trainings consistently increasing respondents' understanding. Overall, respondents rated NYStretch as the least understood code throughout the years.

Figure 28. Self-Rating of Subject Knowledge Before and After Attending Training

Source: Immediate Survey Question: "Prior/After attending the training, what was your level of understanding of the code on a scale from 1 to 7?" 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 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 29 and Figure 30 show the types of changes respondents most commonly reported they were making or expecting to make in the future in each evaluation year.

Figure 29. 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.

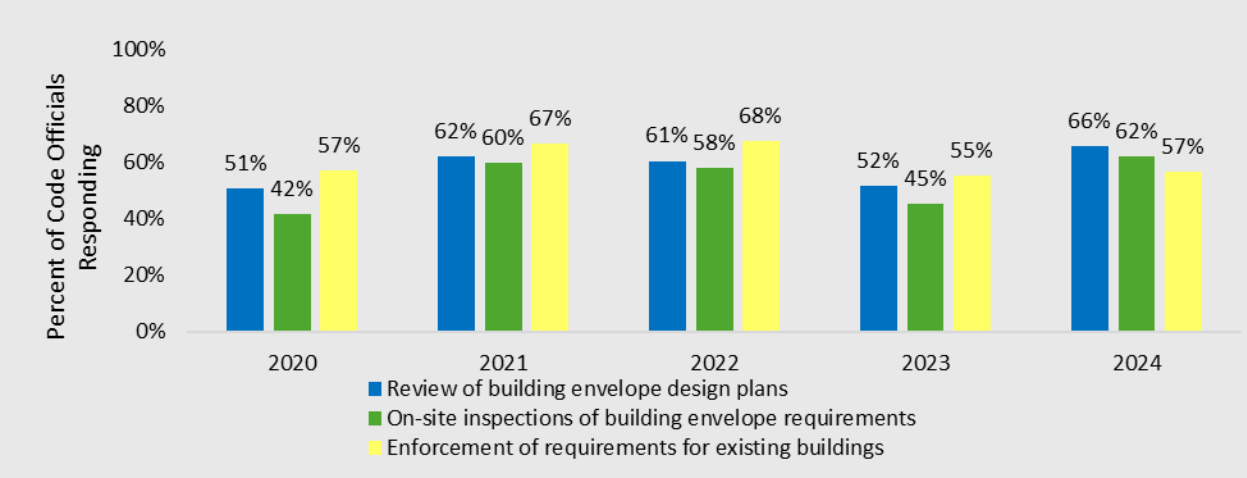
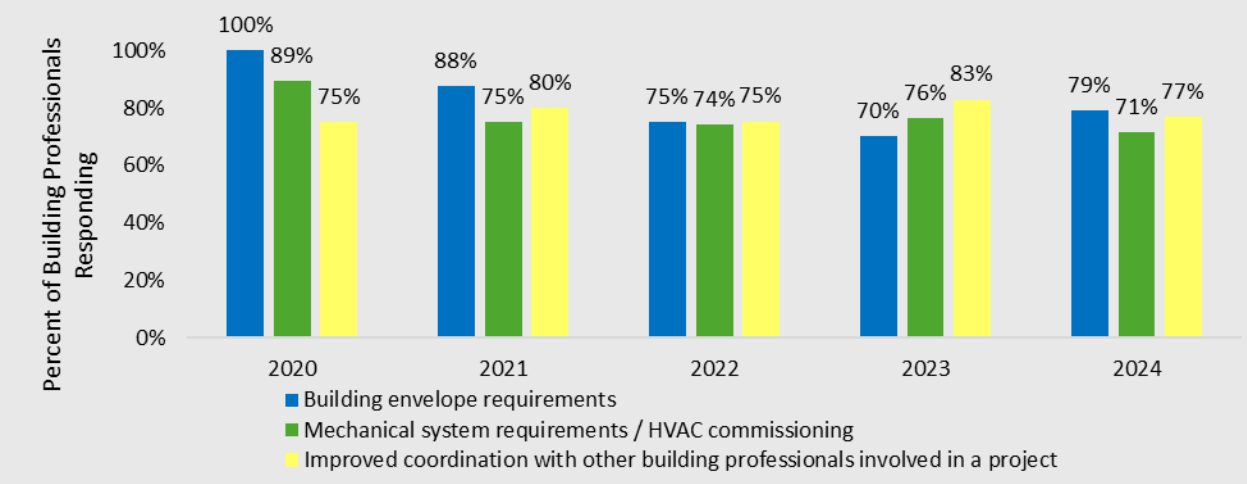


Figure 30. Percentage of Building Professionals Who Changed or Expect to Change Due to Training

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.



1.17. Square Footage Calculation

The team asked follow-up survey respondents to estimate the number and the square footage of projects completed since participating in the webinars. Although most respondents work only in certain sectors (such as residential construction and alterations), in 2023 overall, 82 respondents provided usable information. The number of respondents for each project and respondent types are included in the tables below.

Overall, 31 of the 664 code officials who completed the survey provided a response for at least one building category. As shown in Table 38, most code officials reported working on residential alternations and additions following the trainings. This category includes multifamily buildings with five or fewer dwelling units that were on average the smallest projects in terms of square footage. The largest projects code officials reported working on were multifamily new construction projects.

The market evaluation team calculated the total square footage that code officials worked on after the trainings as the product of the percentage of code officials who worked on a building category, the median of projects on which each building professional worked, the average square footage per project (based on the median of average project square footage reported by code officials), and the number of code officials trained[8]. The total square footage affected by code officials based on this calculation is greater than the new construction and additions and alterations data reported by Dodge Data and Analytics (Dodge), which NYSERDA provided to the market evaluation team. The difference is especially significant for additions and alterations.

Table 38. Projects in the Six Months After Attending Training (Code Officials)

Category	n	Percentage of Code Officials Providing a Response	Median Number of Projects	Average Square Footage per Project	Code Officials Trained in 2022	Square Footage Affected by Training Participants
Commercial New Construction	9	35%	2	50,000	664	22,984,615
Commercial Additions and Alterations	15	58%	4	20,000		30,646,154
Residential New Construction	15	58%	10	3,000		11,492,308
Residential Alterations and Additions	17	65%	8	2,050		7,120,123
Multifamily New Construction	5	19%	2	52,000		13,280,000
Multifamily Alterations and Additions	7	27%	3	28,000		15,016,615

Overall, 51 of the 664 building professionals who completed the survey provided a response for at least one building category. As shown in Table 39, building professionals worked mostly on commercial

[8] 3,963 unique persons attended trainings in 2021. According to the immediate surveys, 47% of those training attendees were code officials.

additions and alteration projects. As with code officials, total square footage reported by building officials exceeds the building square footage reported by Dodge, particularly for alterations and additions.

Table 39. Projects in the Six Months after Attending Training (Building Professionals)

Category	n	Percentage of Building Professionals Providing a Response	Median Number of Projects	Average Square Footage per Project	Building Professionals Trained in 2022	Square Footage Affected by Training Participants
Commercial New Construction	25	53%	2	50,000	797	42,393,617
Commercial Additions and Alterations	33	70%	5	20,000		55,959,574
Residential New Construction	8	17%	5	11,000		6,715,149
Residential Alterations and Additions	10	21%	3	4,500		2,289,255
Multifamily New Construction	9	19%	2	210,000		64,099,149
Multifamily Alterations and Additions	6	13%	2	53,000		10,784,936

The total square footage reportedly affected by the follow-up survey respondents exceeds the 2023 square footage reported by Dodge. This difference may result from multiple respondents in the same building department or firm working on the same building or from inaccurate data from Dodge.

1.18. Understanding of the ECCCNYS, NYCECC, and NYStretch (Immediate Survey)

To assess the impact of the training on attendees' understanding of the ECCCNYS, NYCECC, and NYStretch, the market evaluation team asked immediate survey respondents to estimate their level of understanding of the energy code before and immediately following the event on a 7-point scale (where 1 means no understanding and 7 means expert understanding).

Figure 31 illustrates the change in attendees' level of understanding of the ECCCNYS. The team asked only individuals attending ECCCNYS-specific training to estimate their level of understanding of the ECCCNYS before and after the training. Overall, 18% of respondents ranked themselves as having an understanding of 6 or 7 on the 7-point scale prior to attending the training. After the training, the scores improved such that 48% of respondents ranked their understanding as a 6 or 7. This resulted in a statistically significant increase ($p < .001$) from a mean score of 4.3 to a mean score of 5.3.

Figure 31. Understanding of the ECCCNYS

Source: Immediate Survey Questions: "Prior to attending the training on [Course Title], what was your level of understanding of the Energy Conservation Code of New York State?" and "After attending the training on [Course Title], what is your level of understanding of the Energy Conservation Code of New York State?"

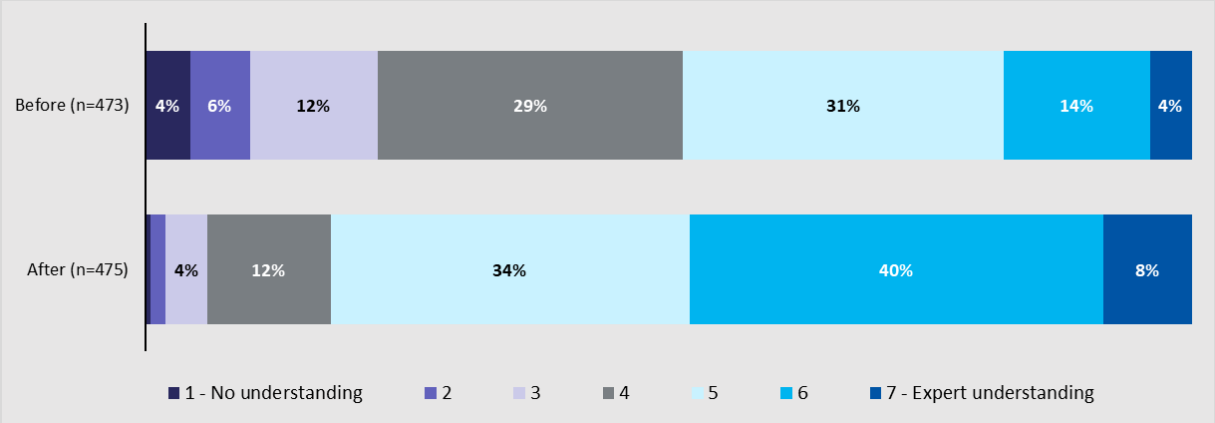


Figure 32 shows the change in attendees' level of understanding of the NYCECC. The team asked individuals attending New York City (NYC)-specific training to estimate their level of understanding of the NYCECC before and after the training events. Fifteen percent of the respondents ranked themselves as having an understanding of 6 or 7 on the 7-point scale prior to attending the training. After the training, the scores improved such that 39% of respondents ranked themselves as having an understanding of 6 or 7. This resulted in a statistically significant ($p < .001$) increase from a mean score of 3.8 to a mean score of 4.8.

Figure 32. Understanding of the NYCECC (n=214)

Source: Immediate Survey Questions: "Prior to attending the training on [Course Title], what was your level of understanding of the New York City Energy Conservation Code?" and "After attending the training on [Course Title], what is your level of understanding of the New York City Energy Conservation Code?"

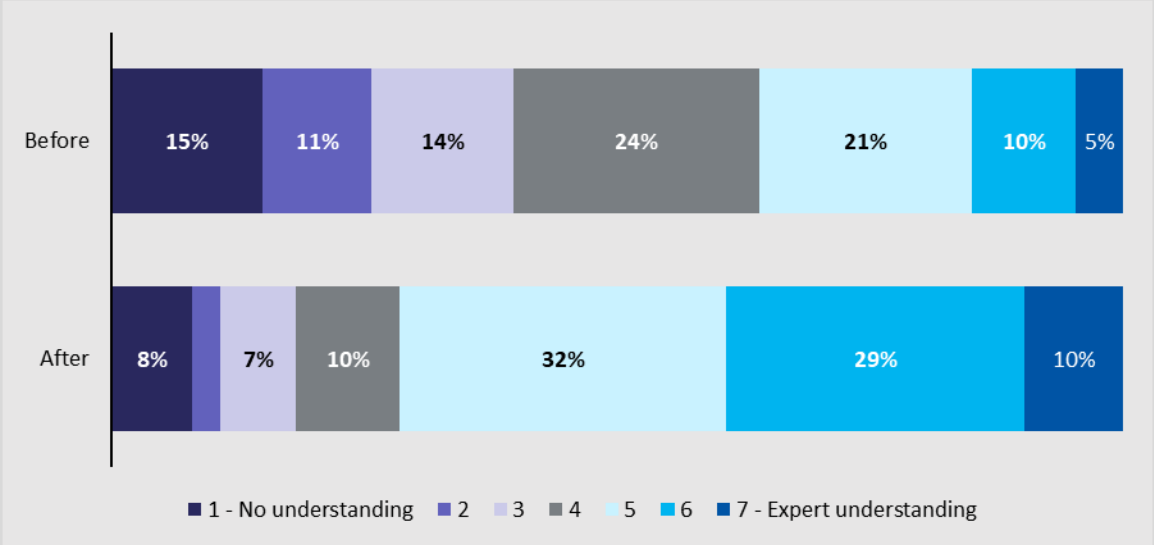
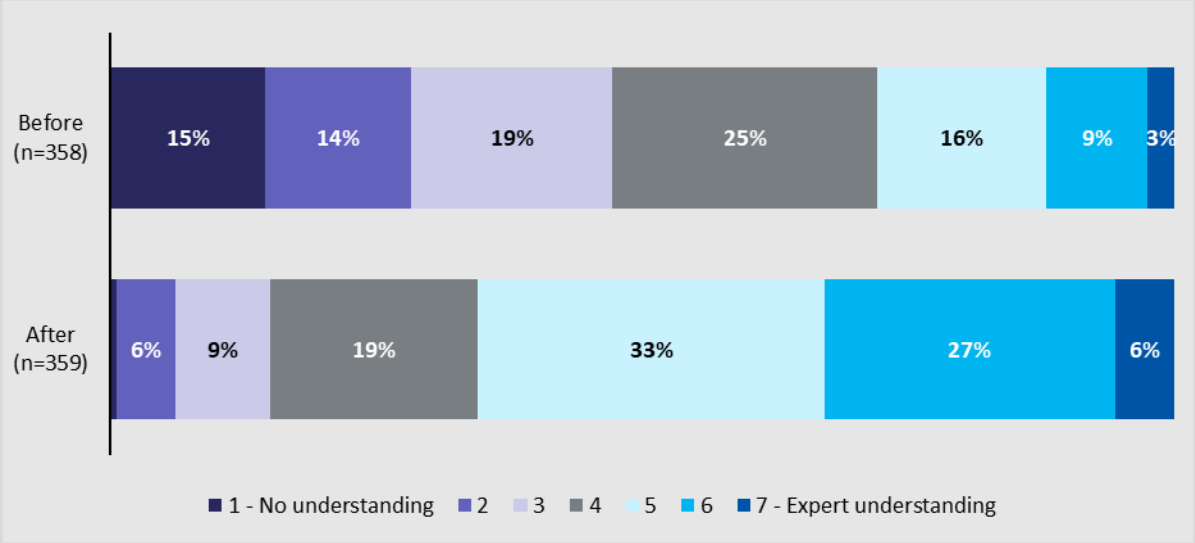


Figure 33 shows the change in attendees' level of understanding of NYStretch. The team asked only individuals attending a training session covering NYStretch topics to provide their level of understanding of the stretch energy code before and after the training events. Only 12% of respondents ranked themselves as having a level of understanding of 6 or 7 prior to attending the training. The level of understanding increased to 33% rating themselves a 6 or 7 after the training. Overall, mean scores increased from 3.5 prior to the training to 4.8 after attending the training, a statistically significant change ($p < .001$).

Figure 33. Understanding of NYStretch

Source: Immediate Survey Questions: "Prior to attending the training on [Course Title], what was your level of understanding of the NYStretch Energy Code - 2020 on a scale from 1 to 7" and "After attending the training on [Course Title], what is your level of understanding of the NYStretch Energy Code - 2020 on a scale from 1 to 7"

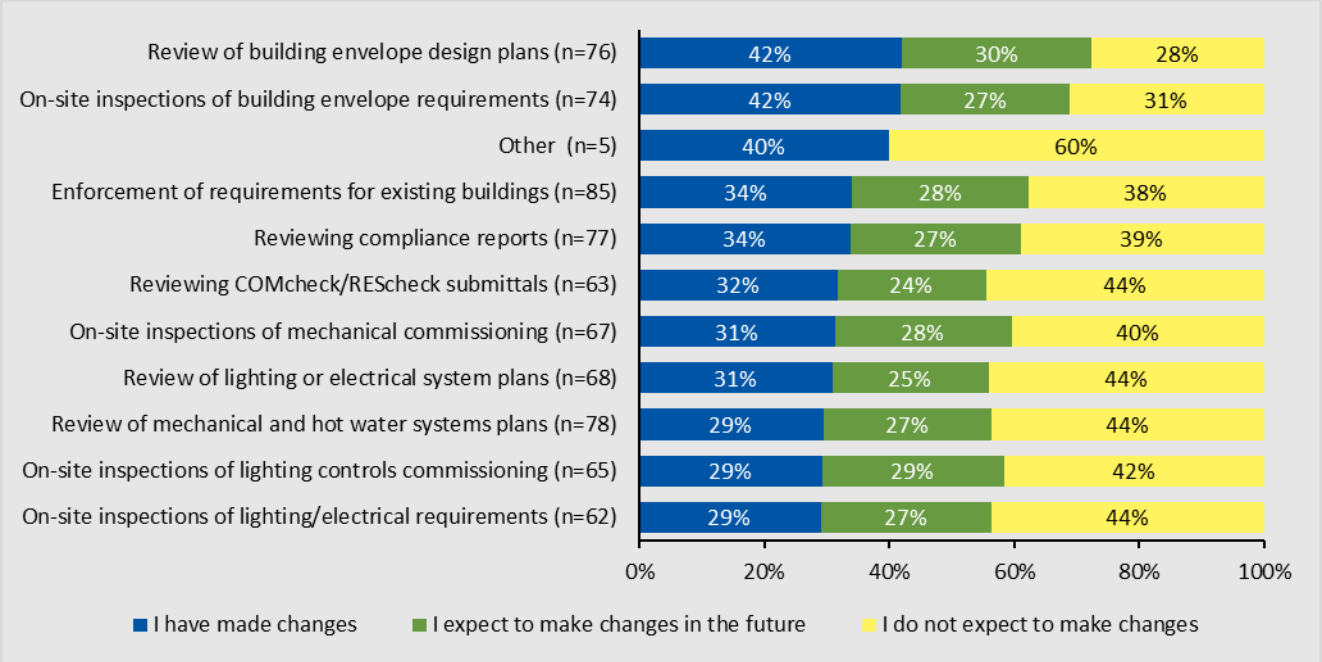


1.19. Participant Changes to Work Procedures (Follow-Up Survey)

Code officials were asked to identify which (if any) procedures of their work had changed as a result of attending the training webinars. As shown in Figure 34, code officials said that they had made changes to the way they review building envelope design plans, their on-site inspections of building envelope requirements (both 42%), their enforcement of requirements for existing buildings, and their review of compliance reports (both 34%).

Figure 34. Work Procedures Changed from Lessons Learned at NYSERDA Webinars (Code Officials)

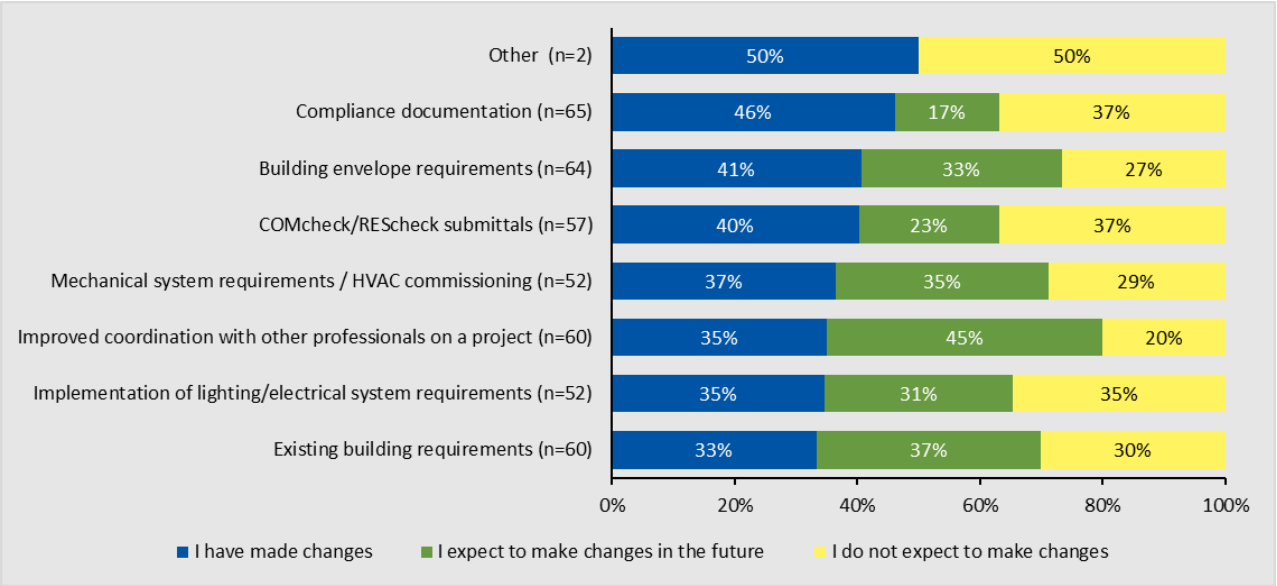
Source: Follow-Up Survey Question: "For each topic listed below, please identify if the procedures of your work have changed or will change as a result of what you learned at the webinars you attended."



Building professionals were also asked to consider if their work procedures had changed as a result of what they learned at NYSERDA-sponsored webinars. As shown in Figure 35, building professionals most often reported that they had made changes to their work around compliance documentation (46%) and building envelope requirements (41%). However, 37% of building professionals indicated that they were unlikely to make changes to their compliance documentation and COMcheck or REScheck submittals.

Figure 35. Work Procedures Changed from Lessons Learned at NYSERDA Webinars (Building Professionals)

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 webinars you attended."

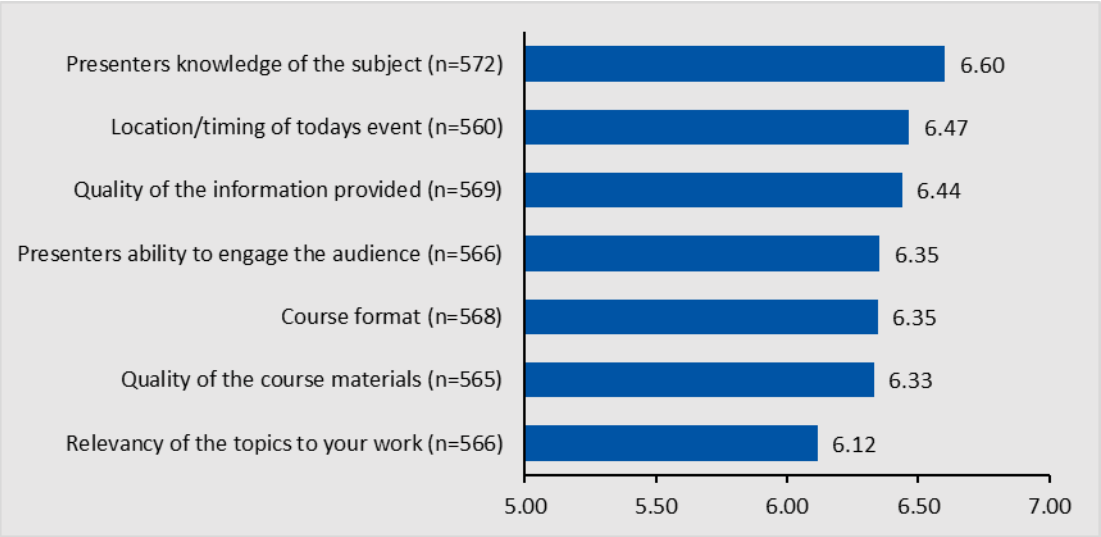


1.20. Satisfaction with Training Elements (Immediate Survey)

The market evaluation team asked respondents to rate their satisfaction with key aspects of the training on a 7-point scale, where 1 is not at all satisfied and 7 is very satisfied. Figure 36 shows that respondents were generally satisfied with all aspects of the training. The mean rating for all elements was higher than 6 on the 7-point scale. The figure also shows that respondents were most satisfied with how knowledgeable the presenters were on the subject matter, followed by the convenient timing of the webinars and the quality of the information provided.

Figure 36. Respondent Mean Satisfaction Rating for Key Training Elements

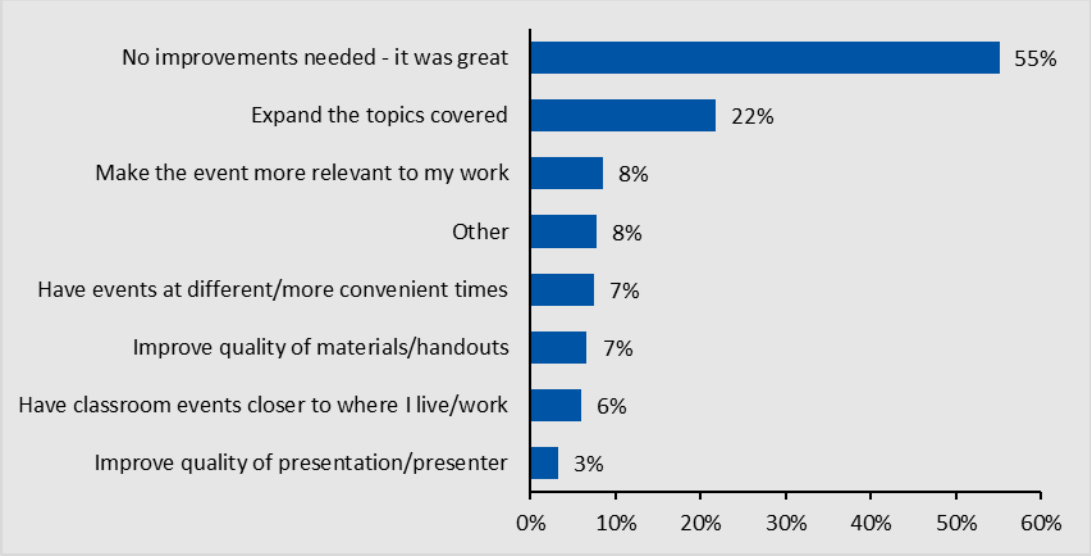
Source: Immediate Survey Question: "Please rate your satisfaction with: … on a scale of 1 – Not satisfied at all, to 7 – Very satisfied."



When asked what could improve the training events, 55% of respondents said the training "was great" and no improvements were needed. Figure 37 shows the most common suggestions for improvements.

Figure 37. Respondent Suggests for Course Improvement (n=483)

Source: Immediate Survey Question: "How can we improve the [Course Title] training or similar events in the future?"



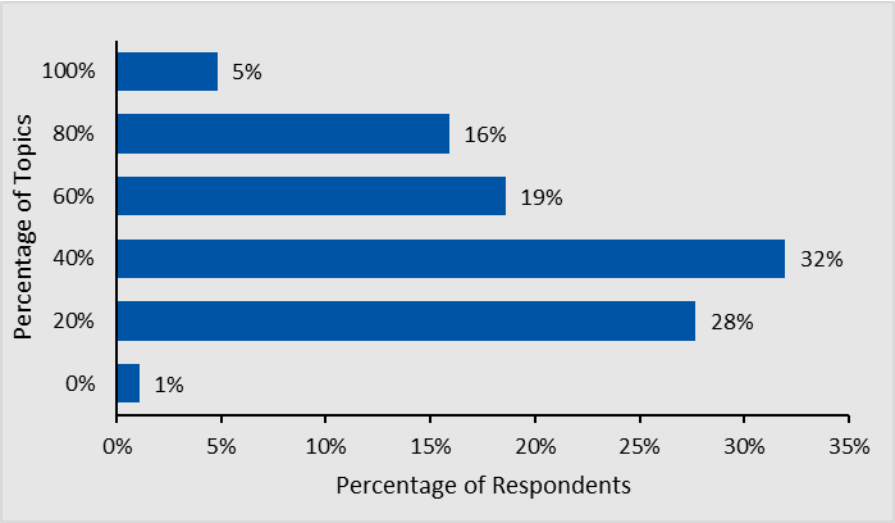
1.21. Relevance and Usefulness of Training Topics (Immediate Survey)

The market evaluation team asked respondents to identify the percentage of topics in the training sessions that covered new information. As shown in Figure 38, few respondents said that either all or none of the

topics covered were new to them. Nearly a third of respondents (28%) said that approximately 40% of the topics covered was new information.

Figure 38. New Information as a Percentage of Topics Covered (n=560)

Source: Immediate Survey Question: "What percent of the topics covered in the training session today was new information for you?"



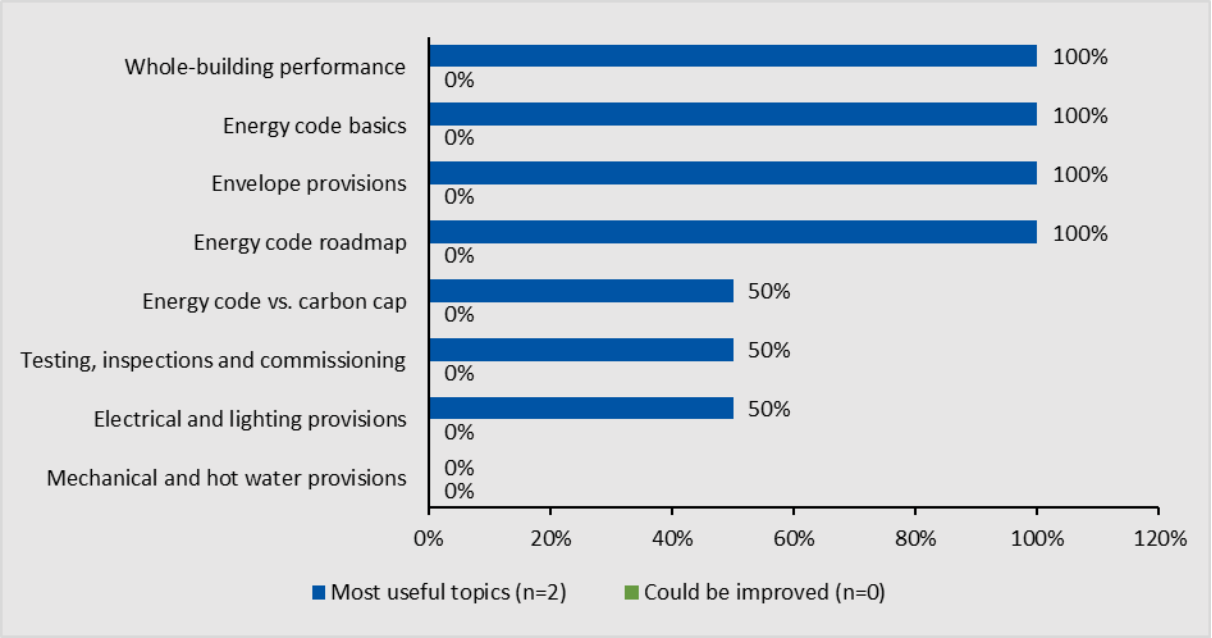
The most useful topics and the topics identified as needing improved content for each course are presented in the following sections.

1.22. What's New in the 2020 NYC Energy Code: Commercial (UGC)

Figure 39 shows the topics two respondents who took the "What's New in the 2020 NYC Energy Code" training found most useful and those they suggested could be improved. Both respondents found four of the topics useful. Neither respondent said any topic could be improved.

Figure 39. Feedback on Topics Covered (What's New in the 2020 NYC Energy Code: Commercial)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

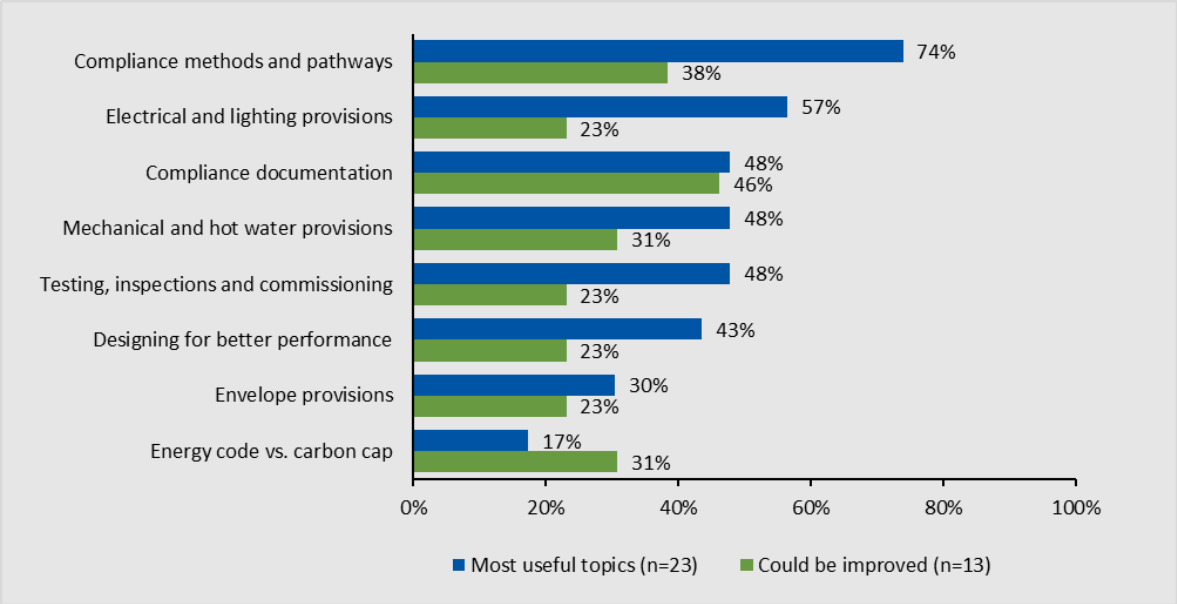


1.23. Crushing the NYC Energy Code: Commercial (UGC)

Figure 40 shows the topics respondents who took the "Crushing the NYC Energy Code: Commercial" training found most useful and those they suggested could be improved. The topic respondents found most useful was compliance methods and pathways (74%). When asked which topic could be improved, 46% of respondents said compliance documentation.

Figure 40. Feedback on Topics Covered (Crushing the NYC Energy Code: Commercial)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

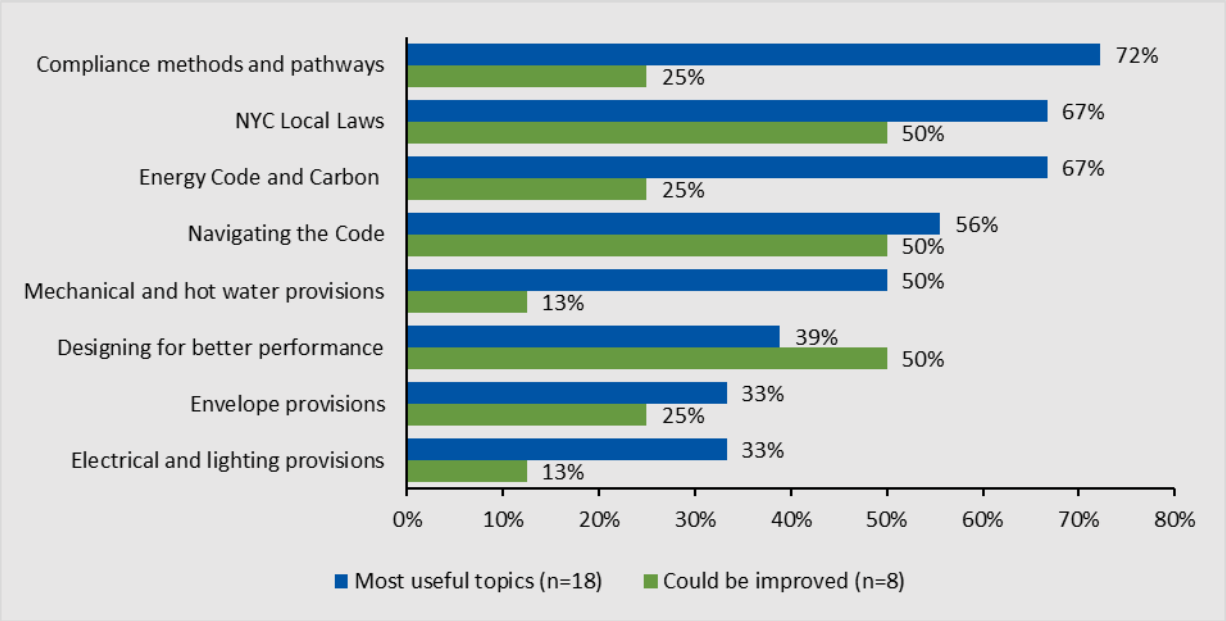


1.24. Crushing the NYC Energy Code: Residential (UGC)

Figure 41 shows the topics respondents who took the "Crushing the NYC Energy Code: Residential" training found most useful and those they suggested could be improved. The topics respondents found most useful was compliance methods and pathways (72%). The topics respondents most commonly said could be improved were NYC local laws, navigating the code, and designing for better performance (50%).

Figure 41. Feedback on Topics Covered (Crushing the NYC Energy Code: Residential)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

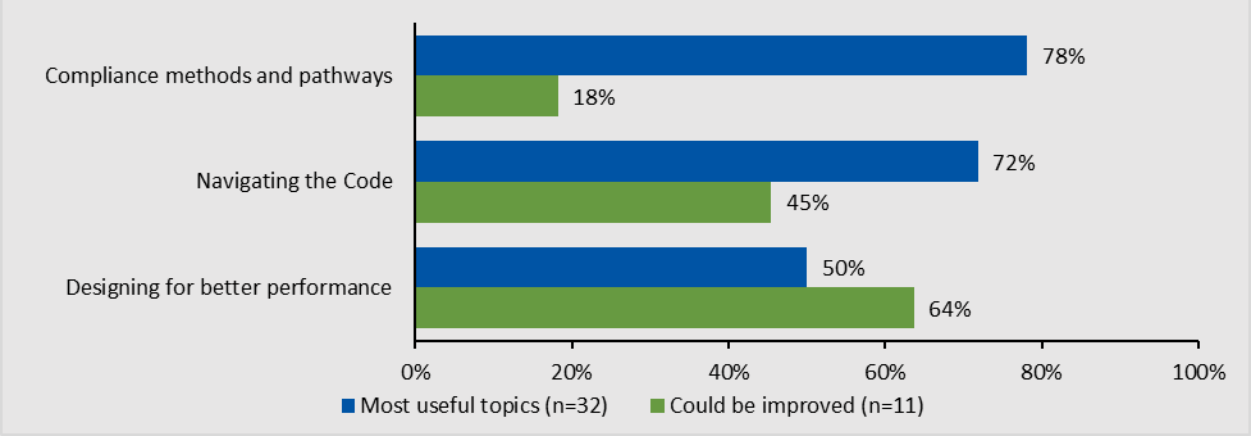


1.25. Crushing the Code NYS: Energy Code 101 (UGC)

Figure 42 shows the topics respondents who took the "Crushing the Code NYS: Energy Code 101" training found most useful and those they suggested could be improved. Respondents found compliance methods and pathways useful (78%). When asked which topics could be improved, respondents said designing for better performance (64%).

Figure 42. Feedback on Topics Covered (Crushing the Code NYS: Energy Code 101)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

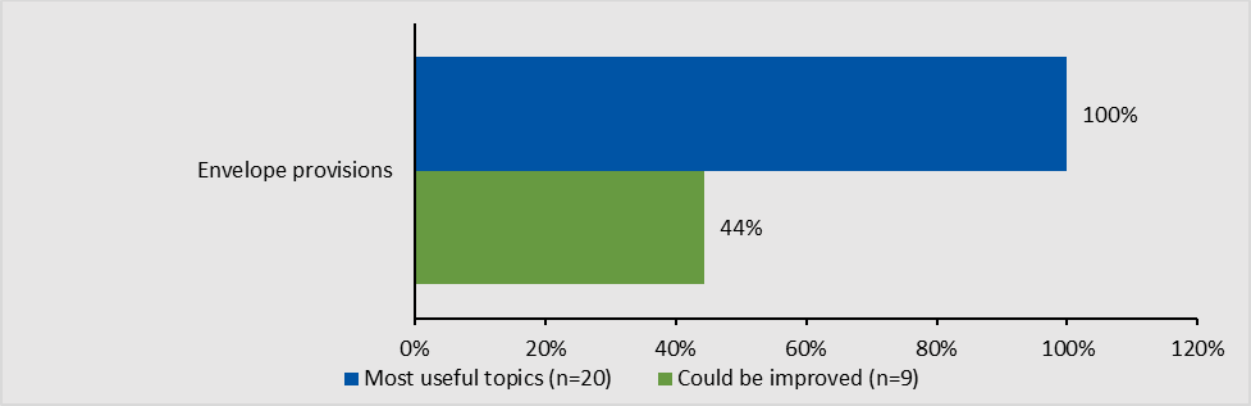


1.26. Crushing the Code NYS: Residential Envelope (UGC)

Figure 43 shows the topics respondents who took the "Crushing the Code NYS: Residential Envelope" training found most useful and those they suggested could be improved. This training had only one topic, which 100% of respondents said was useful, while 44% said it could use improvement.

Figure 43. Feedback on Topics Covered (Crushing the Code NYS: Residential Envelope)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

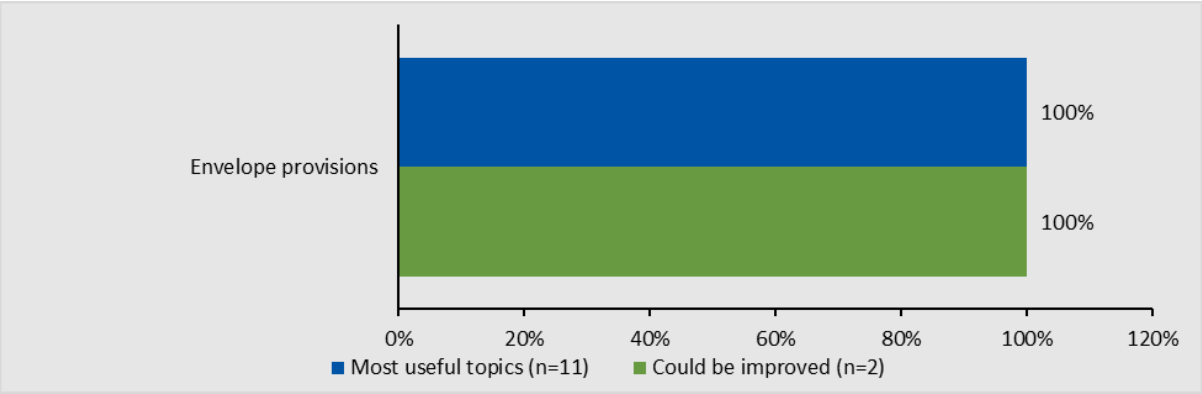


1.27. Crushing the Code NYS: Commercial Envelope (UGC)

Figure 44 shows the topics respondents who took the "Crushing the Code NYS: Commercial Envelope" training found most useful and those they suggested could be improved. There is only one topic for this training, and all respondents said it was useful (100%) and could be improved (100%).

Figure 44. Feedback on Topics Covered (Crushing the Code NYS: Commercial Envelope)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

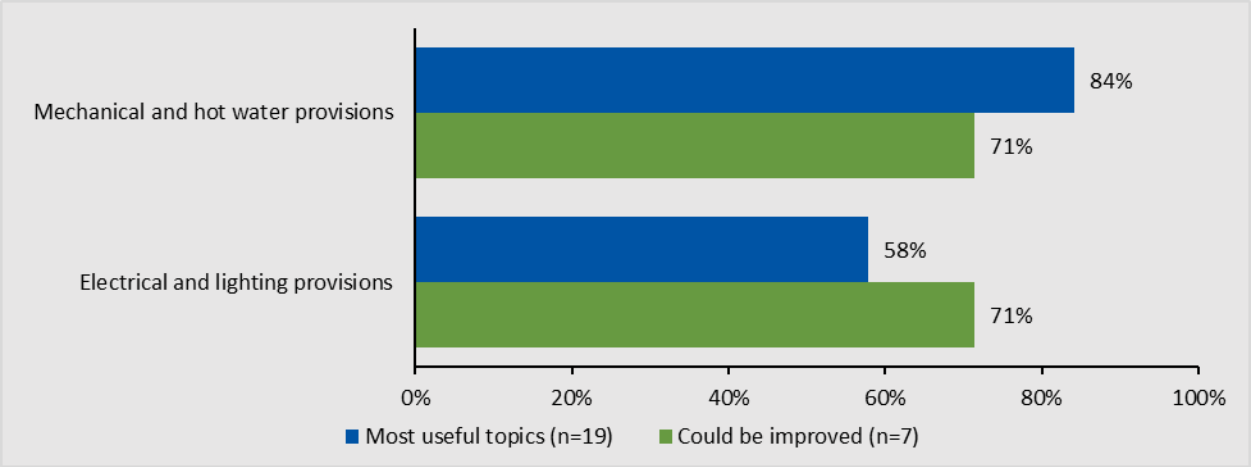


1.28. Crushing the Code NYS: Residential Building Systems (UGC)

Figure 45 shows the topics respondents who took the "Crushing the Code NYS: Residential Building Systems" training found most useful and those they suggested could be improved. Most respondents said mechanical and hot water provisions was useful (84%). When asked which topics could be improved, respondents mentioned the same topic (71%) and electrical and lighting provisions (71%).

Figure 45. Feedback on Topics Covered (Crushing the Code NYS: Residential Building Systems)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

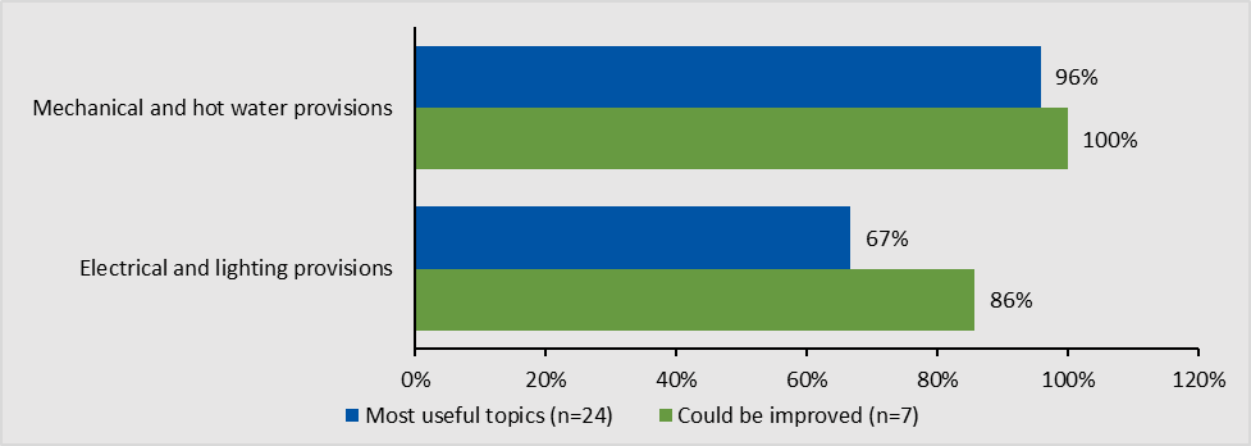


1.29. Crushing the Code NYS: Commercial Building Systems (UGC)

Figure 46 shows the topics respondents who took the "Crushing the Code NYS: Commercial Building Systems" training found most useful and those they suggested could be improved. Most respondents said mechanical and hot water provisions was useful (96%). When asked which topics could be improved, respondents mentioned the same topic (100%) and electrical and lighting provisions (86%).

Figure 46. Feedback on Topics Covered (Crushing the Code NYS: Commercial Building Systems)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

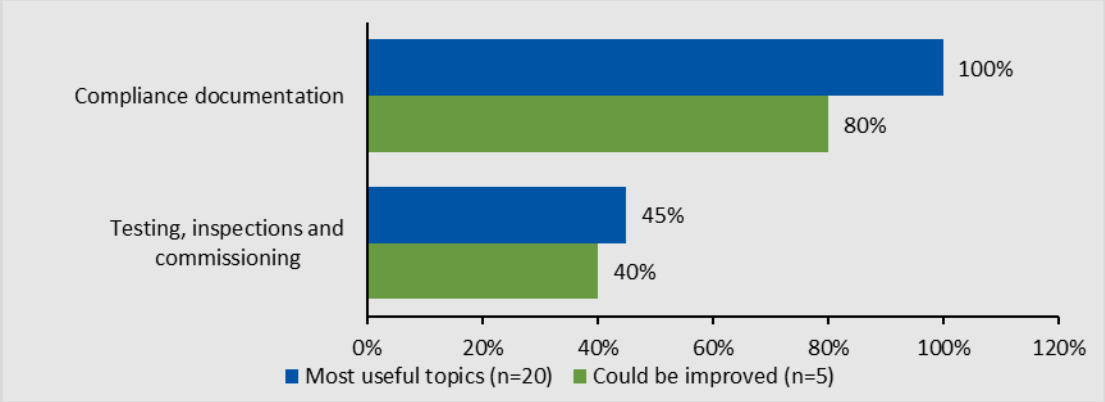


1.30. Crushing the Code NYS: Demonstrate Compliance (UGC)

Figure 47 shows the topics respondents who took the "Crushing the NYS Energy Code: Residential" training found most useful and those they suggested could be improved. All respondents said compliance documentation was useful (100%), and most respondents said the same topic could be improved (80%).

Figure 47. Feedback on Topics Covered (Crushing the Code NYS: Demonstrate Compliance)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.



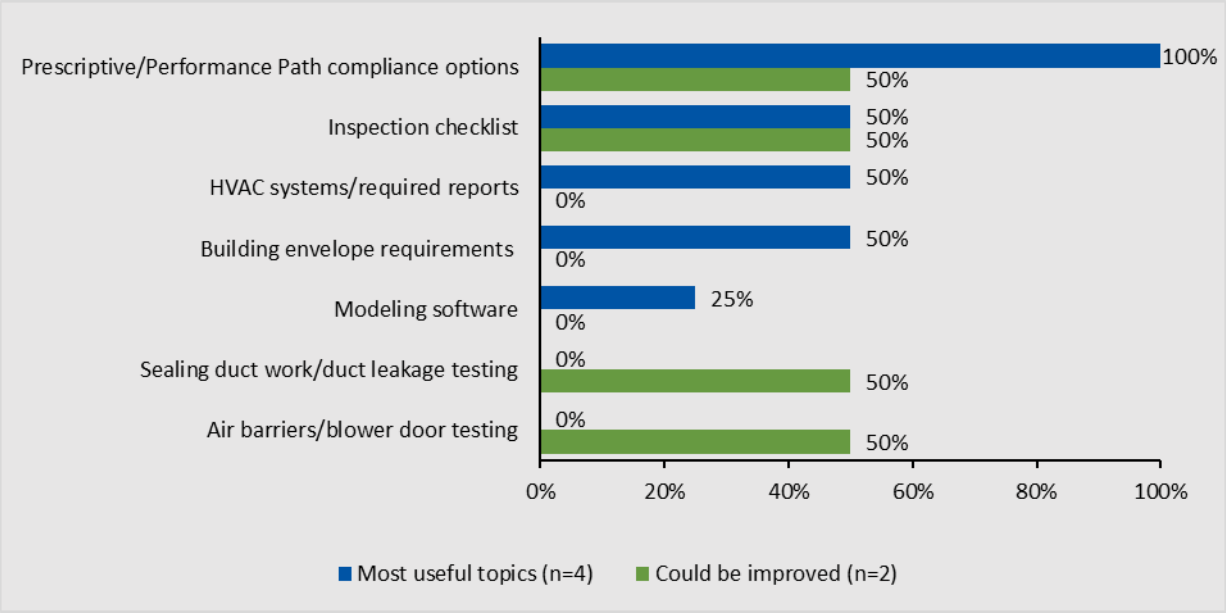
1.31. 2020 ECCCNYS for Residential Buildings: Overview (Newport Ventures)

Figure 48 shows the topics respondents who took the "2020 ECCCNYS for Residential Buildings: Overview" training found most useful and those they suggested could be improved. All respondents said

prescriptive/performance path compliance options was useful (100%). When asked which topics could be improved, respondents identified several topics.

Figure 48. Feedback on Topics Covered (2020 ECCCNYS for Residential Buildings: Overview)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

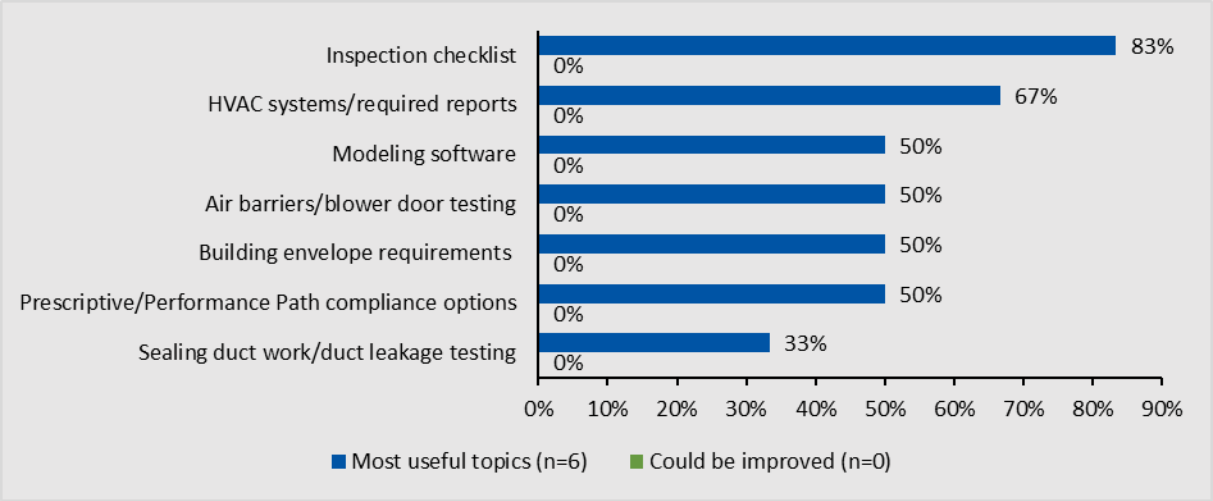


1.32. 2020 ECCCNYS for Commercial Buildings: Overview (Newport Ventures)

Figure 49 shows the topics respondents who took the "2020 ECCCNYS for Commercial Buildings: Overview" training found most useful and those they suggested could be improved. Most respondents said inspection checklist was useful (83%). None of the respondents chose a topic that could be improved.

Figure 49. Feedback on Topics Covered (2020 ECCCNYS for Commercial Buildings: Overview)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

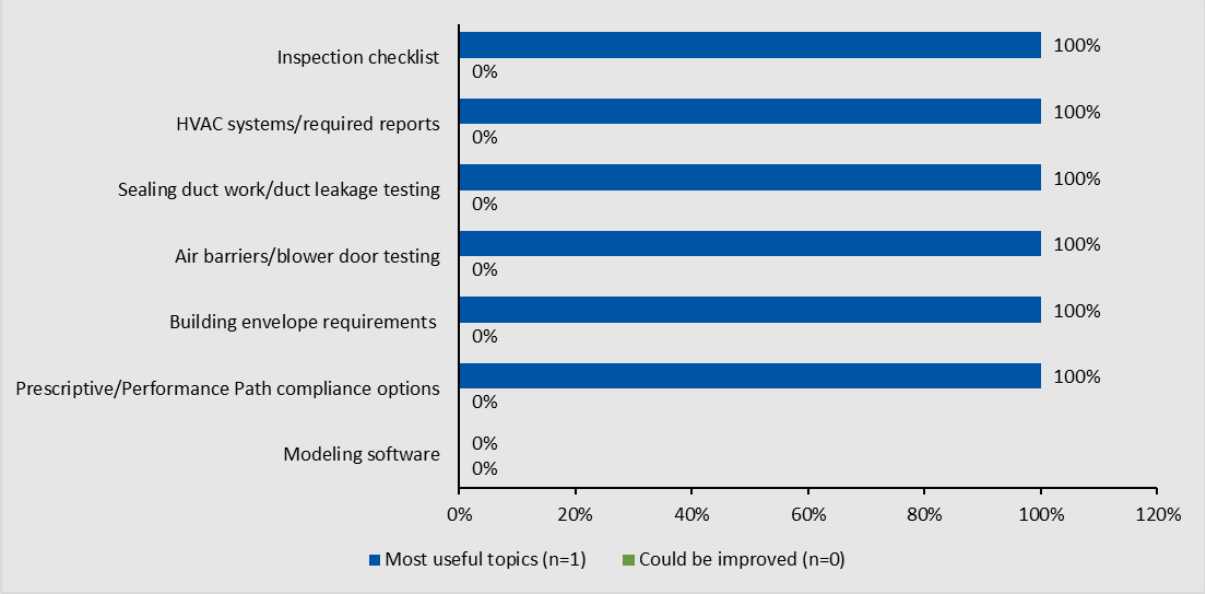


1.33. Energy Code Enforcement Training (Newport Ventures)

Figure 50 shows the topics respondents who took the "Energy Code Enforcement Training" found most useful and those they suggested could be improved. Only one of the respondents answered. They said all topics except modeling software were useful and none need improvement.

Figure 50. Feedback on Topics Covered (Energy Code Enforcement Training)

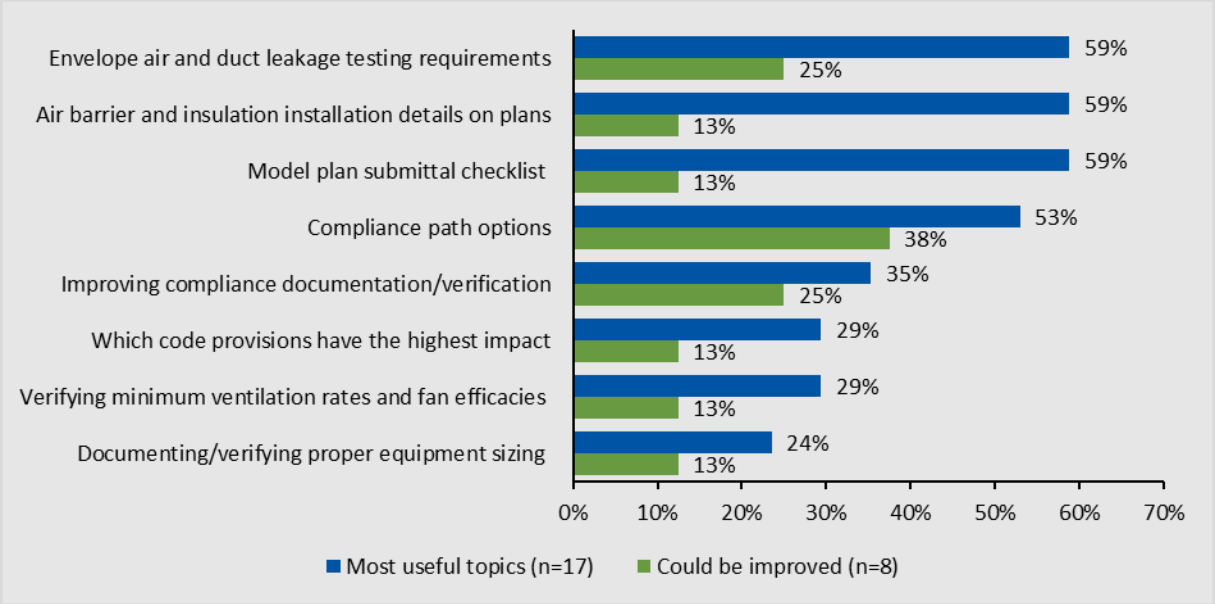
Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.



1.34. R1.1 A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews 15 Minutes or Less (PSD)

Figure 51 shows the topics respondents who took the "A Process for Energy Code Compliance and Enforcement/Energy Code Plan Reviews 15 Minutes or Less" training found most useful and those they suggested could be improved. The most useful topics according to respondents were envelope air and duct leakage testing requirements, air barrier and insulation installation details on plans, and model plan submittal checklist (each 59%). When asked which topics could be improved, 25% of respondents identified compliance path options.

Figure 51. Feedback on Topics Covered (R1.1 A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews 15 Minutes or Less)

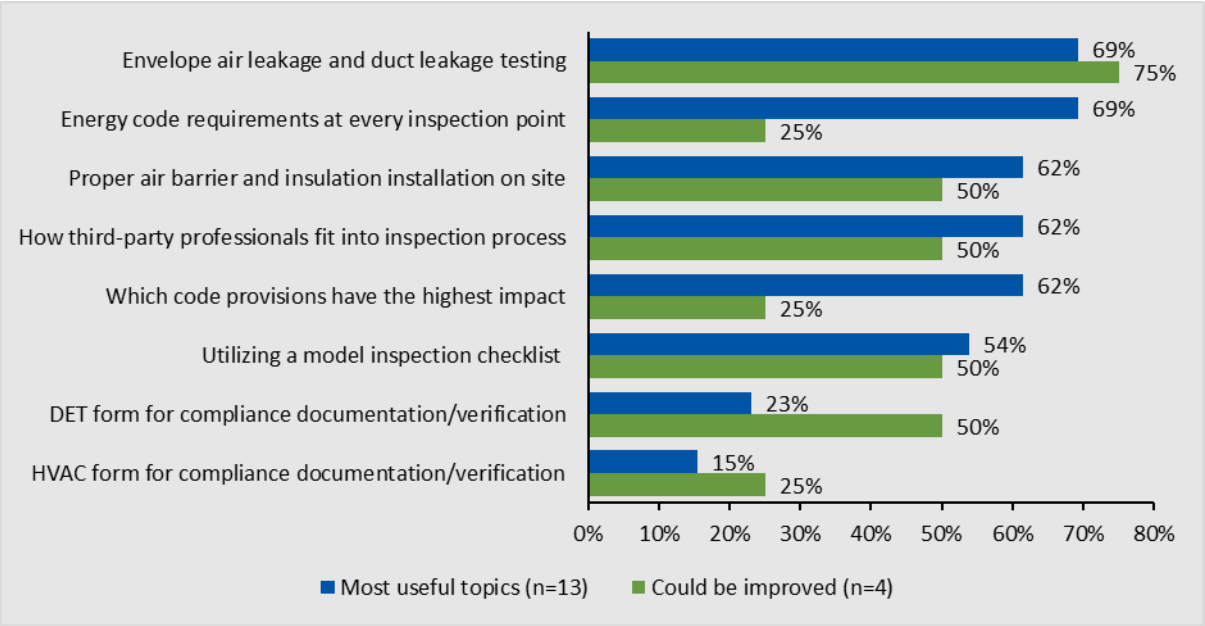


1.35. R1.2 – A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less (PSD)

Figure 52 shows the topics respondents who took the "A Process for Energy Code Compliance and Enforcement/Energy Code Inspections in 15 Minutes or Less" training found most useful and those they suggested could be improved. Respondents said the most useful topics were envelope air leakage and duct leakage testing and energy code requirements at every inspection point (both 69%). Respondents suggested that the former topic also needs improvement (75%).

Figure 52. Feedback on Topics Covered (R1.2 – A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

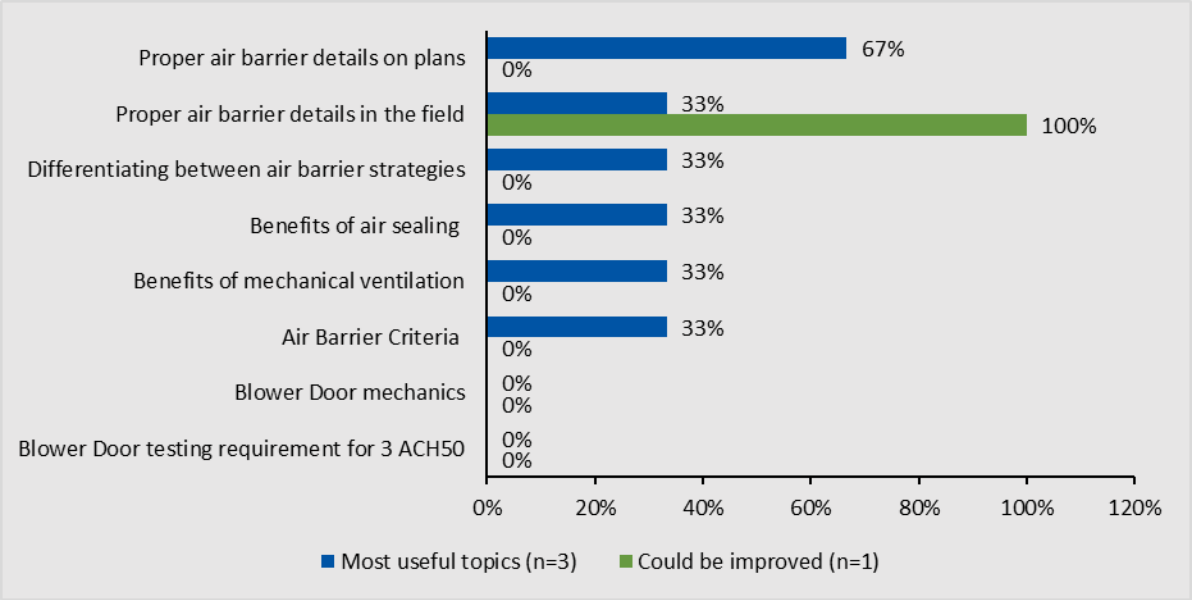


1.36. R2.1 Air Sealing to 3 ACH50 (PSD)

Figure 53 shows the topics respondents who took the "Air Sealing to 3 ACH50" training found most useful and those they suggested could be improved. Respondents said the most useful topic was proper air barrier details on plans (67%), and the topic that could be improved most was proper air barrier details in the field (60%).

Figure 53. Feedback on Topics Covered (R2.1 Air Sealing to 3 ACH50)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

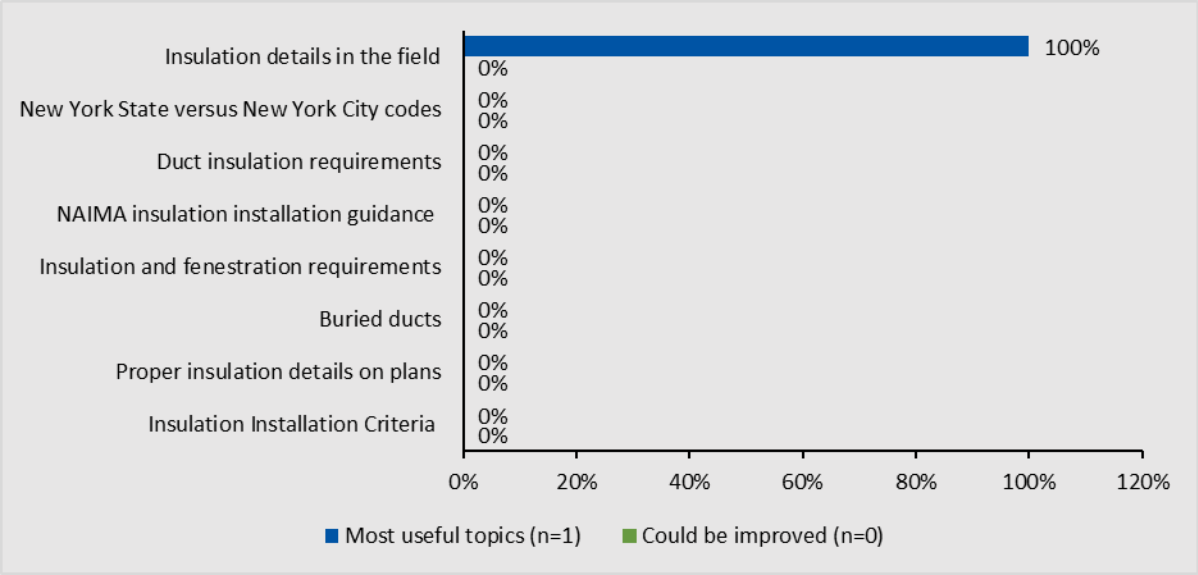


1.37. R2.2 Other IECC Envelope Requirements (PSD)

Figure 54 shows the topics respondents who took the "Other IECC Envelope Requirements" training found most useful and those they suggested could be improved. Only one of the respondents answered. They said insulation details in the field was most useful and none of the topics need improvement.

Figure 54. Feedback on Topics Covered (R2.2 Other IECC Envelope Requirements)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

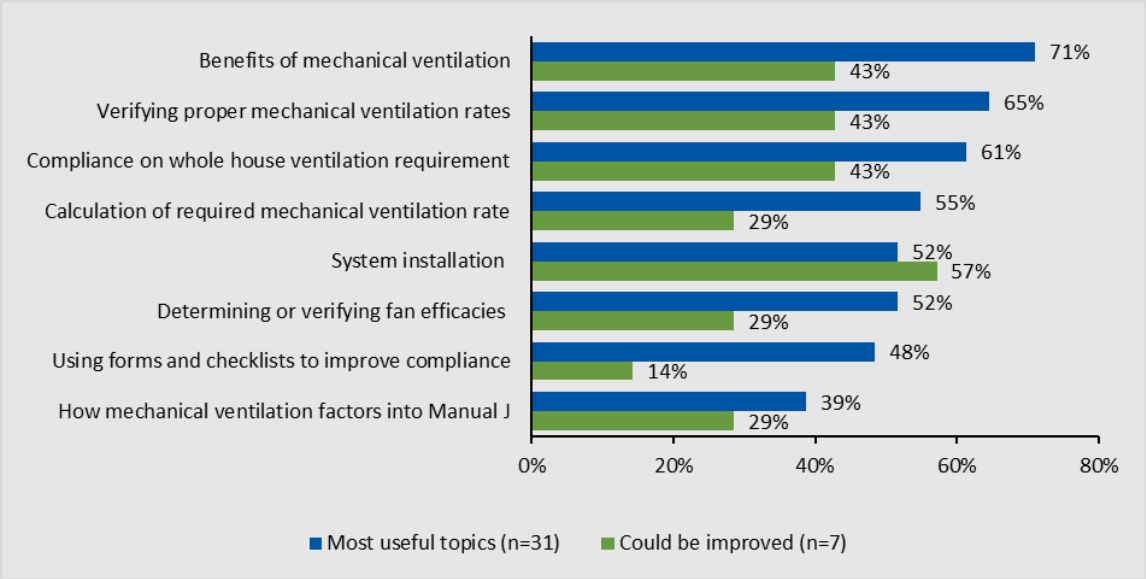


1.38. R3.1 Whole-house Mechanical Ventilation (PSD)

Figure 55 shows the topics respondents who took the "Whole-house Mechanical Ventilation" training found most useful and those they suggested could be improved. The most useful topic was benefits of mechanical ventilation (71%). When asked what topics could be improved, 57% of respondents identified system installation.

Figure 55. Feedback on Topics Covered (R3.1 Whole-house Mechanical Ventilation)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

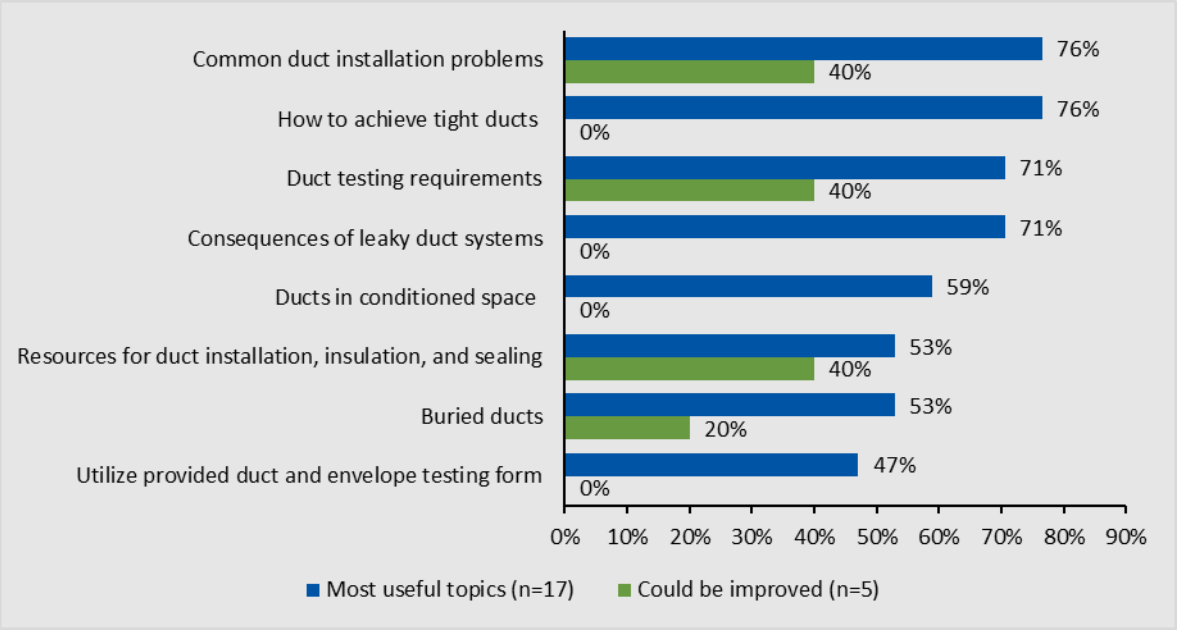


1.39. R3.2 Efficient Forced Air Distribution (PSD)

Figure 56 shows the topics respondents who took the "Efficient Forced Air Distribution" training found most useful and those they suggested could be improved. The most useful topics were common duct installation problems and how to achieve tight ducts (each 76%). When asked which topics could be improved, respondents most commonly identified resources for duct installation, insulation, and sealing; common duct installation problems; and duct testing requirements (each 40%).

Figure 56. Feedback on Topics Covered (R3.2 Efficient Forced Air Distribution)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

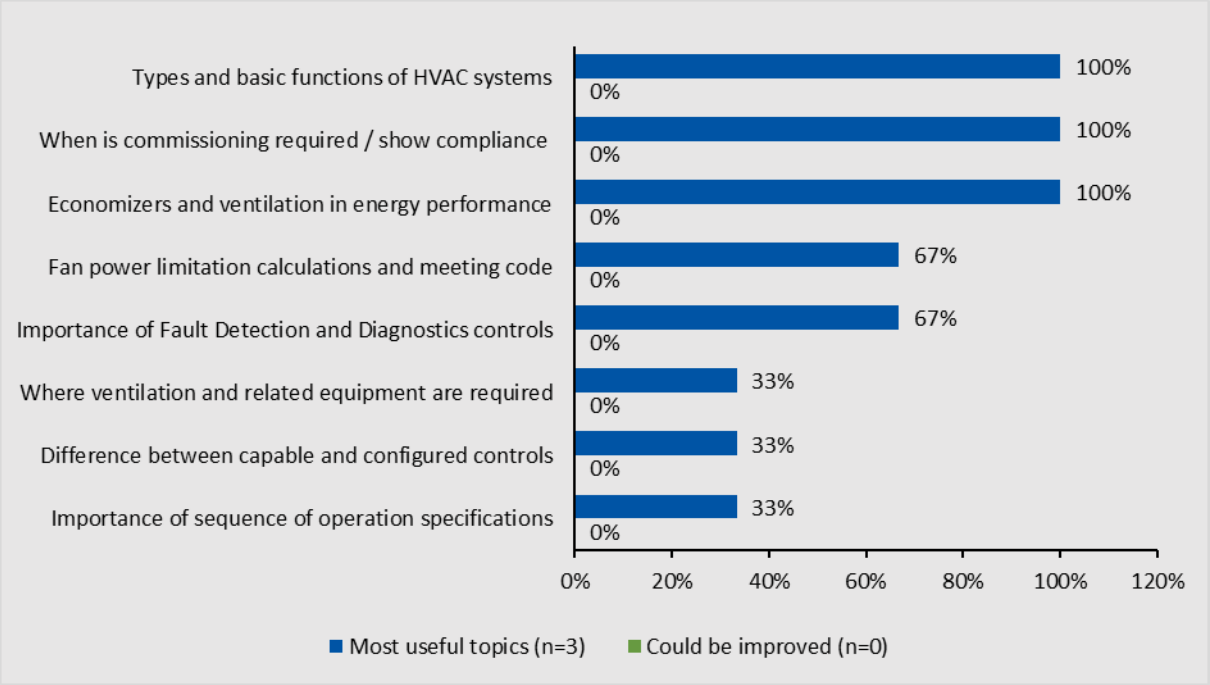


1.40. C1.1 ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems (PSD)

Figure 57 shows the topics respondents who took the "ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems" training found most useful and those they suggested could be improved. The most useful topics were types and basic functions of HVAC systems; when is commissioning required/show compliance; and economizers and ventilation in energy performance (each 100%). Respondents did not identify any topics that need improvement.

Figure 57. Feedback on Topics Covered (C1.1 ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems Buildings)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

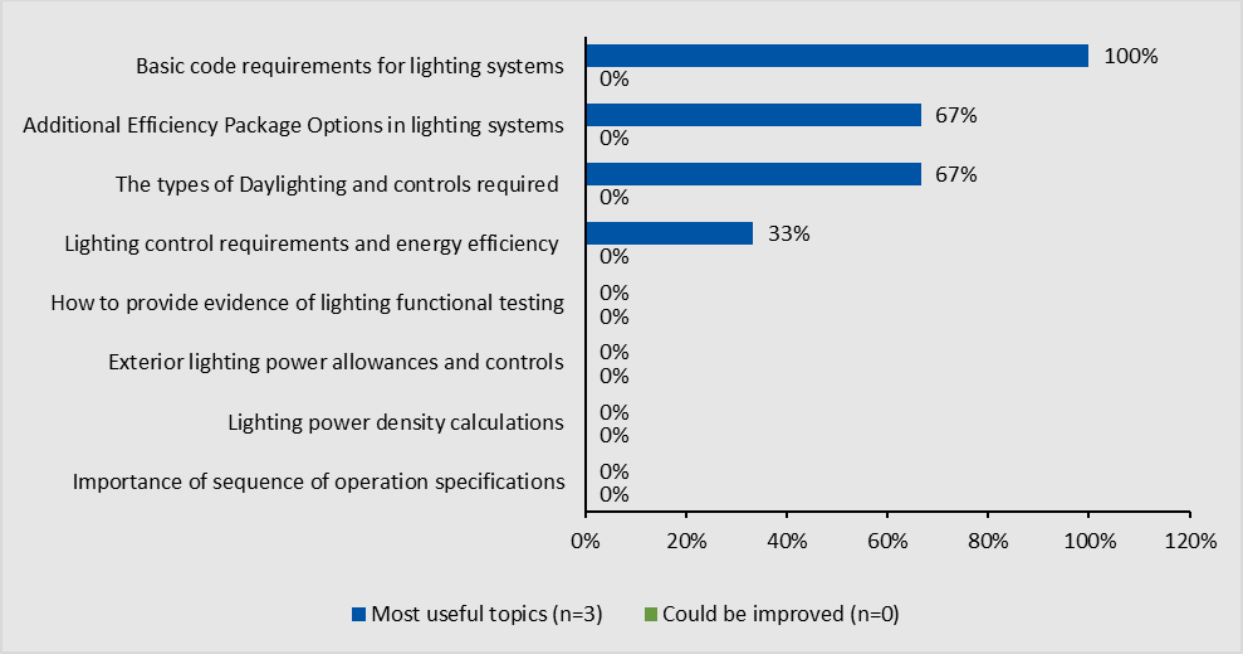


1.41. C1.2 ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems (PSD)

Figure 58 shows the topics respondents who took the "ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems" training found most useful and those they suggested could be improved. According to respondents, the most useful topic was information on basic code requirements for lighting systems (100%). Respondents indicated that none of the topics need improvement.

Figure 58. Feedback on Topics Covered (C1.2 ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

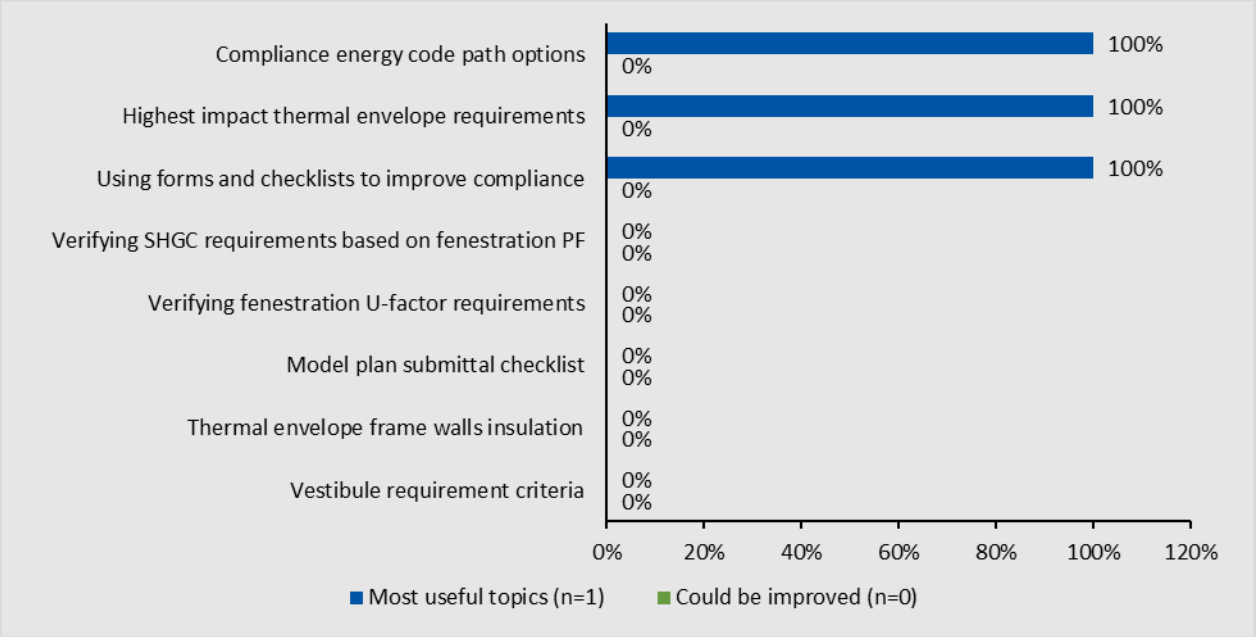


1.42. C2.1 Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1) (PSD)

Figure 59 shows the topics respondents who took the "Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)" training found most useful and those they suggested could be improved. Only one respondent answered this question. They reported that three topics were most useful: compliance energy code path options, highest impact thermal envelope requirements, and using forms and checklists to improve compliance. They also reported that none of the topics need improvement.

Figure 59. Feedback on Topics Covered (C2.1 Prioritizing ECCCNYS Enforcement for Commercial Buildings Pt 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

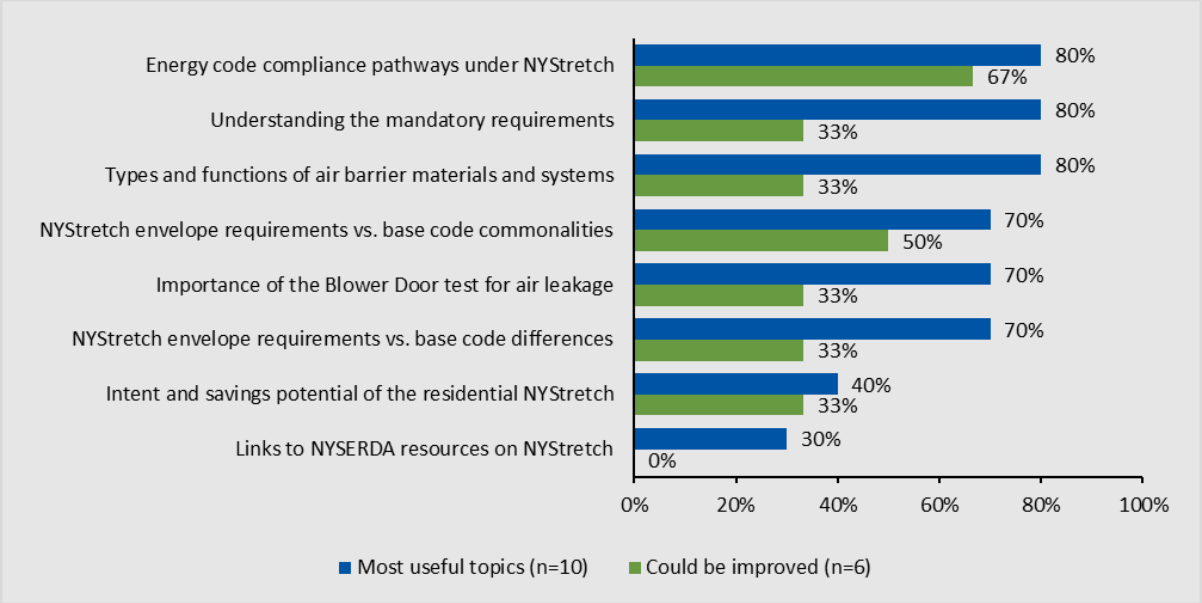


1.43. S2.1 NYStretch Overview and Thermal Envelope Requirements Part 1 (PSD)

Figure 60 shows the topics respondents who took the "NYStretch Overview and Thermal Envelope Requirements Part 1" training found most useful and those they suggested could be improved. Respondents said the most useful topics were energy code compliance pathways under NYStretch, understanding the mandatory requirements, and types and functions of air barrier materials and systems (each 80%). Respondents suggested energy code compliance pathways under NYStretch topic could use improvement (67%).

Figure 60. Feedback on Topics Covered (S2.1 NYStretch Overview and Thermal Envelope Requirements)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

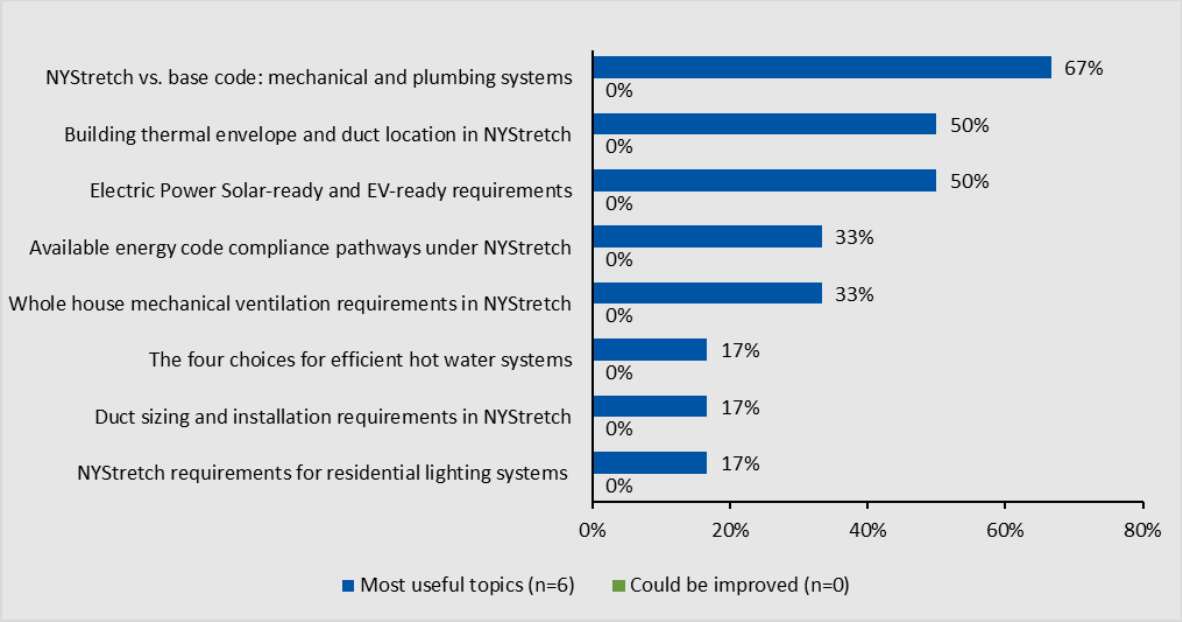


1.44. S2.2 NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2 (PSD)

Figure 61 shows the topics respondents who took the "NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2" training found most useful and those they suggested could be improved. Respondents reported that the most useful topic was NYStretch vs. base code: mechanical and plumbing systems (67%). Respondents did not suggest any topics that could use improvement.

Figure 61. Feedback on Topics Covered (S2.2 NYStretch Mechanical, Plumbing, Lighting, and Electric Power)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

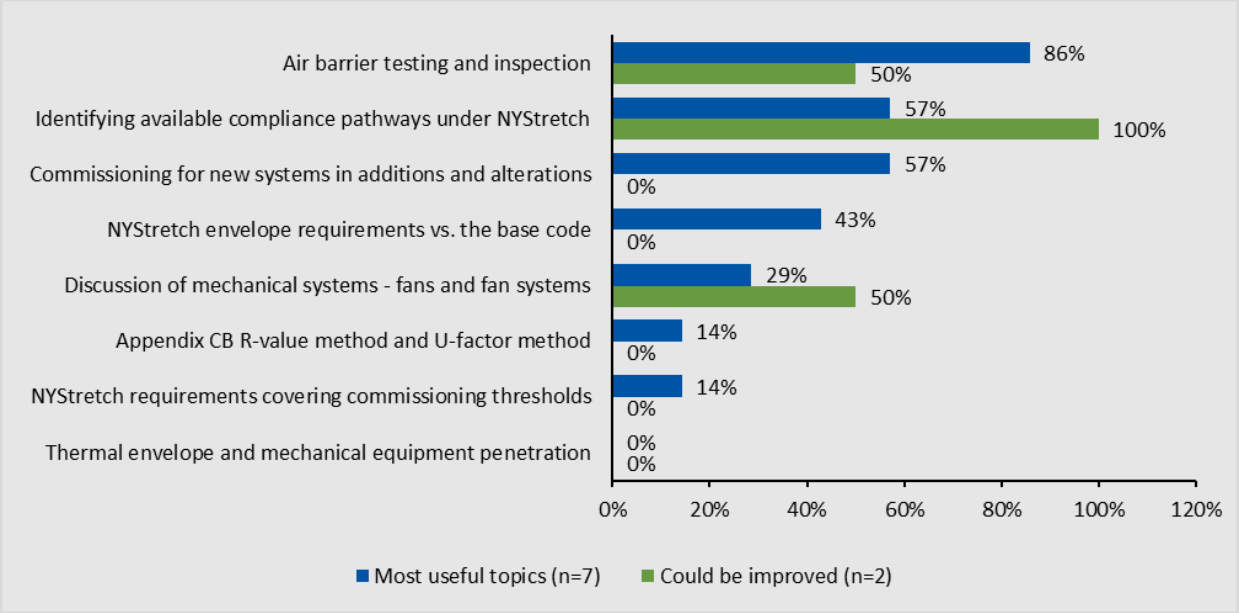


1.45. S3.1 NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations (PSD)

Figure 62 shows the topics respondents who took the "NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations" training found most useful and those they suggested could be improved. Respondents rated air barrier testing and inspection as the most useful topic (86%). Respondents suggested that identifying available compliance pathways under NYStretch could use improvement (100%).

Figure 62. Feedback on Topics Covered (S3.1 NYStretch Energy Code for Commercial Buildings Part 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

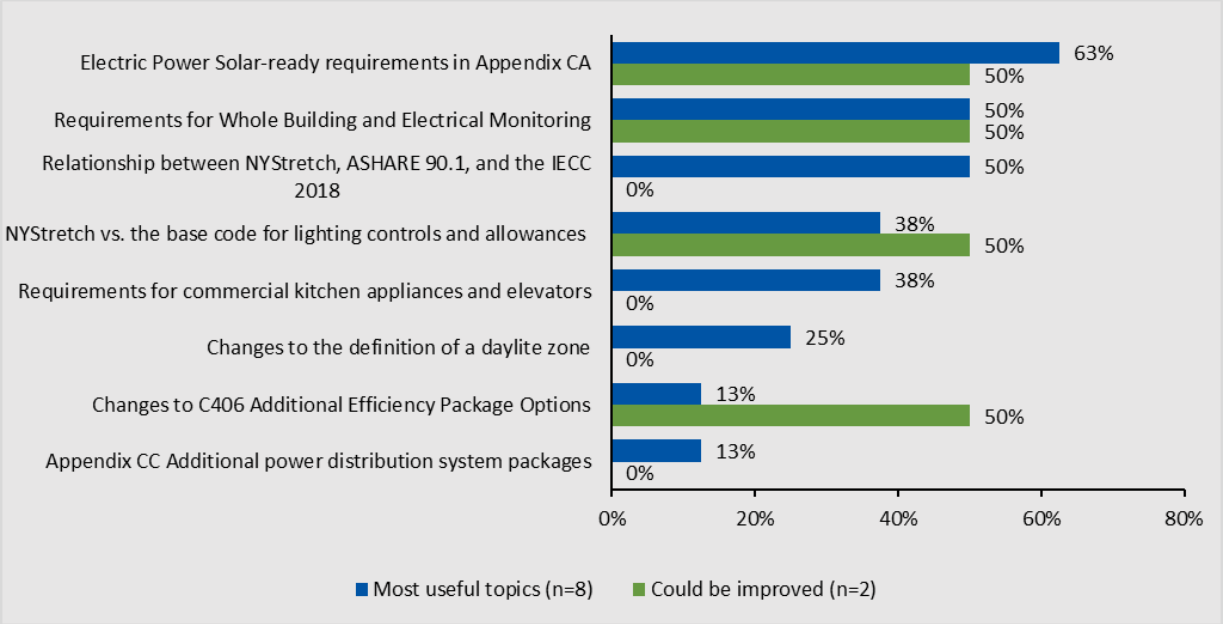


1.46. S3.2 NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices (PSD)

Figure 63 shows the topics respondents who took the "NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices" training found most useful and those they suggested could be improved. The most useful topic according to respondents was electric power solar-ready requirements in Appendix CA (63%). Respondents suggested that several topics could use improvement (each 50%).

Figure 63. Feedback on Topics Covered (S3.2 NYStretch Energy Code for Commercial Buildings Part 2)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

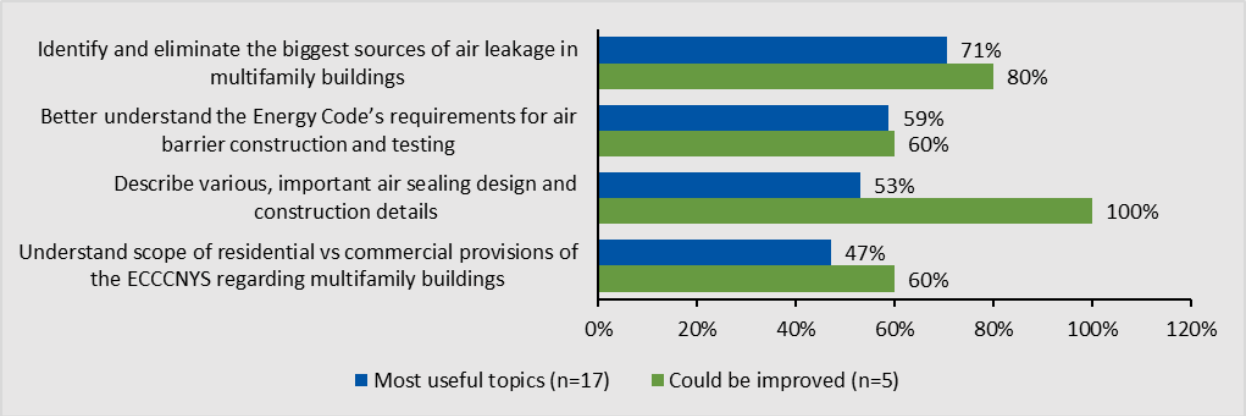


1.47. M1.1 Multifamily Air Sealing (PSD)

Figure 64 shows the topics respondents who took the "Multifamily Air Sealing" training found most useful and those they suggested could be improved. The most useful topic cited by respondents was identifying and eliminating the biggest sources of air leakage in multifamily buildings (71%). Respondents suggested that describing various, important air sealing design and construction details could use improvement (100%).

Figure 64. Feedback on Topics Covered (M1.1 Multifamily Air Sealing)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

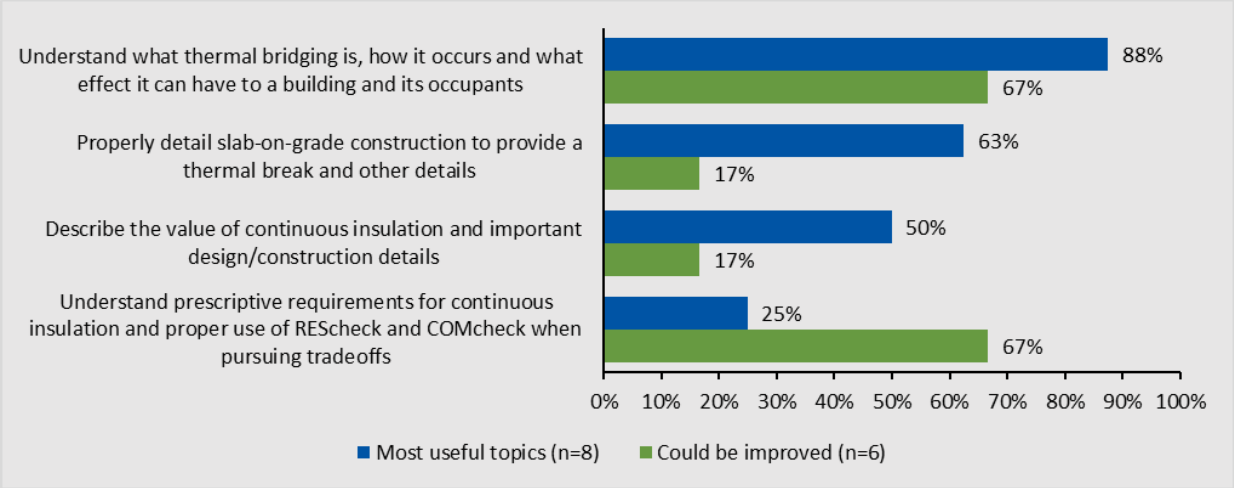


1.48. M1.2 Multifamily Thermal Bridging (PSD)

Figure 65 shows the topics respondents who took the "Multifamily Thermal Bridging" training found most useful and those they suggested could be improved. The most useful topic according to respondents was understanding thermal bridging, how it occurs, and what effect it can have (88%). Respondents suggested that this topic, in addition to understanding prescriptive requirements for continuous insulation and proper use of REScheck and COMcheck, could use improvement (each 67%).

Figure 65. Feedback on Topics Covered (M1.2 Multifamily Thermal Bridging)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

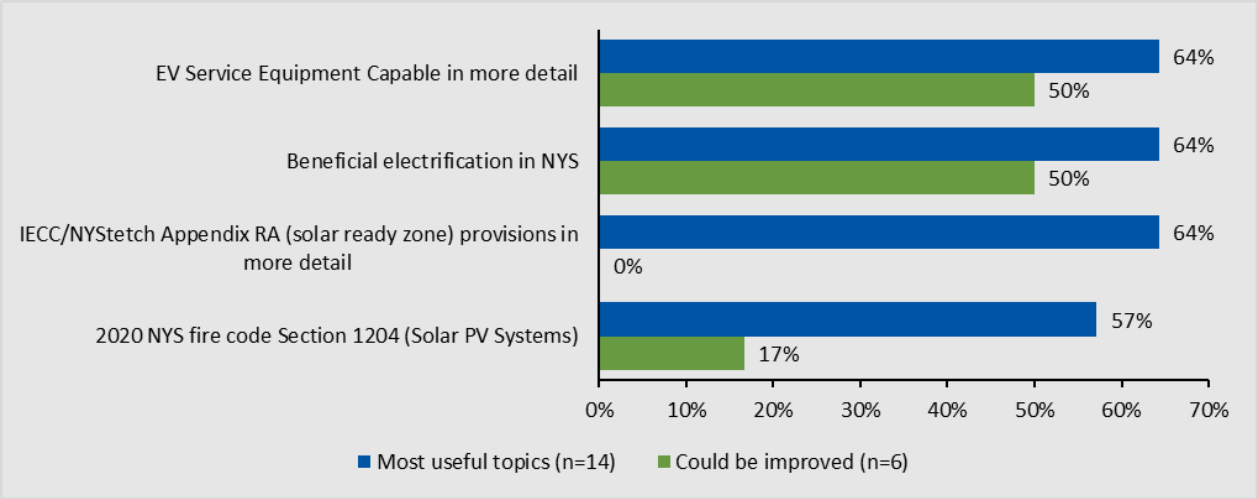


1.49. R4.0 Electrifying the Energy Code - Residential (PSD)

Figure 66 shows the topics respondents who took the "Electrifying the Energy Code - Residential" training found most useful and those they suggested could be improved. All topics were selected as useful by at least half the respondents, and respondents suggested that EV service equipment capable in more detail and beneficial electrification in NYS could use improvement (53%).

Figure 66. Feedback on Topics Covered (R4.0 Electrifying the Energy Code - Residential)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

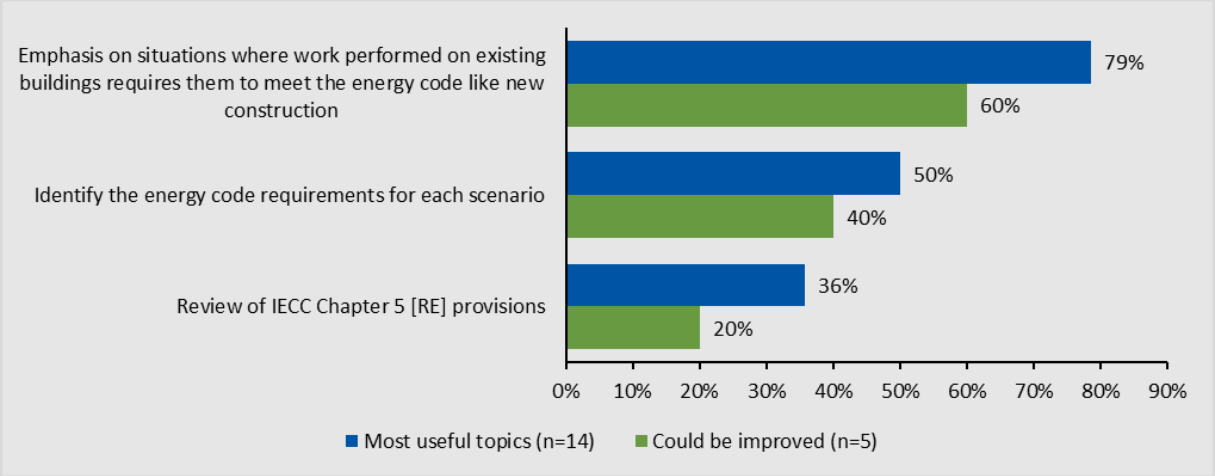


1.50. R5.1 The Energy Code and Existing Buildings – Residential Part 1 Additions (PSD)

Figure 67 shows the topics respondents who took the "The Energy Code and Existing Buildings – Residential Part 1 Additions" training found most useful and those they suggested could be improved. Respondents selected emphasis on situations where work performed on existing buildings requires officials to meet the energy code as the most useful topic (79%). Respondents suggested the same topic could use improvement (60%).

Figure 67. Feedback on Topics Covered (R5.1 The Energy Code and Existing Buildings – Residential Part 1 Additions)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

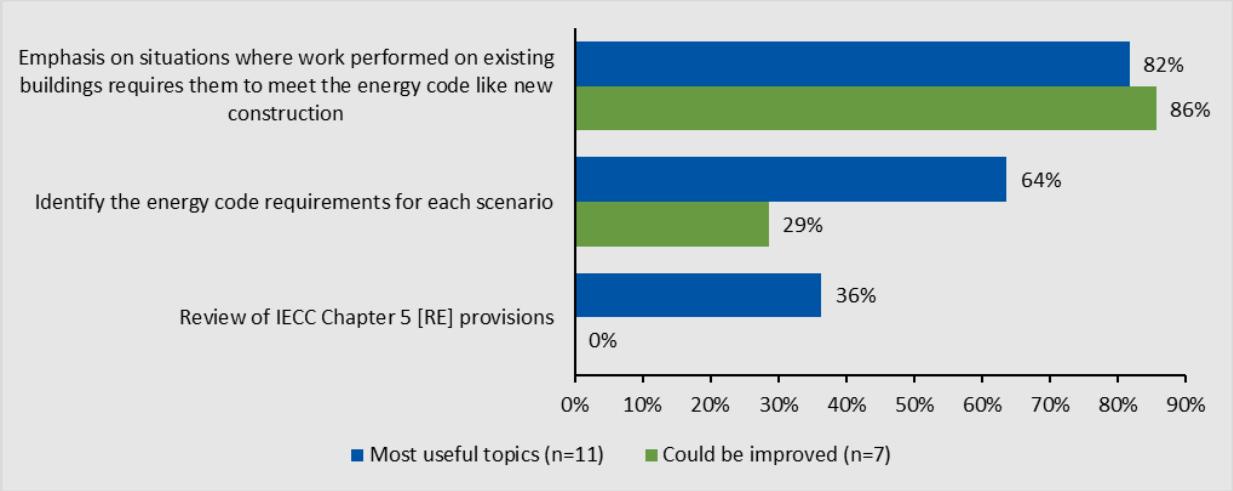


1.51. R5.2 – The Energy Code and Existing Buildings – Residential Part 2 Alterations, Repairs, and Changes of Occupancy or Use (PSD)

Figure 68 shows the topics respondents who took the "The Energy Code and Existing Buildings – Residential Part 2 Alterations, Repairs, and Changes of Occupancy or Use" training found most useful and those they suggested could be improved. The most useful topic according to respondents was emphasis on situations where work performed on existing buildings requires officials to meet the energy code (82%). Respondents suggested the same topic could use improvement (86%).

Figure 68. Feedback on Topics Covered (R5.2 - The Energy Code and Existing Buildings – Residential Part 2 Alterations, Repairs, and Changes of Occupancy or Use)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

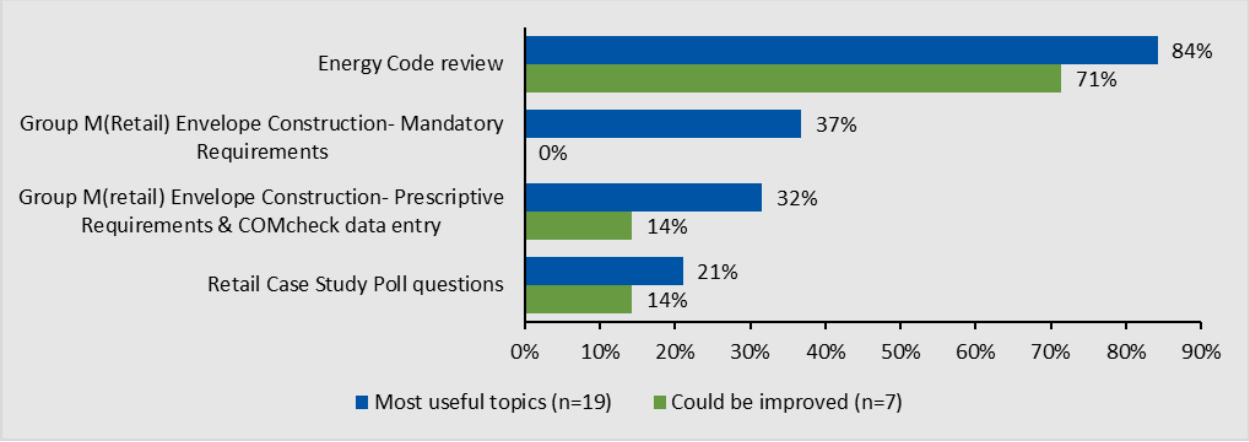


1.52. C3.1 – NY Energy Codes for Simple Buildings – Part 1: Retail Building (PSD)

Figure 69 shows the topics respondents who took the "NY Energy Codes for Simple Buildings – Part 1: Retail Building" training found most useful and those they suggested could be improved. Respondents indicated that the most useful topic was energy code review (84%). Respondents suggested that the same topic could use improvement (71%).

Figure 69. Feedback on Topics Covered (C3.1 – NY Energy Codes for Simple Buildings – Part 1: Retail Building)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

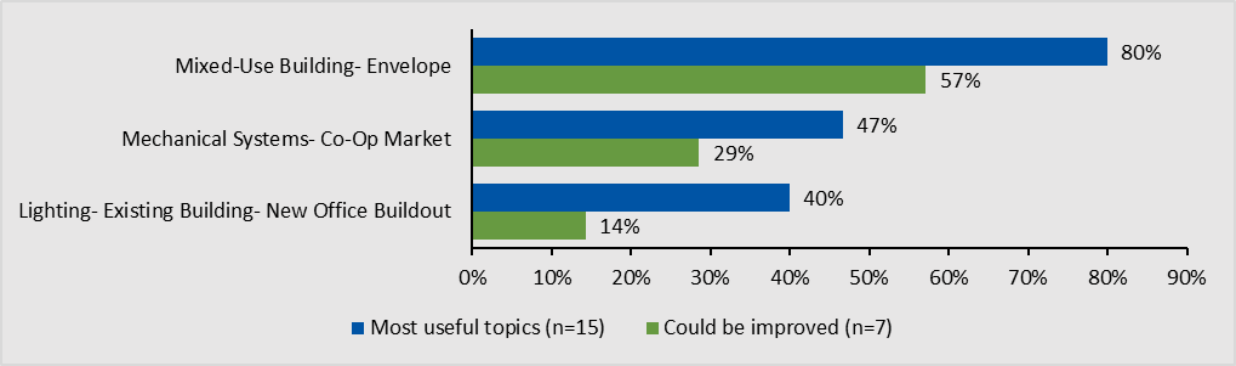


1.53. C3.2 – NY Energy Code for Simple Commercial Buildings – Part 2: Mixed-Use Apartment, Grocery, and Office Building (PSD)

Figure 70 shows the topics respondents who took the "NY Energy Code for Simple Commercial Buildings – Part 2: Mixed-Use Apartment, Grocery, and Office Building" training found most useful and those they suggested could be improved. The most useful topic as cited by respondents was mixed-use building envelope (80%). Respondents suggested that the same topic could use the most improvements (57%).

Figure 70. Feedback on Topics Covered (C3.2 – NY Energy Code for Simple Commercial Buildings – Part 2: Mixed-Use Apartment, Grocery, and Office Building)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

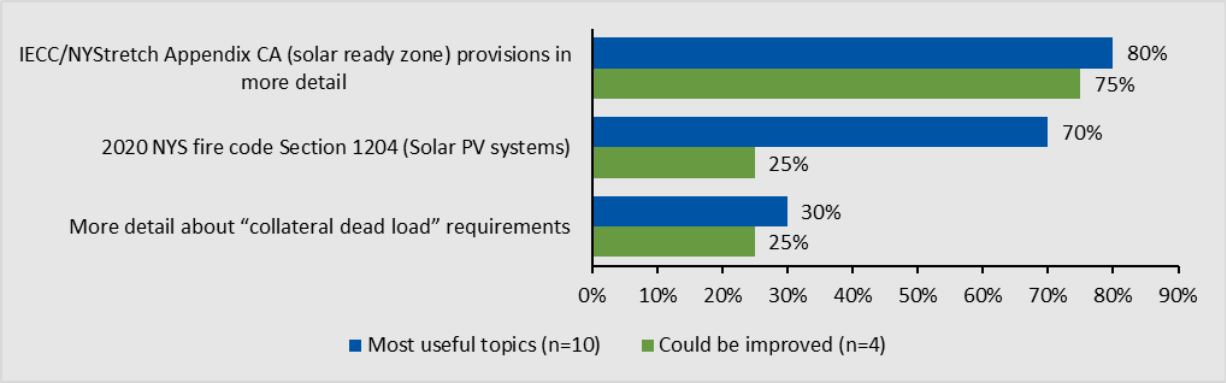


1.54. C4.1 – Electrifying the Energy Code – Commercial Part 1 (PSD)

Figure 71 shows the topics respondents who took the "Electrifying the Energy Code – Commercial Part 1" training found most useful and those they suggested could be improved. The most useful topic according to respondents was IECC/NYStretch Appendix CA provisions in more detail (80%). Respondents suggested that the same topic could use improvement (75%).

Figure 71. Feedback on Topics Covered (C4.1 – Electrifying the Energy Code – Commercial Part 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

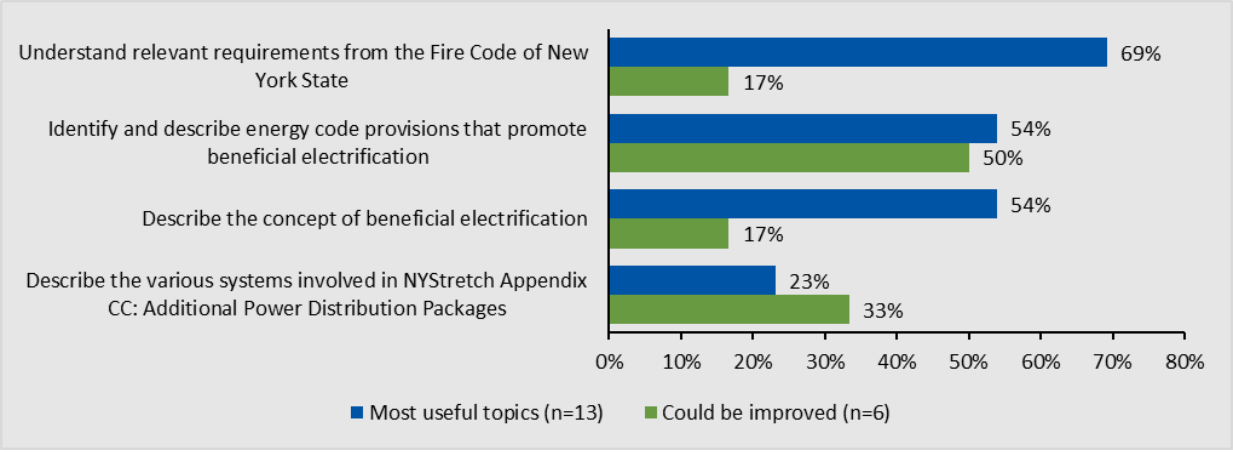


1.55. C4.2 – Electrifying the Energy Code – Commercial Part 2 (PSD)

Figure 72 shows the topics respondents who took the "Electrifying the Energy Code – Commercial Part 2" training found most useful and those they suggested could be improved. Respondents reported that the most useful topic was understanding relevant requirements from the Fire Code of NYS (69%). Respondents suggested identifying and describing energy code provisions that promote beneficial electrification could use improvement (50%).

Figure 72. Feedback on Topics Covered (C4.2 - Electrifying the Energy Code – Commercial Part 2)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

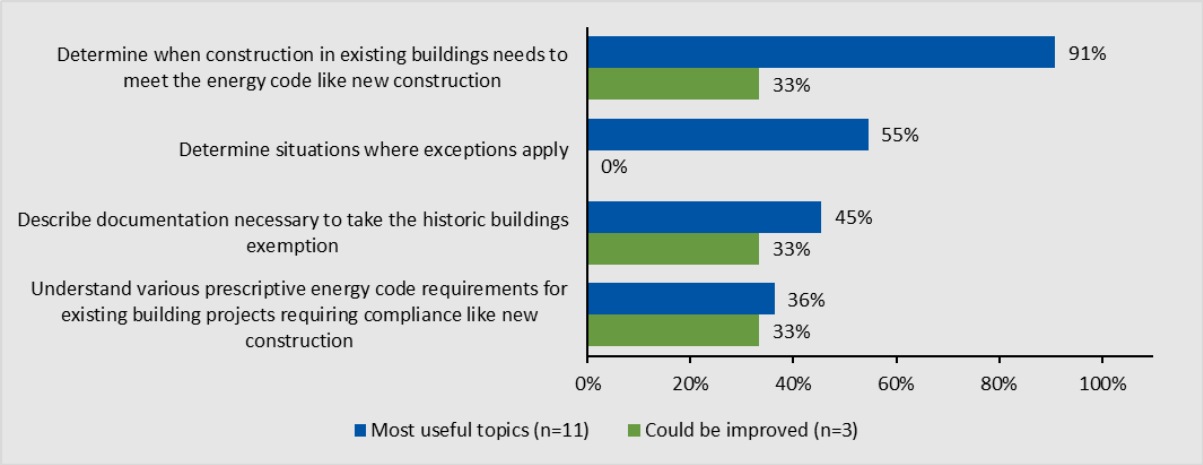


1.56. C5.1 – The Energy Code and Existing Buildings (Commercial) – Part 1 (PSD)

Figure 73 shows the topics respondents who took the "The Energy Code and Existing Buildings (Commercial) – Part 1" training found most useful and those they suggested could be improved. The most useful topic to respondents was determining when construction in existing buildings needs to meet the energy code like new construction (91%). Respondents suggested that three of the four topics could use improvement (each 33%).

Figure 73. Feedback on Topics Covered (C5.1 - The Energy Code and Existing Buildings (Commercial) – Part 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

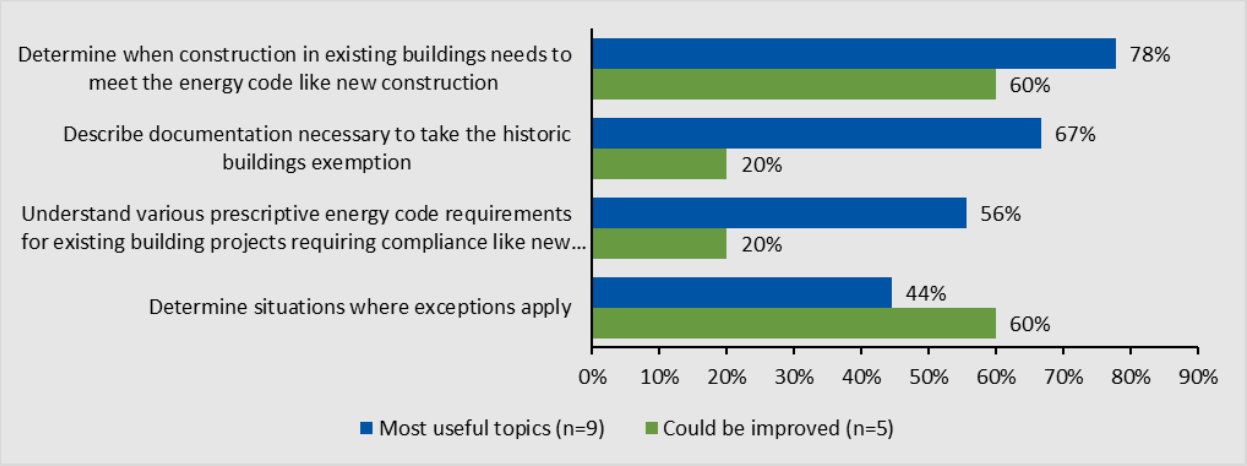


1.57. C5.2 – The Energy Code and Existing Buildings (Commercial) – Part 2 (PSD)

Figure 74 shows the topics respondents who took the "The Energy Code and Existing Buildings (Commercial) – Part 2" training found most useful and those they suggested could be improved. Respondents rated as the most useful topic determining when construction in existing buildings needs to meet the energy code like new construction (78%). Respondents suggested that the same topic, along with determining where exceptions apply, could use improvement (each 60%).

Figure 74. Feedback on Topics Covered (C5.2 – The Energy Code and Existing Buildings (Commercial) – Part 2)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

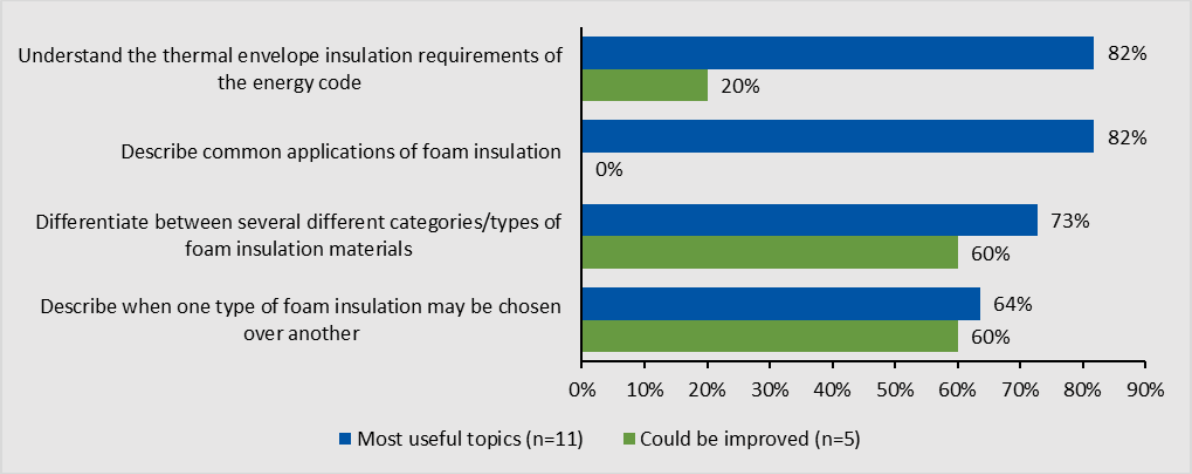


1.58. R6.1 – Don't Be Left Exposed – Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation (PSD)

Figure 75 shows the topics respondents who took the "Don't Be Left Exposed – Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation" training found most useful and those they suggested could be improved. The most useful topics to respondents were understanding the thermal envelope insulation requirements and describing common applications of foam insulation (82%). Respondents suggested that differentiating between several different categories/types of foam insulation materials and describing when one type of foam insulation may be chosen over another could use improvement (each 60%).

Figure 75. Feedback on Topics Covered (R6.1 – Don't Be Left Exposed – Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

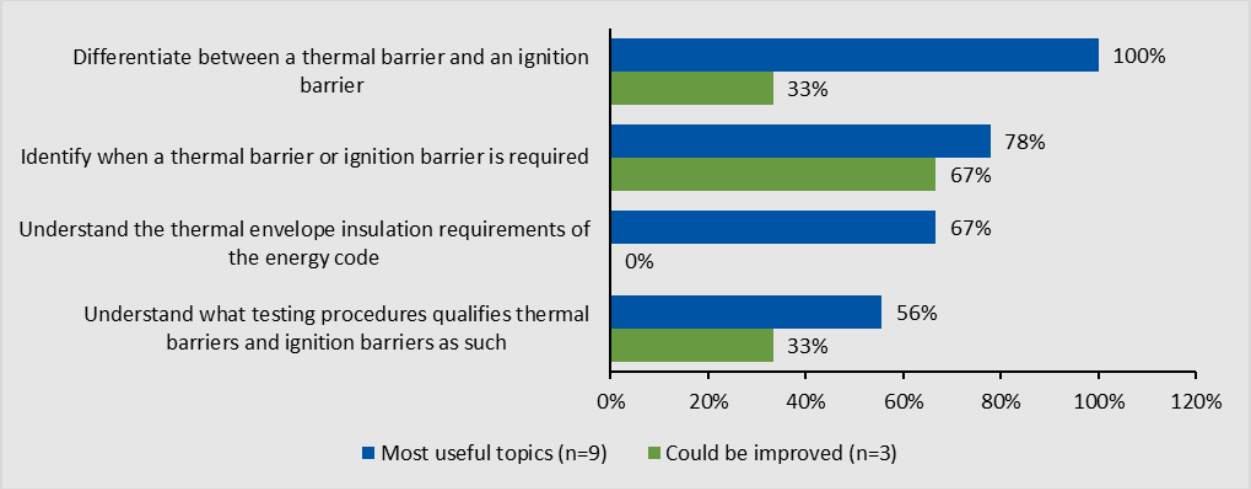


1.59. R6.2 – Don't Be Left Exposed – Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation (PSD)

Figure 76 shows the topics respondents who took the "Don't Be Left Exposed – Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation" training found most useful and those they suggested could be improved. Respondents reported that the most useful topic was differentiating between a thermal barrier and an ignition barrier (100%). Respondents suggested that identifying when a thermal barrier or ignition barrier is required could use improvement (78%).

Figure 76. Feedback on Topics Covered (R6.2 – Don't Be Left Exposed – Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

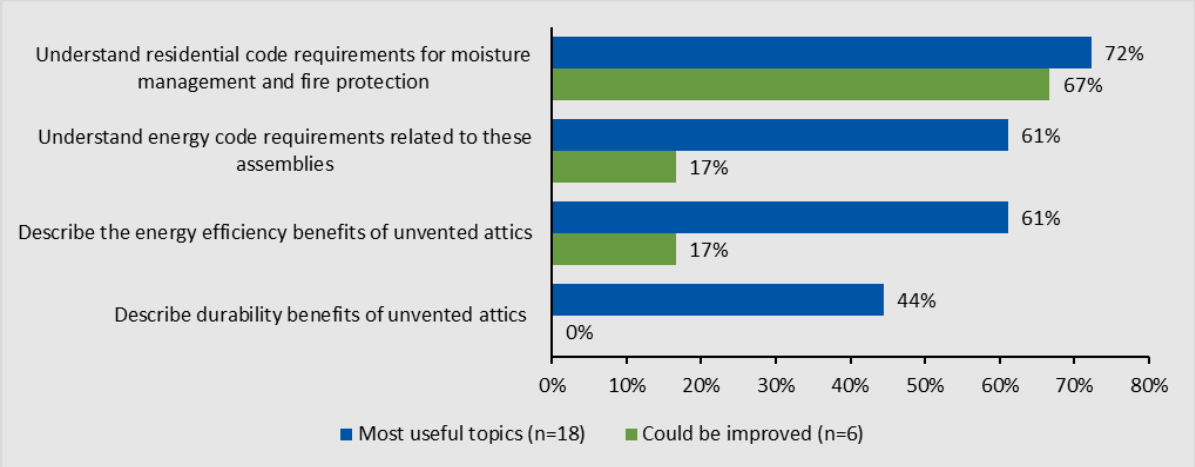


1.60. R7.1 – Put a Lid On It Part 1: Unvented Attics (PSD)

Figure 77 shows the topics respondents who took the "Put a Lid On It Part 1: Unvented Attics" training found most useful and those they suggested could be improved. The most useful topic to respondents was understanding residential code requirements for moisture management and fire protection (72%). Respondents suggested that the same topic could use improvement (67%).

Figure 77. Feedback on Topics Covered (R7.1 – Put a Lid On It Part 1: Unvented Attics)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

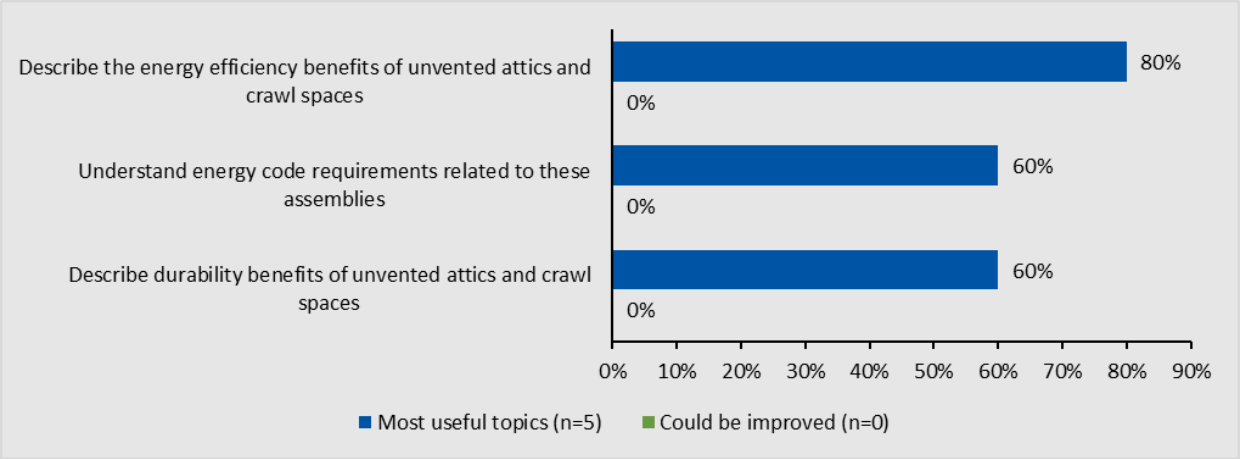


1.61. R7.2 – Put a Lid On It Part 1: Unvented Crawlspaces (PSD)

Figure 78 shows the topics respondents who took the "Put a Lid On It Part 1: Unvented Crawlspaces" training found most useful and those they suggested could be improved. According to respondents, the most useful topic was describing the energy efficiency of unvented attics and crawl spaces (80%). Respondents did not suggest any topics that could use improvement.

Figure 78. Feedback on Topics Covered (R7.2 – Put a Lid On It Part 1: Unvented Crawlspaces)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

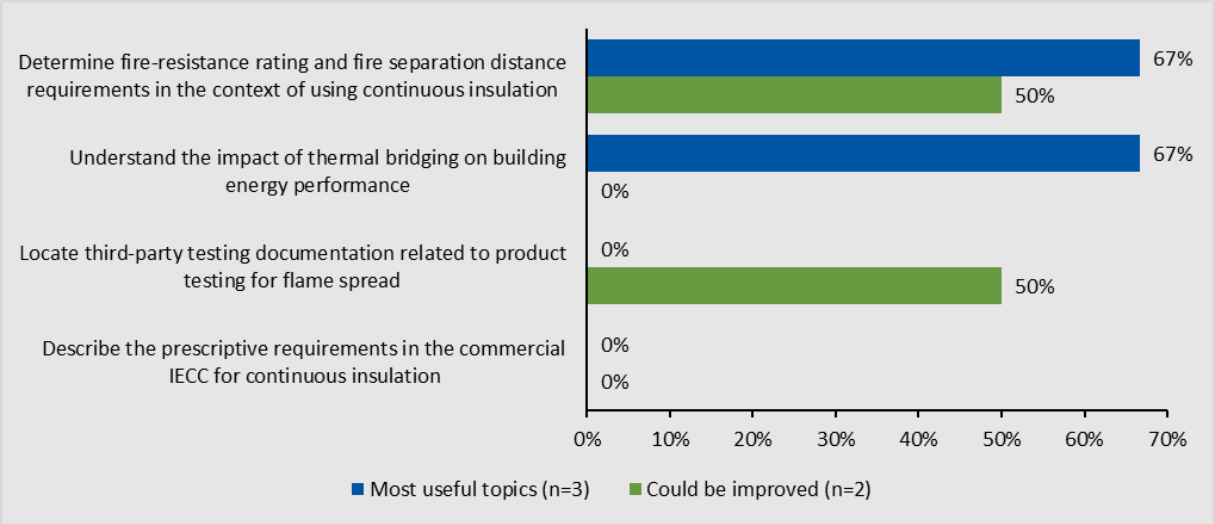


1.62. C6.1 – Foam without Flames Part 1: Thermal Bridging (PSD)

Figure 79 shows the topics respondents who took the "Foam without Flames Part 1: Thermal Bridging" training found most useful and those they suggested could be improved. Respondents cited as the most useful topics determining fire-resistance rating and fire separation distance requirements in the context of using continuous insulation and understanding the impact of thermal bridging on building energy performance (each 67%). Respondents suggested that the former topic, in addition to locating third-party testing documentation related to product testing for flame spread, could use improvement (50%).

Figure 79. Feedback on Topics Covered (R7.2 – Foam without Flames Part 1: Thermal Bridging)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

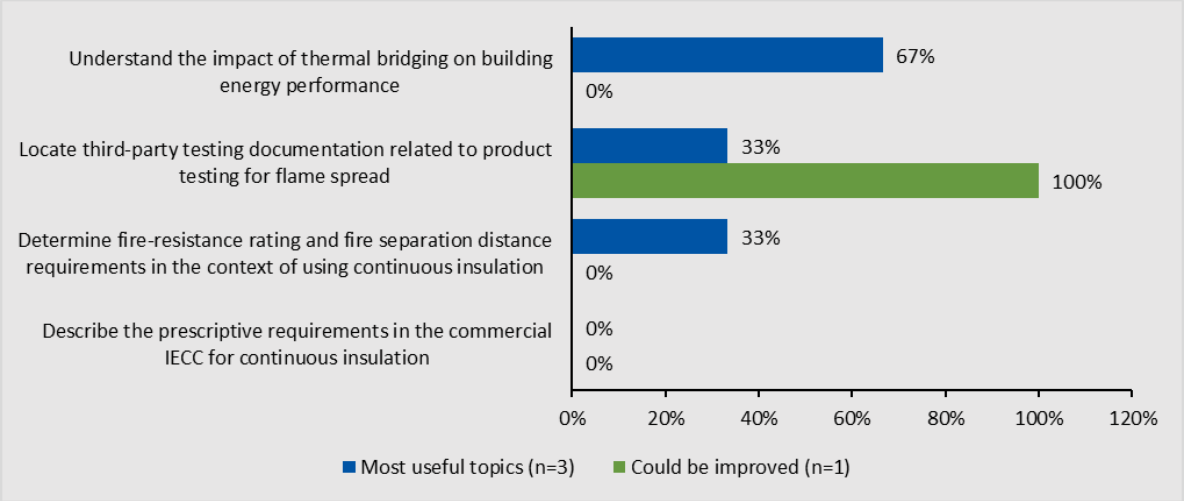


1.63. C6.2 – Foam without Flames Part 2: Fire Rated Assemblies (PSD)

Figure 80 shows the topics respondents who took the "Foam without Flames Part 2: Fire Rated Assemblies" training found most useful and those they suggested could be improved. The most useful topic to respondents was understanding the impact of thermal bridging on building energy performance (67%). Respondents suggested that locating third-party testing documentation related to product testing for flame spread could use improvement (100%).

Figure 80. Feedback on Topics Covered (R7.2 – Foam without Flames Part 2: Fire Rated Assemblies)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

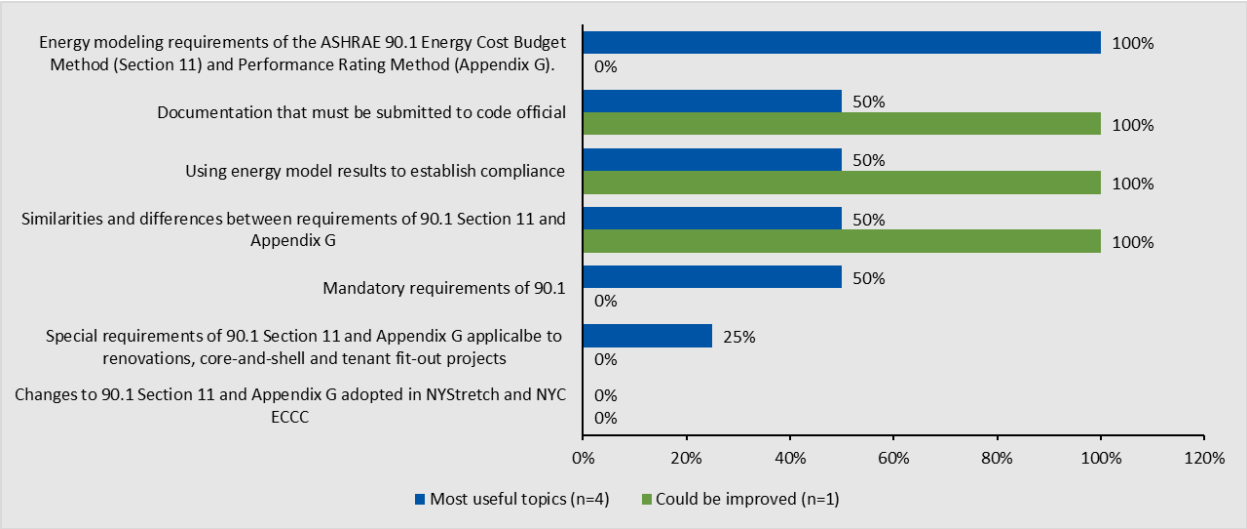


1.64. 110: Performance-Based Compliance with ASHRAE Standard 90.1 2016 (Karpman)

Figure 81 shows the topics respondents who took the "110: Performance-Based Compliance with ASHRAE Standard 90.1 2016" training found most useful and those they suggested could be improved. The most useful topic for respondents was Energy modeling requirements - ASHRAE 90.1 Energy Cost Budget Method (Section 11) and Performance Rating Method (Appendix G) (100%). Respondents suggested that similarities and differences between requirements of 90.1 Section 11 and Appendix G, using energy model results to establish compliance, and documentation that must be submitted to the code officials could use improvement (100%).

Figure 81. Feedback on Topics Covered (110: Performance-Based Compliance with ASHRAE Standard 90.1 2016)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

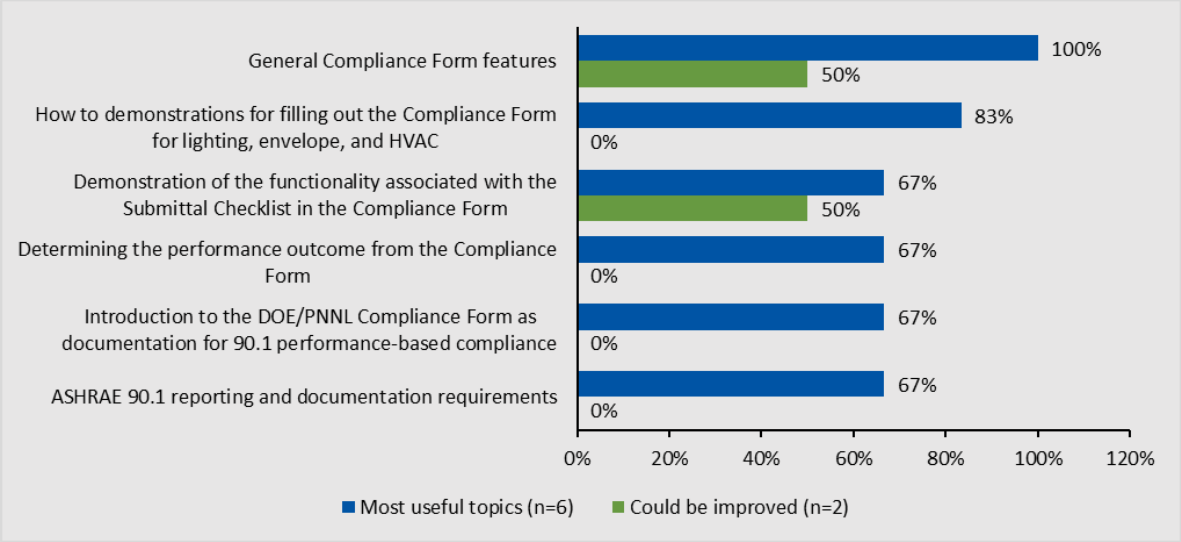


1.65. 210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G (Karpman)

Figure 82 shows the topics respondents who took the "210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G" training found most useful and those they suggested could be improved. Respondents reported that the most useful topic was general compliance form features (100%). Respondents suggested that that same topic, in addition to demonstration of the functionality associated with the submittal checklist in the compliance form, could use improvement (50%).

Figure 82. Feedback on Topics Covered (210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

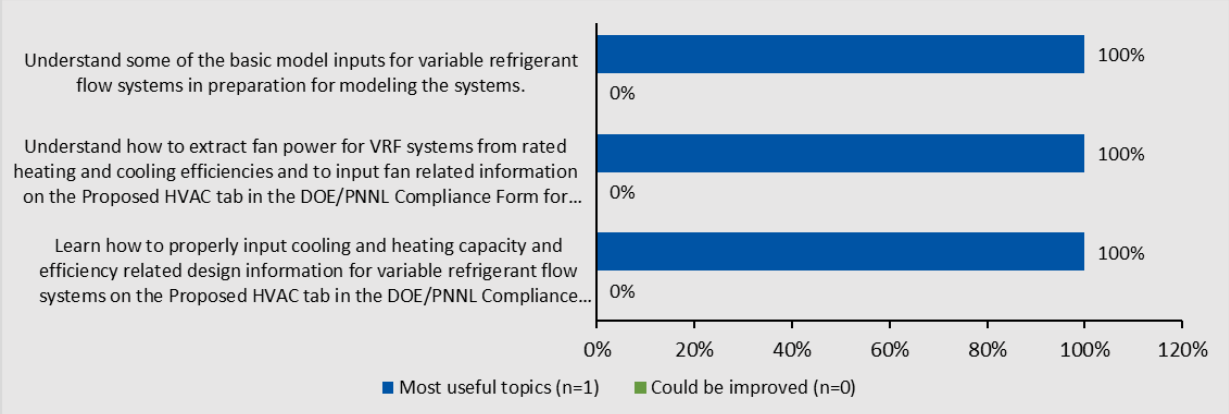


1.66. Documenting and Modeling Variable Refrigerant Flow Systems Part 1 (Karpman)

Figure 83 shows the topics respondents who took the "Documenting and Modeling Variable Refrigerant Flow Systems Part 1" training found most useful and those they suggested could be improved. Only one respondent answered this question. They said that all three topics were useful and that none needed improvement.

Figure 83. Feedback on Topics Covered (Documenting and Modeling Variable Refrigerant Flow Systems Part 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

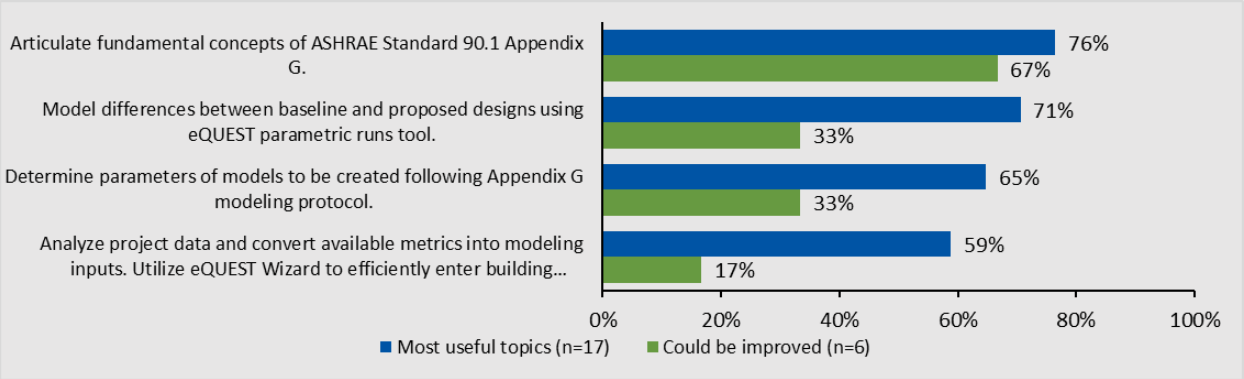


1.67. eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016 (Karpman)

Figure 84 shows the topics respondents who took the "eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016" training found most useful and those they suggested could be improved. The most useful topic to respondents was articulating fundamental concepts of ASHRAE standard 90.1 Appendix G (76%). Respondents suggested that this topic could also use improvement (67%).

Figure 84. Feedback on Topics Covered (eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

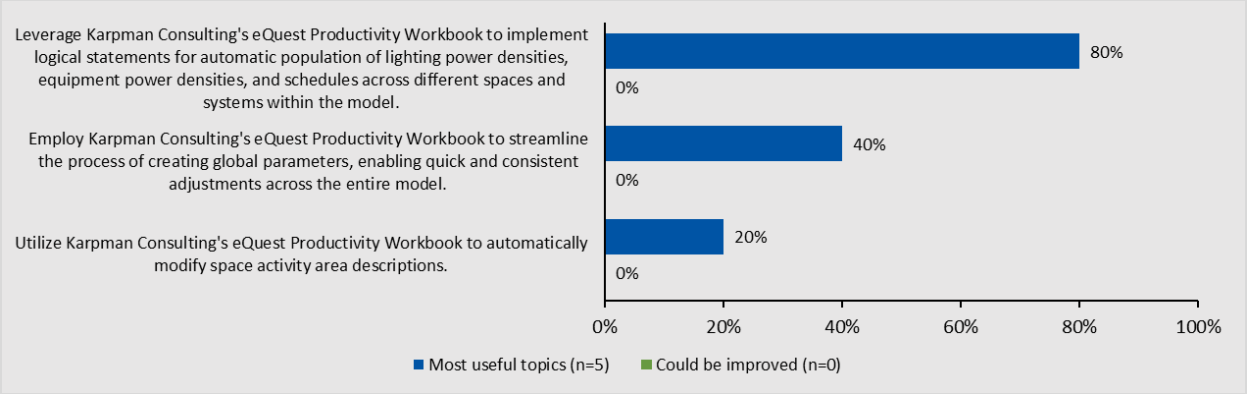


1.68. eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements (Karpman)

Figure 85 shows the topics respondents who took the "eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements" training found most useful and those they suggested could be improved. The most useful topic according to respondents was leveraging Karpman Consulting's eQuest Productivity Workbook (80%). Respondents did not suggest any topic that could use improvement.

Figure 85. Feedback on Topics Covered (eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.

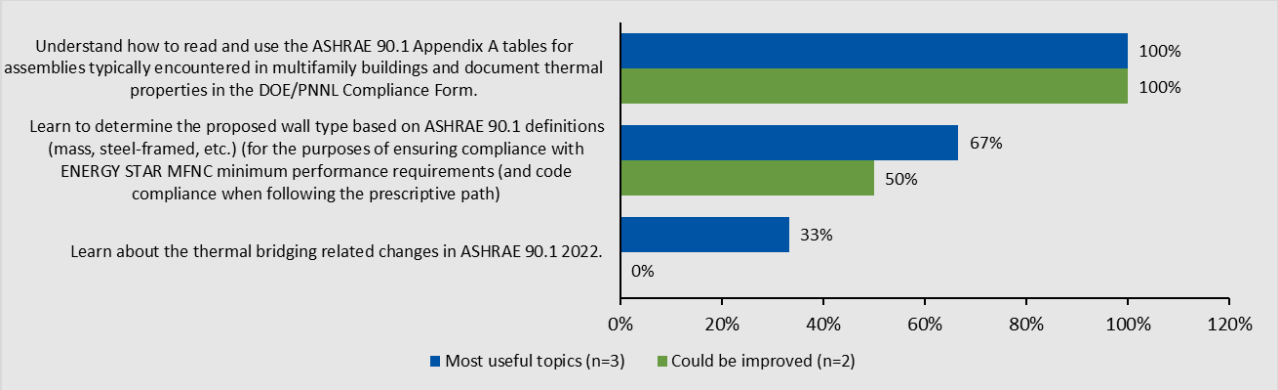


1.69. The Ins and Outs of Building Envelope — Part 1 (Karpman)

Figure 86 shows the topics respondents who took the "The Ins and Outs of Building Envelope — Part 1" training found most useful and those they suggested could be improved. The most useful topic for respondents was understanding how to read and use the ASHRAE 90.1 Appendix A tables (100%). Respondents also suggested that this topic could use improvement (100%).

Figure 86. Feedback on Topics Covered (The Ins and Outs of Building Envelope — Part 1)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.



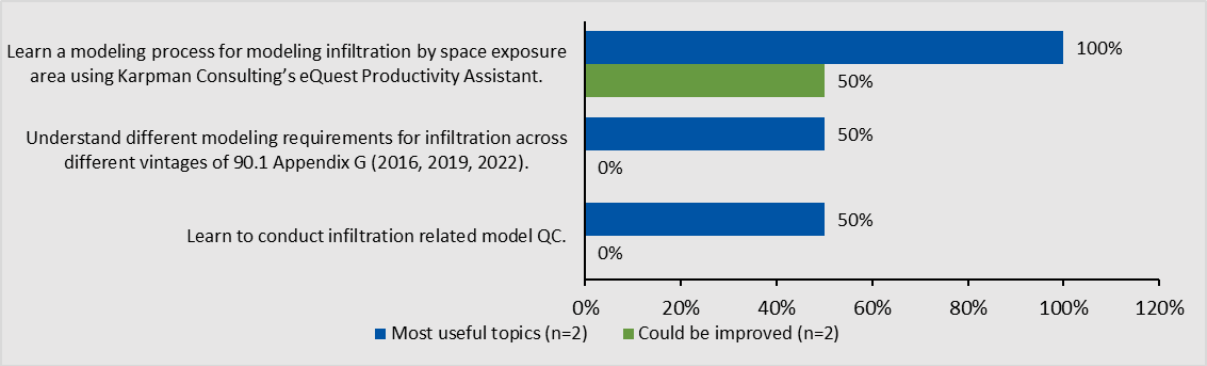
1.70. The Ins and Outs of Building Envelope — Part 3 (Karpman)

Figure 87 shows the topics respondents who took the "The Ins and Outs of Building Envelope — Part 3" training found most useful and those they suggested could be improved. Respondents said the most useful

topic was learning a modeling process for modeling infiltration (100%) and suggested that this topic could also use improvement (50%).

Figure 87. Feedback on Topics Covered (The Ins and Outs of Building Envelope — Part 3)

Source: Immediate Survey Questions: "What were the most useful topics of the training for you?" and "Are there any topics from today's training that could be improved?" Multiple responses allowed.



1.70.1.1. Initial Asynchronous Training Feedback

In Year 5, instead of the typical live trainings, Karpman Consulting began providing pre-recorded 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 the asynchronous training received higher ratings for quality of information and relevancy for work. For quality of information, non-asynchronous trainings received an average rating of 6.4 (n=544) and asynchronous trainings received an average rating of 6.9 (n=26). When respondents were asked to rate the training's relevance to their work, non-asynchronous trainings received an average rating of 6.0 (n=546) and asynchronous training received an average rating of 6.7 (n=26).

1.71. Documentation Filed with Building Departments (Follow-Up Survey)

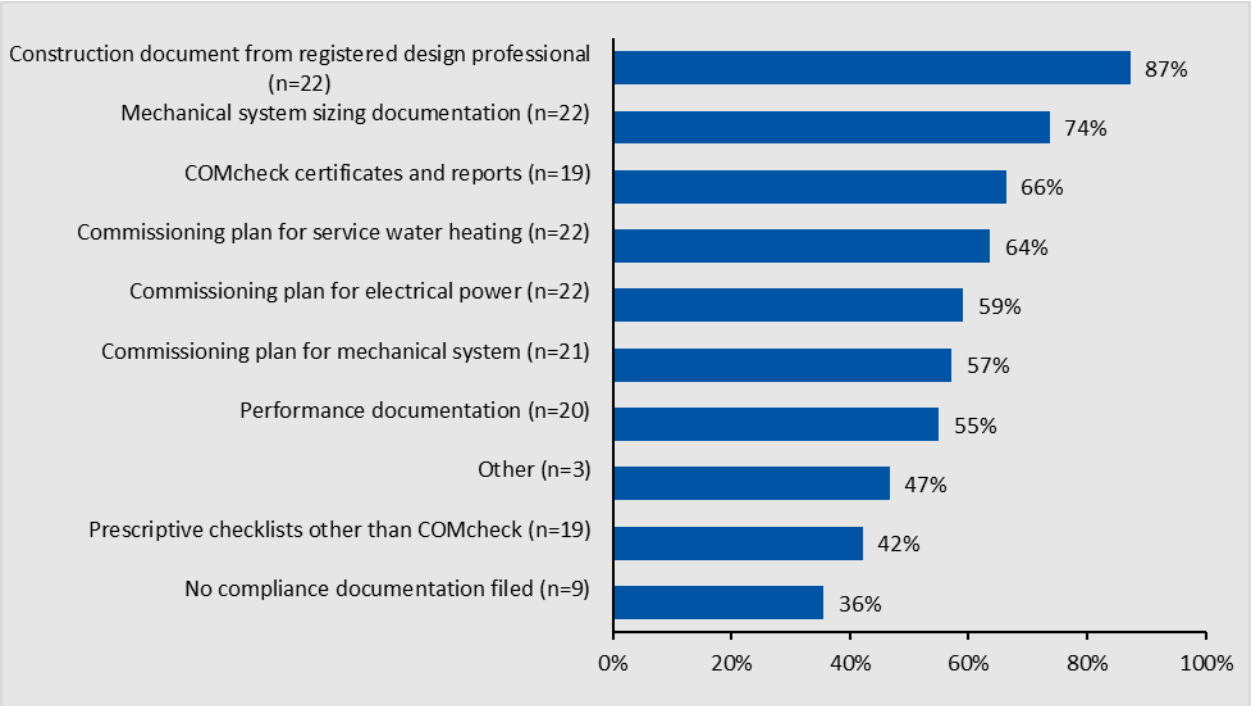
To investigate the types of information filed at building departments, code officials were asked about documents associated with commercial and residential new construction and renovation work. For each project type, code officials were asked about a series of document types that might be included for a project and asked to estimate the percentage of projects that included that type of compliance documentation.

As shown in Figure 88, for commercial new construction projects, 36% of code official reported projects for which no compliance documents were filed. The documents respondents indicated were most

consistently filed included construction documents prepared by a registered design professional (87% of projects) and Mechanical system sizing documentation (74% of projects).

Figure 88. Documents Filed for Commercial New Construction Projects

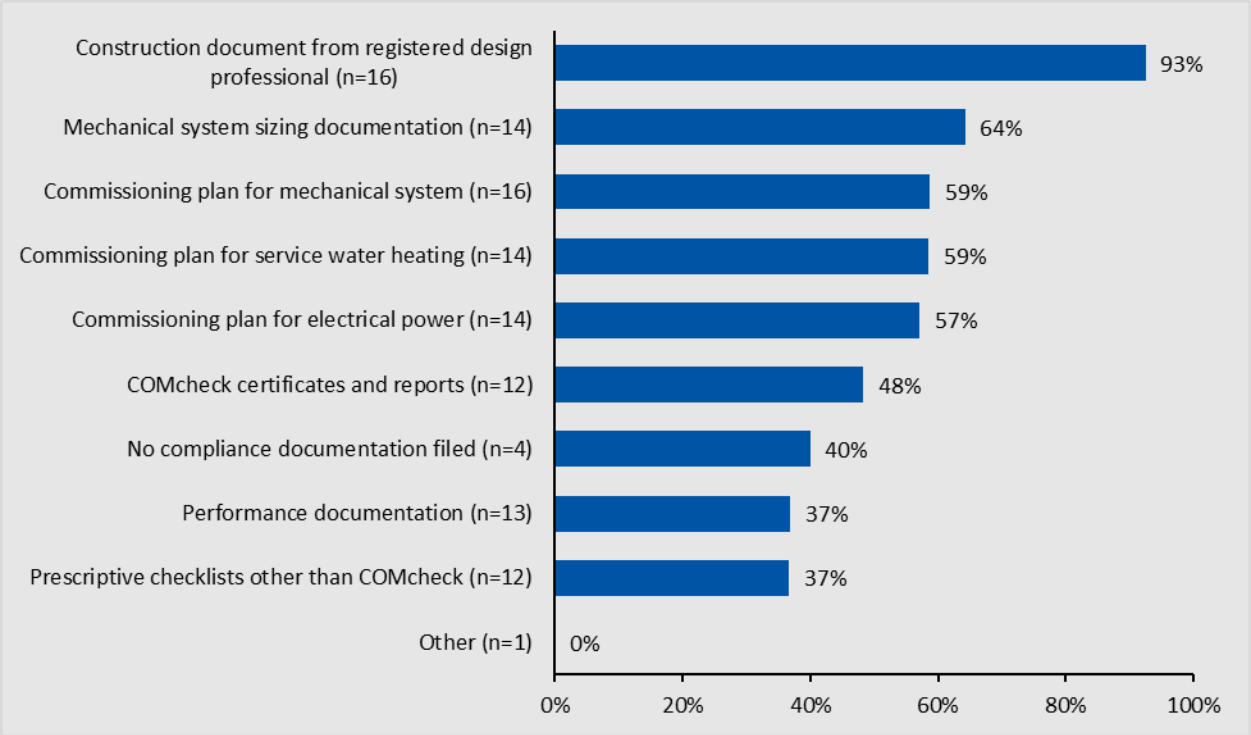
Source: Follow-Up Survey Question: "Approximately what percentage of new construction projects submit the following:"



For commercial addition and alteration projects, code officials also reported that they consistently saw construction documents prepared by a registered design professional (93% of projects) and mechanical system sizing documentation (64% of projects) (Figure 89).

Figure 89. Documentation Filed for Commercial Addition or Alteration Projects

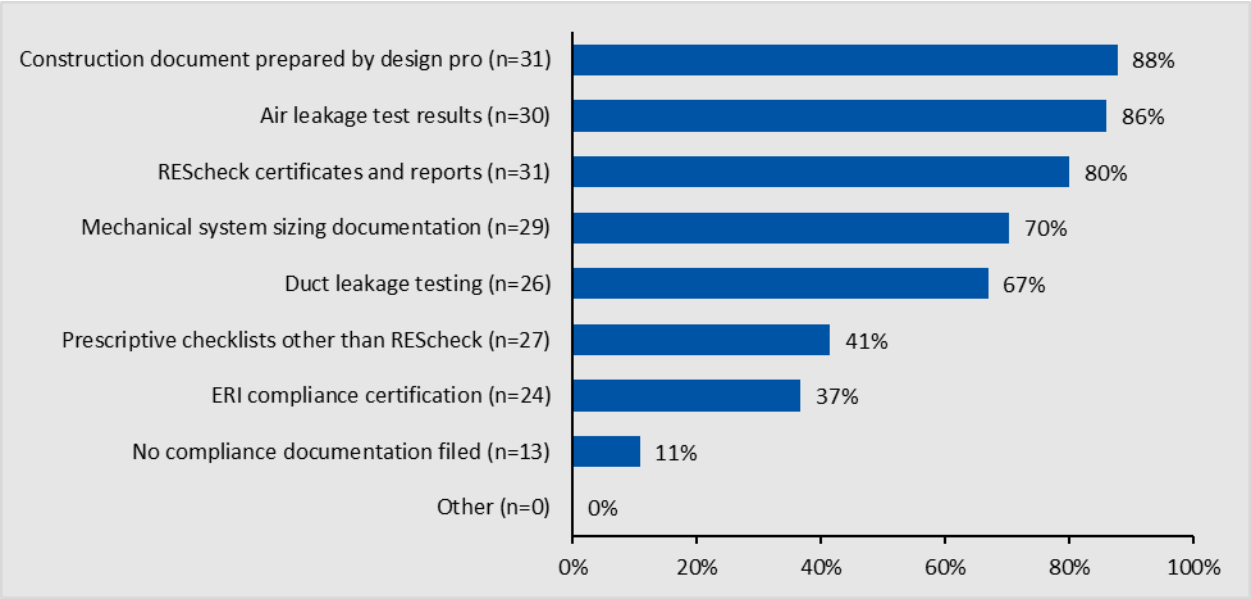
Source: Follow-Up Survey Question: "Thinking of documents relevant to the projects you have reviewed, approximately what percentage of projects submit the following:"



As seen in Figure 90, with residential new construction, code officials stated that the most commonly filed documents for residential new construction projects were construction documents prepared by a registered design professional, with an average of 88% of projects providing this documentation. Overall, 13 respondents said that projects received, "No compliance documentation."

Figure 90. Documents Filed for Residential New Construction Projects

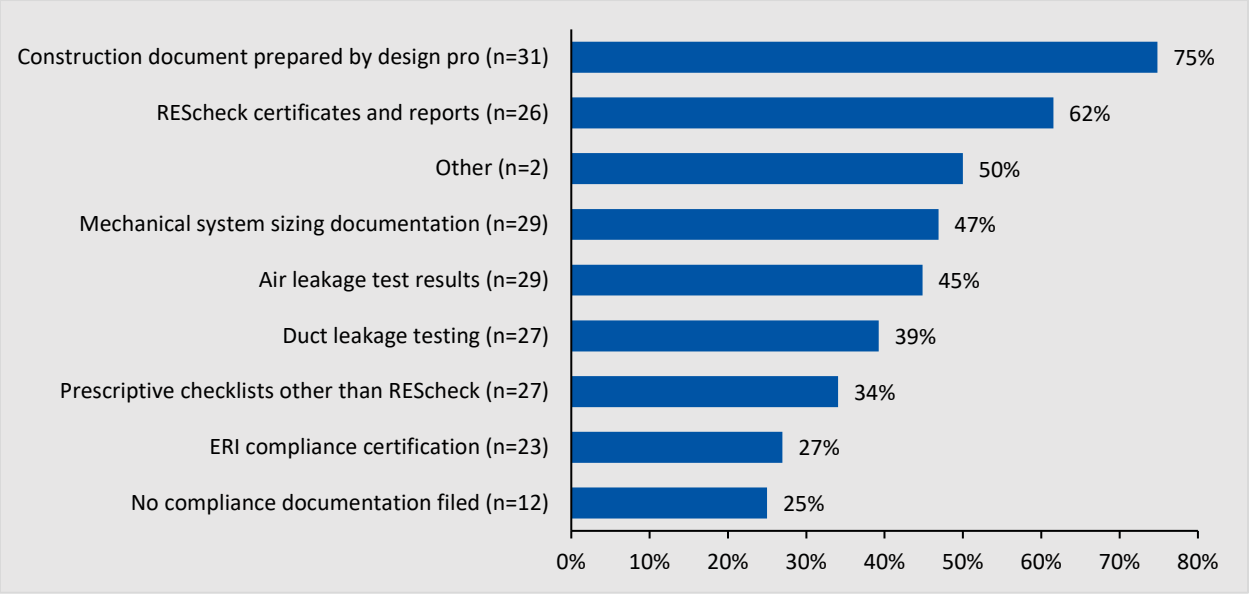
Source: Follow-Up Survey Question: "Approximately what percentage of new construction projects submit the following:"



As shown in Figure 91, construction documents prepared by a registered design professional was also the most common type of filed documentation for residential alteration and addition projects (75% of projects). For these projects, code officials estimated that 25% of projects filed no compliance documentation at all.

Figure 91. Documentation Filed for Residential Addition or Alteration Projects

Source: Follow-Up Survey Question: "Thinking of documents relevant to the projects you have reviewed, approximately what percentage of projects submit the following:"



1.72. Courses

NYSERDA dedicated Q1 2020 to curriculum development and started trainings through its four training contractors in late April 2020. Table 40 summarizes the 1,747 webinars and 118 in-person trainings (by topic area) that NYSERDA held from 2020 to 2024, based on training survey participation.

Table 40. Energy Code Trainings Held by Topic Category (2020-2024)

	2020			2021			2022			2023			2024				All Years[9]		
Training Type	In-person	Webinar	Total	In-person	Webinar	Total	In-person	Webinar	Total	In-person	Webinar	Total	In-person	Webinar	Asynchronous	Total	In-person	Webinar	Total
Code Overview	0	128	128	0	56	56	14	57	71	4	71	75	0	116	0	116	18	428	446
Code Overview - NYStretch	0	4	4	0	54	54	0	62	62	8	41	49	0	16	0	16	8	177	185
Compliance and Enforcement Best Practices	0	29	29	0	92	92	22	55	77	1	30	31	1	77	3	81	24	283	310
Specific Building Systems	0	50	50	0	161	161	0	85	85	10	81	91	0	212	12	224	10	589	611
Building Modeling and Documentation	0	0	0	0	0	0	0	16	16	0	7	7	0	72	53	125	0	95	148
Specific Sector	0	0	0	0	0	0	0	24	24	9	25	34	49	30	0	79	58	79	137
Electrification	0	0	0	0	0	0	0	30	30	0	31	31	0	35	0	35	0	96	96
Total	**0**	**211**	**211**	**0**	**363**	**363**	**36**	**329**	**365**	**32**	**286**	**318**	**50**	**558**	**68**	**676**	**118**	**1,747**	**1,933**

[9] Data as of November 1, 2024.

Table 41 lists the courses offered to date.

Table 41. Training Courses

Course Title	Implementer	Training Type	Date
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	9/1/2022
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	9/1/2022
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	9/1/2022
Multifamily Air Sealing	PSD Consulting	Webinar	9/6/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	9/6/2022
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	9/7/2022
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	9/7/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	9/8/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	9/8/2022
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	9/8/2022
Crushing the NYC Energy Code (Commericial)	Urban Green Council	In-Person	9/13/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	9/13/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	9/13/2022
212: Review of the Modeling-based Submittals for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	9/13/2022
Air Sealing to 3 ACH50	PSD Consulting	Webinar	9/14/2022
Other IECC Envelope Requirements	PSD Consulting	Webinar	9/14/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	9/14/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	9/14/2022
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	9/15/2022
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	9/15/2022
213: Integrating Performance-based Compliance into the Design Process	Karpman Consulting	Webinar	9/20/2022

Course Title	Implementer	Training Type	Date
Multifamily Air Sealing	PSD Consulting	Webinar	9/21/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	9/21/2022
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	9/22/2022
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	9/22/2022
Whats New in the 2020 NYC Energy Code	Urban Green Council	In-Person	9/23/2022
Air Sealing to 3 ACH50	PSD Consulting	Webinar	9/27/2022
Other IECC Envelope Requirements	PSD Consulting	Webinar	9/27/2022
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	9/28/2022
Efficient Forced Air Distribution	PSD Consulting	Webinar	9/28/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	9/28/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	9/28/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	9/29/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	9/29/2022
What's New in the 2020 NYC Energy Code	Urban Green Council	In-Person	9/29/2022
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	10/4/2022
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	10/4/2022
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	10/4/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	10/5/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	10/5/2022
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	10/6/2022
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	10/6/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	10/11/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	10/11/2022
Crushing the NYC Energy Code (Commericial)	Urban Green Council	Webinar	10/12/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	10/12/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	10/12/2022
Air Sealing to 3 ACH50	PSD Consulting	Webinar	10/13/2022
Other IECC Envelope Requirements	PSD Consulting	Webinar	10/13/2022

Course Title	Implementer	Training Type	Date
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	10/13/2022
212: Review of the Modeling-based Submittals for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	10/17/2022
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	10/18/2022
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	10/18/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	10/19/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	10/19/2022
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	10/19/2022
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	10/20/2022
Efficient Forced Air Distribution	PSD Consulting	Webinar	10/20/2022
Multifamily Air Sealing	PSD Consulting	Webinar	10/25/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	10/25/2022
210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	10/25/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	10/26/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	10/26/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	10/27/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	10/27/2022
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	10/27/2022
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	11/1/2022
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	11/1/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	11/2/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	11/2/2022
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	11/3/2022
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	11/3/2022
Crushing the NYC Energy Code (Commericial)	Urban Green Council	Webinar	11/3/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	11/8/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	11/8/2022
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	11/9/2022

Course Title	Implementer	Training Type	Date
Air Sealing to 3 ACH50	PSD Consulting	Webinar	11/9/2022
Other IECC Envelope Requirements	PSD Consulting	Webinar	11/9/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	11/10/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	11/10/2022
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	11/10/2022
Crushing the NYC Energy Code (Commericial)	Urban Green Council	In-Person	11/15/2022
213: Integrating Performance-based Compliance into the Design Process	Karpman Consulting	Webinar	11/15/2022
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	11/16/2022
Efficient Forced Air Distribution	PSD Consulting	Webinar	11/16/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	11/17/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	11/17/2022
Multifamily Air Sealing	PSD Consulting	Webinar	11/22/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	11/22/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	11/23/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	11/23/2022
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	11/29/2022
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	11/29/2022
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	11/29/2022
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	11/30/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	11/30/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	11/30/2022
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	12/1/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	12/6/2022
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	12/6/2022
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	12/7/2022
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	12/7/2022
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	12/7/2022

Course Title	Implementer	Training Type	Date
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	12/7/2022
Multifamily Air Sealing	PSD Consulting	Webinar	12/8/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	12/8/2022
210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	12/13/2022
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	12/13/2022
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	12/14/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	12/14/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	12/14/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	12/15/2022
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	12/15/2022
Air Sealing to 3 ACH50	PSD Consulting	Webinar	12/16/2022
Other IECC Envelope Requirements	PSD Consulting	Webinar	12/16/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	12/20/2022
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	12/20/2022
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	12/21/2022
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	12/21/2022
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	12/21/2022
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	12/21/2022
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	12/21/2022
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	12/22/2022
Efficient Forced Air Distribution	PSD Consulting	Webinar	12/22/2022
110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	Karpman Consulting	Webinar	10/11/2022–10/14/2022
110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	Karpman Consulting	Webinar	12/6/2022–12/9/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	12/27/2022
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	12/27/2022
Multifamily Air Sealing	PSD Consulting	Webinar	12/28/2022
Multifamily Thermal Bridging	PSD Consulting	Webinar	12/28/2022
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	12/29/2022

Course Title	Implementer	Training Type	Date
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	12/29/2022
Energy Code Enforcement Training	Newport Ventures	Webinar, in-person	2022
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	Webinar, in-person	2022
Energy Code Enforcement Training	Newport Ventures	Webinar	12/7/2022
2020 ECCCNYS for Residential Buildings	Newport Ventures	Webinar	12/14/2022
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	1/3/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	1/3/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	1/4/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	1/5/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	1/5/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	1/11/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	1/10/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	1/10/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	1/11/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	1/11/2023
Multifamily Air Sealing	PSD Consulting	Webinar	1/12/2023
Multifamily Thermal Bridging	PSD Consulting	Webinar	1/12/2023
212: Review of the Modeling-based Submittals for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	1/10/2023-1/13/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	1/19/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	1/17/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	1/17/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	1/18/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	1/18/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	1/19/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	1/19/2023
213: Integrating Performance-based Compliance into the Design Process	Karpman Consulting	Webinar	1/24/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	1/24/2023

Course Title	Implementer	Training Type	Date
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	1/24/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	1/24/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	1/25/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	1/25/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	1/26/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	1/26/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	1/26/2023–1/27/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	1/31/2023
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	2/1/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	1/31/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	1/31/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	2/1/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	2/2/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	2/2/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	2/7/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	2/7/2023
Multifamily Air Sealing	PSD Consulting	Webinar	2/8/2023
Multifamily Thermal Bridging	PSD Consulting	Webinar	2/8/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	2/16/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	2/14/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	2/14/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	2/15/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	2/15/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	2/16/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	2/16/2023
110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	Karpman Consulting	Webinar	2/14/2023 - 2/17/2023

Course Title	Implementer	Training Type	Date
Crushing the NYC Energy Code: Residential	Urban Green Council	Webinar	2/22/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	2/23/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	2/22/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	2/22/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	2/23/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	2/23/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	3/8/2023
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	Webinar	2/3/2023
Energy Code Enforcement Training	Newport Ventures	In-Person	2/23/2023
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	In-Person	2/15/2023
110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	Karpman Consulting	Webinar	3/7/2023–3/10/2023
212: Review of the Modeling-based Submittals for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	3/14/2023–3/17/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	3/14/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	3/15/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	3/15/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	3/16/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	3/16/2023
213: Integrating Performance-based Compliance into the Design Process	Karpman Consulting	Webinar	3/21/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	3/21/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	3/22/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	3/22/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	3/23/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	3/23/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	3/14/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	3/23/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	3/28/2023
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	3/29/2023
2020 ECCCNYS for Commercial Buildings: Overview	Newport Ventures	Webinar	2/3/2023

Course Title	Implementer	Training Type	Date
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	3/28/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	3/28/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	3/29/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	3/30/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	3/30/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	4/4/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	4/4/2023
Multifamily Air Sealing	PSD Consulting	Webinar	4/5/2023
Multifamily Thermal Bridging	PSD Consulting	Webinar	4/5/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	4/6/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	4/6/2023
212: Review of the Modeling-based Submittals for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	4/4/2023–4/7/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	4/13/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	4/11/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	4/11/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	4/12/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	4/12/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	4/13/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	4/13/2023
110: Performance-Based Compliance with ASHRAE Standard 90.1 2016	Karpman Consulting	Webinar	4/11/2023–4/13/2023
210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	4/18/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	4/12/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	4/12/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	4/20/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	4/18/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	4/18/2023

Course Title	Implementer	Training Type	Date
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	4/19/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	4/19/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	4/20/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	4/20/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	4/25/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	In-Person	4/13/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	In-Person	4/13/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	In-Person	4/18/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	4/25/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	4/25/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	4/26/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	4/26/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	4/27/2023
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	4/27/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	5/2/2023
Multifamily Air Sealing	PSD Consulting	In-Person	5/2/2023
Multifamily Thermal Bridging	PSD Consulting	In-Person	5/2/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	In-Person	5/2/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	In-Person	5/2/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	5/3/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	5/3/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	5/4/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	5/4/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	5/11/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	5/9/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	5/9/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	5/10/2023

Course Title	Implementer	Training Type	Date
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	5/10/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	In-Person	5/9/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	In-Person	5/9/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	5/11/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	5/11/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	In-Person	5/11/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	In-Person	5/11/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	5/16/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	5/16/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	5/16/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	5/17/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	5/17/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	5/18/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	5/18/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	5/23/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	5/23/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	5/23/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	5/24/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	5/24/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	5/25/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	5/25/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	5/30/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	5/31/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	5/31/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	6/1/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	6/1/2023
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	Webinar	5/22/2023
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	Webinar	5/25/2023

Course Title	Implementer	Training Type	Date
2020 ECCCNYS for Commercial Buildings: Overview	Newport Ventures	Webinar	5/23/2023
2020 ECCCNYS for Commercial Buildings: Overview	Newport Ventures	Webinar	5/26/2023
Transitioning from Code Compliant to High-Performance: Strategies for Residential Buildings	Newport Ventures	Webinar	5/24/2023
Energy Code Enforcement Training	Newport Ventures	Webinar	5/3/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	6/6/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	6/6/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	6/7/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	6/7/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	6/8/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	6/8/2023
Crushing the NYS Energy Code: Commercial	Urban Green Council	Webinar	6/13/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	6/15/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	6/13/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	6/13/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	6/14/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	6/14/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	6/15/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	6/15/2023
Crushing the NYC Energy Code (Commercial)	Urban Green Council	Webinar	6/20/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	In-Person	6/9/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	In-Person	6/9/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	6/14/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	6/14/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	6/20/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	6/20/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	6/21/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	6/21/2023

Course Title	Implementer	Training Type	Date
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	6/22/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	6/22/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	6/27/2023
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	6/28/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	6/27/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	6/27/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	6/28/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	6/29/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	6/29/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	7/5/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	7/5/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	7/6/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	7/6/2023
Crushing the NYS Energy Code (Residential)	Urban Green Council	Webinar	7/12/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	7/11/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	7/11/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	7/13/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	7/13/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	In-Person	7/11/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	In-Person	7/11/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	7/12/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	7/12/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	7/18/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	7/18/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	7/13/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	In-Person	7/13/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	7/25/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	7/25/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	7/27/2023

Course Title	Implementer	Training Type	Date
Efficient Forced Air Distribution	PSD Consulting	Webinar	7/27/2023
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	7/11/2023
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	7/12/2023
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	7/13/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	7/18/2023
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	7/19/2023
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	7/20/2023
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	7/25/2023
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	7/26/2023
What's New in the 2020 New York Energy Code	Urban Green Council	Webinar	7/27/2023
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	8/3/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	8/1/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	8/1/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	8/2/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	8/2/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	8/3/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	8/3/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	8/8/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	8/8/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	8/9/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	8/9/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	8/10/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	8/10/2023
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	8/9/2023
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	8/10/2023
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	8/16/2023
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	8/17/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	8/15/2023

Course Title	Implementer	Training Type	Date
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	8/15/2023
Air Sealing to 3 ACH50	PSD Consulting	Webinar	8/16/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	8/16/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	8/17/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	8/17/2023
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	8/22/2023
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	8/23/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	8/22/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	8/22/2023
Multifamily Air Sealing	PSD Consulting	Webinar	8/23/2023
Multifamily Thermal Bridging	PSD Consulting	Webinar	8/23/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	8/24/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	8/24/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	8/29/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	8/29/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	8/30/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	8/30/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	8/31/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	8/31/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	8/30/2023
What's New in the 2020 NYC Energy Code	Urban Green Council	Webinar	8/31/2023
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	9/5/2023
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	9/6/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	9/5/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	9/5/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	9/6/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	9/6/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	9/7/2023

Course Title	Implementer	Training Type	Date
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	9/7/2023
NYStretch Overview and Thermal Envelope Requirements Part 1	PSD Consulting	Webinar	9/12/2023
NYStretch Mechanical, Plumbing, Lighting, and Electric Power Part 2	PSD Consulting	Webinar	9/12/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 1)	PSD Consulting	Webinar	9/13/2023
Prioritizing ECCCNYS Enforcement for Commercial Buildings (Pt 2)	PSD Consulting	Webinar	9/13/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	9/14/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	9/14/2023
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	9/12/2023
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	9/14/2023
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	9/19/2023
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	9/20/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	9/19/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	9/19/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	9/20/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	9/20/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	9/21/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	9/21/2023
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	9/26/2023
What's New in the 2020 New York Energy Code	Urban Green Council	Webinar	9/27/2023
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	9/28/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	9/26/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	9/26/2023
ECCCNYS for Large Commercial Buildings (Pt 1): Mechanical Systems	PSD Consulting	Webinar	9/27/2023
ECCCNYS for Large Commercial Buildings (Pt 2): Lighting Systems	PSD Consulting	Webinar	9/27/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	9/28/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	9/28/2023
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	10/4/2023

Course Title	Implementer	Training Type	Date
Air Sealing to 3 ACH50	PSD Consulting	Webinar	10/3/2023
Other IECC Envelope Requirements	PSD Consulting	Webinar	10/3/2023
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	10/4/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	10/4/2023
Multifamily Air Sealing	PSD Consulting	Webinar	10/5/2023
Multifamily Thermal Bridging	PSD Consulting	Webinar	10/5/2023
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	10/10/2023
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	10/11/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	10/10/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	10/10/2023
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	10/11/2023
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	10/11/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	10/12/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	10/12/2023
	PSD Consulting		
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	10/17/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	10/17/2023
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	10/18/2023
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	10/18/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	10/19/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	10/19/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	11/7/2023
Put a Lid On It Part 2: Unvented Crawlspaces	PSD Consulting	Webinar	11/7/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	11/8/2023
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	11/8/2023
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	11/9/2023
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	11/9/2023

Course Title	Implementer	Training Type	Date
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	11/14/2023
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	11/14/2023
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	11/16/2023
Crushing the NYC Energy Code: Residential	Urban Green Council	Webinar	10/24/2023
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	10/26/2023
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	10/31/2023
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	11/2/2023
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	11/7/2023
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	11/9/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	11/28/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	11/28/2023
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	11/29/2023
Efficient Forced Air Distribution	PSD Consulting	Webinar	11/29/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	11/30/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	11/30/2023
Crushing the NYC Energy Code: Residential	Urban Green Council	Webinar	12/12/2023
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	12/13/2023
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	12/14/2023
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	12/14/2023
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	12/19/2023
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	12/19/2023
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	12/19/2023
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	12/27/2023
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	12/27/2023
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	1/2/2024
Put a Lid On It Part 2: Unvented Crawlspaces	PSD Consulting	Webinar	1/2/2024
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	1/4/2024

Course Title	Implementer	Training Type	Date
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	1/4/2024
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	1/9/2024
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	1/9/2024
NY Energy Codes for Simple Buildings- Part 1: Retail Building	PSD Consulting	Webinar	1/11/2024
NY Energy Code for Simple Commercial Buildings- Part 2:Mixed-Use Apartment, Grocery, and Office Building	PSD Consulting	Webinar	1/11/2024
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	1/9/2024
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	1/11/2024
Put a Lid On It Part 1: Unvented Attics	PSD Consulting	Webinar	1/2/2024
Put a Lid On It Part 2: Unvented Crawlspaces	PSD Consulting	Webinar	1/2/2024
The Energy Code and Existing Buildings (Commercial) - Part 1	PSD Consulting	Webinar	1/16/2024
The Energy Code and Existing Buildings (Commercial) - Part 2	PSD Consulting	Webinar	1/16/2024
NYStretch Energy Code for Commercial Buildings Part 1: Building Thermal Envelope, Mechanical Systems, Commissioning, and Additions and Alterations	PSD Consulting	Webinar	1/18/2024
NYStretch Energy Code for Commercial Buildings Part 2: Electric Power and Lighting, Total Building Performance, Additional Efficiency Package Options, and Appendices	PSD Consulting	Webinar	1/18/2024
Electrifying the Energy Code - Residential	PSD Consulting	Webinar	1/23/2024
Multifamily Air Sealing	PSD Consulting	Webinar	1/23/2024
Don't Be Left Exposed - Part 1: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	1/25/2024
Don't Be Left Exposed - Part 2: Meeting the Energy Code with the Safe Use of Foam Insulation	PSD Consulting	Webinar	1/25/2024
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	1/30/2024
Efficient Forced Air Distribution	PSD Consulting	Webinar	2/7/2024
Whole-house Mechanical Ventilation	PSD Consulting	Webinar	2/8/2024
Efficient Forced Air Distribution	PSD Consulting	Webinar	2/8/2024
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	1/16/2024
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	1/17/2024
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	1/24/2024
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	1/25/2024
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	2/6/2024
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	2/8/2024
Electrifying the Energy Code - Commercial Part 1	PSD Consulting	Webinar	2/15/2024

Course Title	Implementer	Training Type	Date
Electrifying the Energy Code - Commercial Part 2	PSD Consulting	Webinar	2/15/2024
Multifamily Air Sealing	PSD Consulting	Webinar	2/29/2024
Multifamily Thermal Bridging	PSD Consulting	Webinar	2/29/2024
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	2/21/2024
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	2/22/2024
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	2/27/2024
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	3/5/2024
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	3/7/2024
Foam without Flames Part 1: Thermal Bridging	PSD Consulting	Webinar	3/8/2024
Foam without Flames Part 2: Fire Rated Assemblies	PSD Consulting	Webinar	3/8/2024
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	3/5/2024
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	3/12/2024
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	3/13/2024
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	3/14/2024
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	3/20/2024
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	3/27/2024
A Process for Energy Code Compliance and Enforcement / Energy Code Plan Reviews in 15 Minutes or Less	PSD Consulting	Webinar	3/29/2024
A Process for Energy Code Compliance and Enforcement / Energy Code Inspections in 15 Minutes or Less	PSD Consulting	Webinar	3/29/2024
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	4/10/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	4/10/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	4/10/2024
eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	Karpman Consulting	Webinar	4/10/2024
The Ins and Outs of Building Envelope — Part 1	Karpman Consulting	Webinar	4/10/2024
The Ins and Outs of Building Envelope — Part 2	Karpman Consulting	Webinar	4/10/2024
The Ins and Outs of Building Envelope — Part 3	Karpman Consulting	Webinar	4/10/2024
A Reviewer’s Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	4/10/2024
Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	Karpman Consulting	Webinar	4/10/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	4/10/2024

Course Title	Implementer	Training Type	Date
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	4/10/2024
Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	4/10/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	4/10/2024
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	4/11/2024
The Energy Code and Existing Buildings- Residential Part 1 Additions	PSD Consulting	Webinar	4/12/2024
The Energy Code and Existing Buildings- Residential Part 2 Alterations, repairs and changes of occupancy or use	PSD Consulting	Webinar	4/12/2024
07: eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	4/10/2024
Crushing the NYC Energy Code: Commercial	Urban Green Council	Webinar	4/23/2024
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	4/24/2024
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	4/30/2024
Crushing the Code NYS: Energy Code 101	Urban Green Council	Webinar	5/2/2024
Crushing the Code NYS: Residential Building Systems	Urban Green Council	Webinar	5/7/2024
Crushing the Code NYS: Residential Envelope	Urban Green Council	Webinar	5/9/2024
Crushing the Code NYS: Commercial Envelope	Urban Green Council	Webinar	5/15/2024
Crushing the Code NYS: Commercial Building Systems	Urban Green Council	Webinar	5/16/2024
Crushing the Code NYS: Demonstrate Compliance	Urban Green Council	Webinar	5/22/2024
Crushing the NYC Energy Code (Residential)	Urban Green Council	Webinar	5/23/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	5/14/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	5/14/2024
eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	Karpman Consulting	Webinar	5/14/2024
The Ins and Outs of Building Envelope — Part 1	Karpman Consulting	Webinar	5/14/2024
The Ins and Outs of Building Envelope — Part 2	Karpman Consulting	Webinar	5/14/2024
The Ins and Outs of Building Envelope — Part 3	Karpman Consulting	Webinar	5/14/2024
A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	5/14/2024
Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	Karpman Consulting	Webinar	5/14/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	5/14/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	5/14/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 1	Karpman Consulting	Webinar	5/14/2024

Course Title	Implementer	Training Type	Date
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 2	Karpman Consulting	Webinar	5/14/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	5/14/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	6/7/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	6/7/2024
eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	Karpman Consulting	Webinar	6/7/2024
The Ins and Outs of Building Envelope — Part 1	Karpman Consulting	Webinar	6/7/2024
The Ins and Outs of Building Envelope — Part 2	Karpman Consulting	Webinar	6/7/2024
The Ins and Outs of Building Envelope — Part 3	Karpman Consulting	Webinar	6/7/2024
A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	6/7/2024
Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	Karpman Consulting	Webinar	6/7/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	6/7/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	6/7/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 1	Karpman Consulting	Webinar	6/7/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 2	Karpman Consulting	Webinar	6/7/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	6/7/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	7/9/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	7/9/2024
eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	Karpman Consulting	Webinar	7/9/2024
The Ins and Outs of Building Envelope — Part 1	Karpman Consulting	Webinar	7/9/2024
The Ins and Outs of Building Envelope — Part 2	Karpman Consulting	Webinar	7/9/2024
The Ins and Outs of Building Envelope — Part 3	Karpman Consulting	Webinar	7/9/2024
A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	7/9/2024
Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	Karpman Consulting	Webinar	7/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	7/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	7/9/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 1	Karpman Consulting	Webinar	7/9/2024

Course Title	Implementer	Training Type	Date
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 2	Karpman Consulting	Webinar	7/9/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	7/9/2024
2020 ECCCNYS for Residential Buildings: Overview	Newport Ventures	Webinar, Classroom	8/16/2024
Energy Code Enforcement Training	Newport Ventures	classroom	8/16/2024
2020 ECCCNYS for Commercial Buildings: Overview	Newport Ventures	Webinar, Classroom	8/16/2024
A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	8/12/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	8/12/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	8/12/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	9/9/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	9/9/2024
eQuest Productivity Tools and Tips Part 3 – Auto populating Individual Space Lighting Power Densities and Quality Control Tips	Karpman Consulting	Webinar	9/9/2024
A Reviewer's Perspective – Common Mistakes in Submission to the ENERGY STAR Multifamily New Construction Program and Tips for Avoiding them	Karpman Consulting	Webinar	9/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	9/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	9/9/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 1	Karpman Consulting	Webinar	9/9/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	9/9/2024
Lighting Power and Controls in Multifamily Buildings following Appendix G and the ENERGY STAR MFNC Guidelines	Karpman Consulting	Webinar	9/9/2024
The Ins and Outs of Building Envelope — Part 1	Karpman Consulting	Webinar	9/9/2024
The Ins and Outs of Building Envelope — Part 2	Karpman Consulting	Webinar	9/9/2024
eQuest Productivity Tools and Tips Part 1 – Using Global Parameters and Logical Statements	Karpman Consulting	Webinar	10/9/2024
eQuest Productivity Tools and Tips Part 2 – Utilizing eQuest Import Functionality to Improve Efficiency	Karpman Consulting	Webinar	10/9/2024
The Ins and Outs of Building Envelope — Part 3	Karpman Consulting	Webinar	10/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 1	Karpman Consulting	Webinar	10/9/2024
Documenting and Modeling Variable Refrigerant Flow Systems Part 2	Karpman Consulting	Webinar	10/9/2024
Documenting and Modeling Ventilation Systems in Multifamily Buildings following the ENERGY STAR MFNC Program Guidelines Part 2	Karpman Consulting	Webinar	10/9/2024
eQuest Energy Modeling for New Construction using ASHRAE 90.1 2016	Karpman Consulting	Webinar	10/9/2024

Course Title	Implementer	Training Type	Date
210: Compliance Documentation for ASHRAE 90.1 Section 11 and Appendix G	Karpman Consulting	Webinar	10/25/2024
213: Integrating Performance-based Compliance into the Design Process	Karpman Consulting	Webinar	10/28/2024

Appendix F. NYSERDA TMD Savings Memo

Memorandum

To:	Patricia Gonzales, PhD; NYSERDA
From:	Amalia Hicks, Hope Lobkowicz and Jeremy Eckstein; Cadmus
Subject:	Methodology for Analyzing Indirect Energy Impacts of the Codes and Standards for Carbon Neutral Buildings Initiative
Date:	May 31, 2023

1.73. Introduction

This memo outlines methodology for analyzing the indirect energy impacts of the Codes and Standards for Carbon Neutral Buildings initiative (CSCNB) (previously named the Code to Zero initiative).

As noted in NYSERDA's *Code-to-Zero Evaluation Plan*, assessing the indirect impacts of the initiative is linked to hypotheses testing. NYSERDA developed a set of testable hypotheses in the *Theory of Change for the Initiative* and Cadmus continues to work with NYSERDA to ensure that indicators and data collection processes are aligned to support the analysis. Although the actual analysis of indirect impacts will not occur until the final year of the five-year evaluation plan, it is important to design a methodology at the onset of evaluation activities to ensure that appropriate data are collected during the years prior to the analysis. Cadmus first developed the indirect savings methodology in year one and two of the evaluation period, revising it in year four to reflect changes to program design and updates to the initiative logic model.

Indirect impacts are market effects that are expected to accrue over the longer term from follow-on market activity that results from the activities NYSERDA undertakes in this initiative. The initiative activities are intended to influence the behavior of various stakeholder groups through ongoing training, demonstrations, and technical support. NYSERDA designed this initiative to produce indirect impacts, as most of the energy impacts will result from market activities and changes that occur in the market over time in response to NYSERDA's market interventions.

1.74. Indirect Impacts Framework

This section discusses the basic framework required to estimate indirect savings from the initiative.

1.74.1. Logic Model

NYSERDA developed a logic model to characterize the structure of the CSCNB initiative and to provide the basis for evaluating its impacts. This logic model presents market barriers, target audiences, initiative activities (and resources), outputs, near-term outcomes, and mid- and long-term outcomes. Cadmus extracted key portions of the logic model to guide our development and explanation of its proposed analysis methodology. Figure 92 provides the most recent version of the logic model.

Figure 92. Codes and Standards for Carbon Neutral Buildings Logic Model

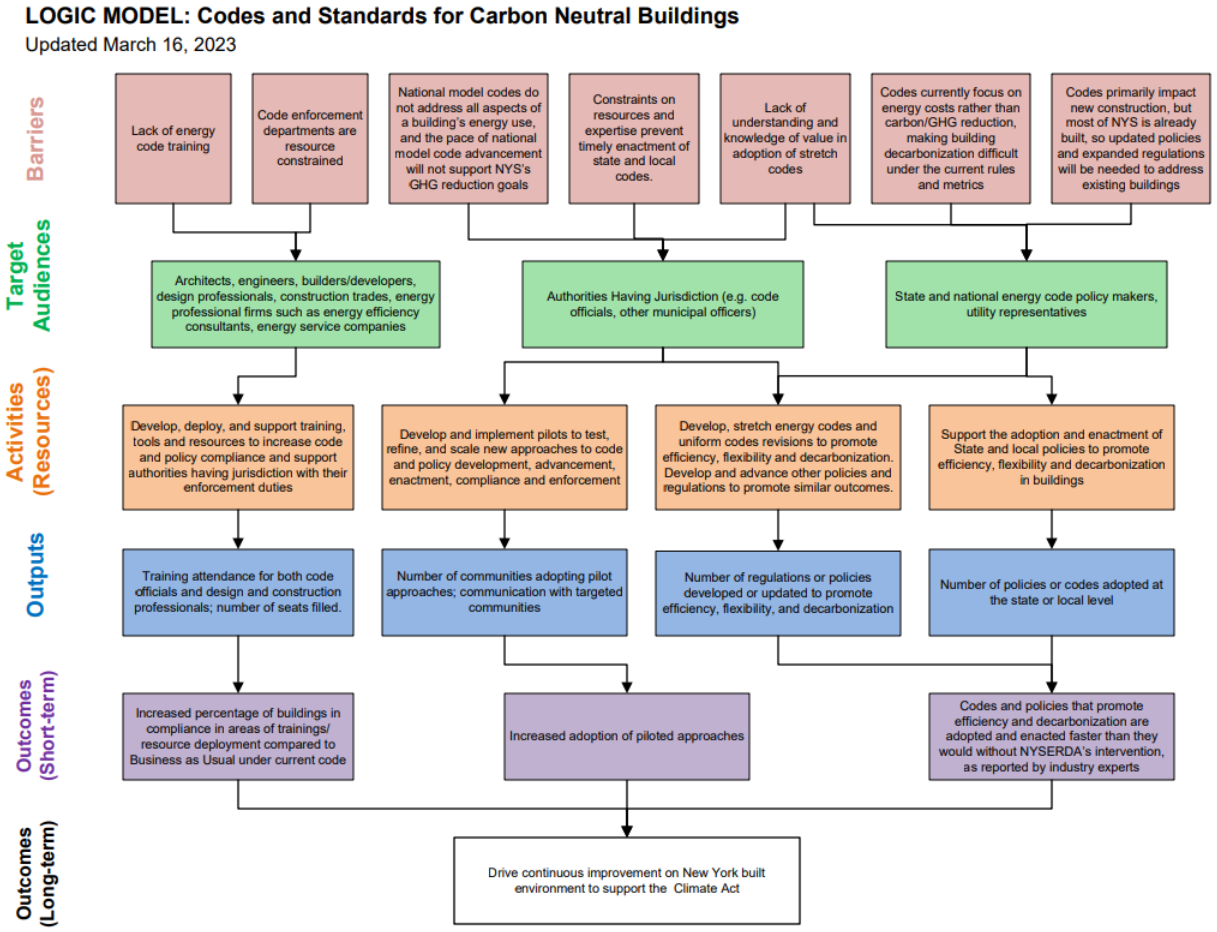


Table 42 lists the five major activities in the initiative, along with their outputs and anticipated outcomes. The table also presents indicators that can be used to monitor the performance and progress of the initiative. As described in the *Code-to-Zero Evaluation Plan*:

> "[P]rogram activity/output indicators represent measurable, quantifiable direct results of activities undertaken in the initiative. Outputs are a key way of regularly tracking progress, especially in

the early stages of an initiative, before broader market changes are measurable. Outcome indicators can encompass near-term through longer-term changes in market conditions expected to result from the activities/outputs of an intervention."

Indicators are clear, verifiable metrics of how well the initiative is achieving its goals, with outcomes ranging from accomplishing planned activities to driving fundamental market changes. For each activity, the table presents multiple indicators that can be used to track the progress of various components of the logic model. The outcome indicators will be assessed relative to a baseline value, which will be established through the initial steps of the evaluation, with progress measured periodically throughout the evaluation.

Table 42. Key Elements of CSCNB Initiative Logic Model

Initiative Activity	Outputs	Short-Term Outcomes	Longer-Term Outcomes	Indicators[1]
Develop, deploy, and support training, tools and resources to increase code and policy compliance and support authorities having jurisdiction with their enforcement duties	Training attendance for both code officials and design and construction professionals; number of seats filled.	Increased percentage of buildings in compliance in areas of trainings/resource deployment compared to Business as Usual under current code	Drive continuous improvement on New York built environment to support the Climate Act	Output: Training attendance, number of seats filled (baseline 0). 2021: 4,000, 2022: 8,000, 2023: 12,000, 2024: 16,000, 2025: 20,000 Outcome: Increased percentage of buildings in compliance in areas of trainings/resource deployment compared to Business as Usual under current code (baseline = 0). 2021-2025: 5%
Develop and implement pilots to test, refine, and scale new approaches to code and policy development, advancement, enactment, compliance and enforcement	Number of communities adopting pilot approaches; communication with targeted communities	Increased adoption of piloted approaches Increased percentage of buildings in compliance in areas of trainings/resource deployment compared to Business as Usual under current code Codes and policies that promote efficiency and decarbonization are adopted and enacted faster than they would without NYSERDA's intervention, as reported by industry experts		Output: Number of communities adopting pilot approaches (baseline = TBD). 2022:5, 2023: 15, 2024: 25, 2025: 35 Outcome: Increased percentage of buildings in compliance in areas of trainings/resource deployment compared to Business as Usual under current code (baseline = 0). 2021-2025: 5%
Develop, stretch energy codes and uniform codes revisions to promote efficiency, flexibility and decarbonization. Develop and advance other policies and regulations to promote similar outcomes.	Number of regulations or policies developed or updated to promote efficiency, flexibility, and decarbonization	Codes and policies that promote efficiency and decarbonization are adopted and enacted faster than they would without NYSERDA's intervention, as reported by industry experts		Output: Number of regulations or policies developed or updated to promote efficiency, flexibility, and decarbonization (baseline = 0). 2022: 2, 2023: 2, 2024: 2, 2025: 4 Outcome: There are currently no outcome indicators associated with the activity described here. The baseline value for the output presented in this table is not derived from evaluation studies.
Support the adoption and enactment of State and local policies to promote efficiency, flexibility and decarbonization in buildings	Number of policies or codes adopted at the state or local level			Output: Number of policies or codes adopted at the state or local level (baseline = 0). 2021: 20, 2022:25, 2023: 26, 2024: 27, 2025: 28 Outcome: Codes and policies are adopted and enacted faster than they would without NYSERDA's intervention, as reported by industry experts (baseline =qualitative)

[1] From the NYSERDA Compiled Investment Plan (revised 2/1/2023) See: https://www.nyserda.ny.gov//media/Project/Nyserda/Files/About/Clean-Energy-Fund/Matter-1600681NYSERDA-CEF-CIP-Revised-1-February-2023.pdf

1.74.2. Overview of Savings Potential

Each initiative activity could produce indirect energy savings, but the timing and mechanisms will vary. It is important to understand the outputs and outcomes from each activity and how they could produce energy savings.

The codes compliance and enforcement training activity is likely to produce the largest energy savings in the near term. This is because the training can be started and can reach large numbers of code officials and building professionals relatively quickly. Prior studies have demonstrated that immediately after such training, participants say that they plan to make changes in their code enforcement and compliance, and follow-up surveys have confirmed that the training led to behavior changes that improved enforcement and compliance.[10]

However, any energy savings resulting from greater compliance will be constrained by the current rate of noncompliance and the amount that compliance can be improved. To illustrate, if the latest energy code is intended to reduce the amount of building energy consumption by 10% compared to the prior code and compliance is at a level where buildings are achieving 90% of the expected savings, the maximum increase in savings from training would be 1% (10% of 10%) of the consumption under the prior code. This increase in savings would apply to the buildings associated with training attendees who were influenced by the training and possibly to buildings associated with other code officials or building professionals who were influenced by the trainees.

Although initiative activities other than training will likely take longer to produce energy savings, some have the potential to generate larger savings. For example, the stretch code pilots are intended to encourage nonparticipant jurisdictions to adopt stretch codes, and ultimately to lead to the adoption of some of the stretch code components into the state energy code. If the stretch code produced 10% savings relative to the base code, then all buildings in jurisdictions that adopt the stretch code would generate savings a full 10% above the base code (if they fully comply). Any stretch code components adopted in the next base state code will generate savings in all new buildings across the state. The combined savings from these effects could be much larger than the savings from increasing the compliance rate alone, but the magnitude of savings will depend on how many and which jurisdictions adopt the stretch code and which of those components are adopted in the base code.

[10] NMR Group and Cadmus. March 10, 2020. *Massachusetts Codes and Standards Compliance and Support Initiative Residential and Commercial Immediate and Follow-up Surveys – All 2019 Reports.* MA19X04-B-CCSISVY.

1.74.3. Steps in Determining Program-Induced Indirect Savings

The overall process of determining program-induced indirect savings for each initiative activity entails several steps:

1. The evaluator refines and explains the logic model for how each activity leads to indirect impacts and savings and identifies the key parameters that will be used to estimate the impact of each initiative activity.
2. The evaluator uses the logic model to identify the outputs, outcomes, and indicators associated with each activity.
3. The evaluator works with the initiative team to identify sources of information for each indicator that will be tracked during the course of the initiative. Likely sources include initiative data, results from pilot projects, Delphi panel results, representative jurisdiction interviews, training participant surveys, and secondary sources.
4. The evaluator compiles the information from all relevant sources and the annual indicator data.
5. The evaluator creates a panel of independent code experts to assess the market impacts of specific initiative activities, based on a careful and systematic review of the evidence, and to determine the program-induced effects. The independent panel will include a mix of experts, not just from New York State but also from other parts of the country, who understand relationships between program activities and influence on compliance.
6. For initiative activities they assess, the independent panel members review the compiled information and estimate the parameters required to calculate the indirect energy impacts of the initiative for each activity (as specified in the component-specific sections of this document).
7. For all initiative components, the evaluator estimates values for all parameters required to calculate the indirect energy impacts that are not estimated by the independent panel (as described in the component-specific sections of this document).
8. The evaluator uses the estimated parameter values for specific activities to calculate the estimated indirect energy impacts.
9. The evaluator makes any adjustments required to avoid double-counting impacts.

NYSERDA provided the following guidance for developing a savings estimation methodology:

> "The program staff would like to explore adopting a savings methodology approach that may already be out in the field in use, but if there is not one that fits the NYSERDA program, then modifications to the current approach may be advisable. The current approach is a very detailed bottom-up approach with a lot of inputs and uncertainty. The staff would like to limit their inputs, have greater certainty in the selected inputs, and would prefer a more top-down methodology."

Cadmus took this guidance into account when developing these proposed methodologies and has relied on approaches already used to the extent possible. The different activities in the initiative, however, are very diverse, as are their mechanisms for affecting outcomes in the market. Therefore, we have tailored the methodology to fit the nature of each activity.

1.75. Training Impacts

This section presents Cadmus' proposed approach to evaluate indirect savings resulting from the initiative's code compliance and enforcement training activities.

The basic algorithm for calculating indirect savings due to training is shown in Equation 1, where each variable in the equation is specific to buildings that are affected directly and indirectly by the training.

Equation 1. Training Indirect Savings Calculation

$$Indirect\ Savings_{Training} = Compliance\ Rate\ Increase_{Training} \times Energy\ Savings\ Per\ Unit\ Compliance\ Rate\ Increase_{Training} \times New\ Buildings/SQFT\ Affected_{Training}$$

While this algorithm looks relatively straightforward, there are complexities. For example, the compliance rate must be expressed and measured in a way that reflects the effect of code compliance on energy savings. To produce reasonably accurate estimates of energy impacts, it may be necessary to disaggregate compliance by building components or by systems to account for building type and size. The affected buildings include those that trained code officials inspect for compliance and those that trained building professionals design or build. Table 43 summarizes the input variables used in Equation 1, their data sources, and the timing of when Cadmus will compile those inputs. Each variable is discussed in further detail below the table.

Table 43. Training Effects Input Variable Sources and Timing

Outcome Variable	Input Variables	Sources	Details	Timing
Compliance rate increase from training	Training effects on compliance rates	Independent panel estimate based on expertise and multiple sources; prior study findings; program tracking data; training surveys; jurisdiction in-depth interviews (IDIs); code	Independent panel reviews inputs from all sources; use experience and professional judgment to develop consensus estimates for change in compliance rate for residential and commercial buildings, new	2024 (collecting sources to inform panel estimate over multiple years)

Outcome Variable	Input Variables	Sources	Details	Timing
		compliance (as estimated by Delphi panel)	construction, and alterations resulting from training	
Energy savings per unit change in compliance rate	Energy use compared to compliance rate	Cadmus review of prior studies; building simulations (note that these results will also apply to the savings analysis of alternative enforcement effects)	Literature review of compliance rate versus energy use; building simulations (if needed); level of disaggregation determined and normalized by floor area	2024
Buildings affected by training	Building market characteristics	Dodge data; Construction Monitor data; construction market data; U.S. Census Bureau details	Census residential permits; other sources combined to cover commercial building market; building type and floor area compiled; profile of new construction and alterations developed	2024 (analysis for all years)
	Buildings/SQFT directly affected by trainees	Follow-up surveys	Number of buildings and floor area quantified by building type inspected or designed by trainees (accounting for possible overlap of code official and building professional counts)	Annual

1.75.1. Logic Model Components

The training targets code officials who are engaged in enforcing the code and building professionals who follow the code requirements by designing and constructing buildings. These trained participants are the output of the training activity, and the training output metric is the number of persons trained, possibly by profession.

The anticipated outcome is an increased level of compliance with the code. In the near term, the outcome is improved code process effectiveness, which captures both changes in the perceptions that building professionals have about the importance of the code (and their efforts to comply with the code) and in the effectiveness of the enforcement process to ensure compliance. In the longer term, specific compliance level targets can be established. For this initiative, NYSERDA set a statewide target of 5% compliance rate increase.

The indicators for the training activity include the number of people who take the training (an output) and the compliance level percentage (an outcome). As stated above, the compliance level must be measured in a way that can be used to estimate the effects of code compliance on energy consumption.

1.75.2. Estimate of Compliance Rate Increase

Cadmus will convene an independent panel of national code experts to estimate the average change in compliance in buildings associated with training participants. The independent panel will base their estimates on experience and professional judgment, combined with data compiled by Cadmus.

We will ask the independent panel to estimate the change in compliance in buildings affected by training participants in terms of specific code requirements, system-level compliance, and whole-building compliance—the same categories that were estimated by the Delphi panel. For commercial buildings, the panel will indicate whether the estimated change in compliance rates varies by building type and, for both commercial and residential buildings, whether the change in compliance rates varies by jurisdiction type. The panel will provide separate estimates for new construction and for additions and alterations.

Cadmus will collect and compile data from the sources listed in Table 44 to inform the independent code expert panel that assesses the increase in code compliance resulting from the training. We will present this information to panel members in a well-organized, clearly written document.

Table 44. Compliance Rate Increase Estimate Inputs, Sources, and Timing

Input	Source	Details	Timing
Other program findings	Literature review by Cadmus	Review prior studies for training effects	2021
Number of trainees	Program tracking data	Obtain all information on training attendees	Annual
Training effects on intentions	Immediate surveys	Surveys document what trainees learned and how they plan to use the information	Ongoing
Training effects on actions	Follow-up surveys	Surveys document specifics about what and how trainees have changed code compliance behavior based on training and with whom and what they have shared from training	Ongoing
Jurisdiction perceptions	Jurisdiction IDIs	Assess compliance rate by building type and system, the role of training and other activities in enhancing compliance, and areas for training to target	Annual
Compliance rate estimates and influences	Delphi panel	Current code compliance levels by building type, system, and key requirement (including with code change in May 2020)	2020, 2022, 2024

1.75.2.1. Literature Review and Initiative Data

Cadmus will research and document the study findings of how training programs have affected code compliance. We will also obtain training attendance data from NYSERDA and will organize these data by date, region, profession, and subject matter in a transparent and easy-to-process format.

1.75.2.2. Delphi Panel Information

The primary source of information for the independent code expert panel will be findings that Cadmus compiles from the Delphi expert panel. The Delphi panel's estimates of compliance rates are key inputs. The compliance rate is the percentage of code requirements that are complied with. The Delphi panel estimated compliance for individual code requirements (such as lighting power density), for major systems (such as mechanical systems), and for whole buildings for both new construction and alterations and additions.

The first Delphi panel process occurred from late 2019 to early 2020 and provided baseline compliance estimates for the 2016 ECCCNYS, which became effective in October 2016. The evaluation plan will require updating those Delphi panel estimates in 2022 and 2024. Given the code change in 2020, it will be important to use the 2020 Delphi panel estimates to establish baseline compliance rates for the new code. Furthermore, the subsequent Delphi panel estimates will be important evidence to establish estimates of the effect of training on compliance.

In addition to quantitative compliance estimates, the Delphi panel provides qualitative information that will support the independent code expert panel's estimates and provide added context. For example, the Delphi panel provides insights on challenges the market faces in complying with the energy code then describes how compliance challenges vary by building type and location. This descriptive information will be useful to the independent panel in judging the effect of the training on compliance.

1.75.2.3. Training Participant Information

Cadmus will extract and summarize information from the immediate surveys and follow-up surveys of training participants. The immediate survey will be administered during each training class and the follow-up surveys will be administered about six months after the training. We will design the surveys to gather details about what the participants learned and how they might use this information in their work as code official or building professional.

The data from these surveys will inform the independent panel about the influence of the training on participant behavior and will help panelists understand how the training affected enforcement of and compliance with the code. The immediate survey data will provide information about participants' intentions. The follow-up survey data will provide information about actions taken by the participants, how the training affected their behavior, and how they shared information and influenced the behavior of other professionals who might also affect code compliance.

1.75.2.4. Jurisdictional In-Depth Interview Data

Cadmus has interviewed representatives from three jurisdictions across NYS and documented the views and experiences of code officials and building professionals from diverse jurisdictions. The evaluation plan includes interviewing staff from these same jurisdictions year over year. These interviews provide information that can be compared to findings by the Delphi panel and may highlight unique perspectives or conditions that reflect jurisdictional differences, which are important to capture.

To assess the effects of training, the most useful information from the interviews is about challenges to code compliance, ways to enhance enforcement, the role of training, and any support other than training that would increase code compliance. Cadmus will summarize and share the relevant interview findings with the independent panel for their consideration.

1.75.3. Estimate of Buildings Affected and Unit Energy Savings

Indirect savings are an estimate of the savings resulting from changes in the compliance rate multiplied by an appropriate measure of the buildings/SQFT affected. Table 44 above identified the data sources required to estimate these values.

1.75.3.1. Building/SQFT Affected by Training

Cadmus will compile estimates of the building floor area or number of units constructed and the amount of alterations and additions that occur each year. We will use the training participant follow-up surveys to estimate the quantity of buildings affected by the training. We will design an appropriate method to accurately allocate the buildings/SQFT affected to building type, given the available data.

1.75.3.2. Unit Energy Savings

We will use existing information on the effect of different compliance rates on energy consumption, starting with prior studies for NYS..

1.75.4. Indirect Savings Calculation

Cadmus will calculate the indirect energy savings from the training activities using Equation 1 (above) by multiplying the estimated compliance rate increase by the energy savings and buildings/SQFT affected. We will perform these calculations at the most disaggregated level possible as well as at an aggregated level.

1.76. Jurisdiction Code Enactment Support Impacts

NYSERDA's CSCNB initiative includes two activities that will indirectly influence jurisdictions to adopt stretch codes and other advanced codes:

1. General code enactment support. NYSERDA provides services (such as technical support and modeling) to jurisdictions with constrained resources and expertise. This activity can generate two types of indirect impacts: the first results when those jurisdictions receiving support go on to adopt a stretch code and the second results when those jurisdictions influence other jurisdictions to also adopt a stretch code. Additionally, NYSERDA provides support to the New York Department of State to enact the ECCCNYS.
2. Stretch to Zero pilots. Through its code pilots, NYSERDA supports a limited number of jurisdictions to adopt a carbon-free or all electric codes. This activity can generate indirect benefits if those pilots also influence other jurisdictions (that NYSERDA did not directly assist) to adopt a stretch code.

Although these two initiative activities are distinct, supporting the enactment of NYStrech (general code enactment) and Stretch to Zero (pilots), we recommend assessing their indirect benefits using the same basic methodology. To accomplish this, we will analyze the indirect savings from codes adopted by jurisdictions in NYS, including those that adopted NYStretch and those adopting carbon-free or all electric codes.

This section presents the proposed steps to analyze indirect savings from code enactment support.

The basic method for assessing indirect energy savings is presented in Equation 2.

Equation 2. Code Enactment Support and Stretch Code Pilots Indirect Savings Calculation

$$Indirect\ Savings_{Stretch\ Code\ Adoption} = \sum(Potential\ Energy\ Savings\ Per\ Building\ /\ SQFT_{Jurisdiction\ code,i} \times Compliance\ Rate_{Jurisdiction\ code,i} \times New\ Building\ /\ SQFT\ Affected_{Jurisdiction\ code,i} \times Attribution_i)$$

This equation assumes that the indirect result of the initiative to provide code enactment support and implementing pilots is that some jurisdictions are indirectly influenced to adopt a stretch, carbon-free, or all-electric code. These jurisdictions could have been supported by the initiative or could have been indirectly influenced by other jurisdictions or by NYSERDA's support. The equation sums the savings across all jurisdictions that were influenced to adopt a new code because of support provided by NYSERDA and adjusts these savings by compliance rate and by an attribution factor that captures how

much influence the initiative had on the jurisdiction's ability to adopt the code. Table 45 summarizes the inputs and sources required to calculate savings in Equation 2.

Table 45. Code Enactment Support Input Variable Sources and Timing

Outcome Variable	Input Variables	Source	Details	Timing
Potential jurisdiction code savings per building	Savings from code compared to base code	Energy modeling analysis by NYSERDA	Savings per residential building and per square foot for different commercial building types	2024
Jurisdiction code compliance rate	Code compliance rate relative to base code compliance rate	Delphi panel informed by prior studies and Cadmus' inputs	Compile information from other studies, Cadmus' experience, and Delphi panel	2024
New buildings affected	Quantities of residential and commercial buildings in affected jurisdictions	Jurisdiction building permit data, Dodge data, Construction Monitor data, construction market data, and U.S. Census Bureau data	Request building construction data from affected jurisdictions (and supplement as needed with other sources)	2024
Attribution (jurisdiction codes adopted as a result of NYSERDA activities)	Percentage of code savings attributable to NYSERDA code enactment support and pilots	Independent panel estimate based on expertise and multiple sources: literature review. Delphi panel results, stretch code expert IDIs, adopting jurisdiction IDIs, and pilot participant interviews	Independent panel review inputs from all sources based on experience and professional judgment (with consensus estimates for percentage of stretch code savings attributable to NYSERDA code enactment support and pilots by adopting jurisdiction)	2024 (sources informing panel estimate collected over multiple years)

1.76.1. Logic Model Components

Key logic model components for NYSERDA's code enactment support and stretch code pilot activities are described below.

1.76.1.1. Code Enactment Support

The logic underlying code enactment support (such as with technical details and modeling services) is that providing this support to resource- or expertise-constrained jurisdictions will indirectly enable those jurisdictions to adopt a stretch code or to encourage other jurisdictions to adopt a stretch code.

The output of this code enactment support activity is that jurisdictions enact NYStretch codes that NYSERDA developed.

The core indicators for this program activity is the number of jurisdiction that adopted stretch or other energy codes (such as the ones piloted by NYSERDA).

1.76.1.2. Stretch to Zero Code Pilots

The logic underlying the initiative activity of having Stretch to Zero pilots is that the jurisdictions that offer and adopt such carbon-free or all electric codes would influence other jurisdictions to adopt similar codes, particularly if the pilots demonstrate energy and environmental benefits and the code is cost-effective and easy to implement.

The output delivered by the Stretch to Zero pilot activity is that pilot jurisdictions adopt carbon-free or all electric codes.

The anticipated outcome is that the initiative's pilots will influence non-pilot jurisdictions to adopt the same stretch code.

The core indicators for this program activity are the number of pilot jurisdictions recruited to adopt a carbon-free or all electric code and the number of non-pilot jurisdictions that adopt a carbon-free or all electric code.

1.76.2. Estimating Program-Induced Effects

Cadmus will convene an independent panel of national code experts to estimate how much the support provided by NYSERDA impacted jurisdictions' ability to adopt a carbon-free or all electric codes and how much the pilots and information provided by NYSERDA influenced jurisdictions in their decision to adopt a carbon-free or all electric codes. The estimates from these experts will provide the attribution factor in Equation 2, and will be based on experience and professional judgment, combined with data compiled by Cadmus.

We propose to estimate program-induced effects and indirect savings for each adopting jurisdiction (unless a very large number of those jurisdictions are supported by the initiative and ultimately adopt a stretch code, in which case we will categorize jurisdictions (by size, urban versus rural, and other categories) and will develop estimates for each category.

Cadmus will collect and compile data from the sources listed in Table 46 to inform the independent panel. We will summarize this information in a structured format and present it to the independent panel so they can estimate the attribution of stretch code adoption to the pilots.

Table 46. Code Enactment Support and Stretch Code Pilots Attribution

Input Variables	Source	Details	Timing
Influence of initiative on stretch code adoption	Literature review; Delphi panel results; interviews of stretch code experts	Provide findings about influences on stretch code adoption	2025
Perceptions about stretch codes in NYS	Jurisdictions IDIs	Compile information for input to independent panel attribution assessment	Annual
Influence of NYSERDA jurisdiction support on stretch code adoption	IDIs with jurisdictions supported by NYSERDA	Identify and interview jurisdictions; independent panel estimates attribution based on interview data	Annual

1.76.2.1. Literature Review and Initiative Data

Our literature review of secondary sources will include case studies of advanced technologies that were incorporated in national model energy codes and stretch codes. We also will review NYStretch Energy Code–2020 and future iterations of NYStretch. We will supplement and combine details from the literature review with responses from targeted interviews of four experts who are knowledgeable about stretch codes.

1.76.2.2. Jurisdictional In-Depth Interview Data

In the in-depth interviews, we will ask respondents about the status of and projections for stretch code adoption, and about the adoption rates projected by the Delphi panel, to gather any insights based on their experience.

We will compile and summarize the data collected from the interviews each year to identify any trends and effects of the initiative and will organize this information for a presentation to the independent panel.

1.76.2.3. Adopting Jurisdiction Interviews

Cadmus will design an interview instrument and will interview a sample of jurisdictions (or a census if the number of adopting jurisdictions is small) that adopt a stretch code. We will obtain information on what influenced them to adopt.

We also will interview representatives from non-pilot/ non-supported jurisdictions that adopted stretch codes during or after the pilot to determine code characteristics, awareness of the NYSERDA activities, and influence of NYSERDA activities on the design and adoption of the codes. These non-supported jurisdiction interviews will provide data needed to differentiate between the effect of the two initiative activities (code enactment support and stretch code pilots).

Cadmus will summarize the findings from these interviews and from any other data provided by the jurisdictions in a format to present to the independent panel.

1.76.3. Estimate of Buildings/SQFT Affected, Unit Energy Savings, and Compliance Rate

Estimating the indirect savings from adopting a stretch code requires estimating the compliance rate for the stretch code, savings from the stretch code, and an appropriate measure of the buildings/ SQFT affected. We will estimate compliance with the stretch code based on estimates from the Delphi panel, prior studies, and Cadmus' experience and will estimate savings and the number of affected buildings using jurisdiction building construction data.

1.76.4. Indirect Savings Calculation

Cadmus will calculate the indirect energy savings from the adoption of stretch codes using Equation 2. We will conduct this analysis either by individual jurisdiction or by jurisdiction category and will sum the results.

1.77. State Code Development Impacts

This section presents the proposed steps to analyze savings resulting from indirect influences of the initiative on NYS energy code development and adoption. The basic algorithm for calculating indirect savings from the influence of the initiative on code development and adoption is shown in Equation 3. It is likely that the NYS state code will not be adopted in time to fit within this evaluation timeline.

Equation 3. Code Development and Adoption Indirect Savings Calculation

$$Indirect\ Savings_{Code\ D\ and\ A} = Savings_{Adoption,NYS} + Savings_{Development,NYS}$$

Where:

$Indirect\ Savings_{Code\ D\ and\ A}$ = Indirect savings from influence on code development (D) and adoption (A)

$Savings_{Adoption,NYS}$ = Indirect savings from influence on the timing of adoption of the ECCCNYS

$Savings_{Development,NYS}$ = Indirect savings from influence on the stringency of the ECCCNYS

This equation breaks the indirect savings into those from effects on the ECCCNYS. For the NYS code, the equation accounts for the time that the initiative advances code adoption as well as the added

stringency of the code. Table 47 summarizes the inputs required to estimate the indirect energy savings from the initiative's influence on code adoption timing and stringency.

Table 47. Code Development Impact Input Variable Sources and Timing

Outcome Variable	Input Variables	Source	Details	Timing
Savings from accelerating NYS code adoption	Months ECCCNYS adoption accelerated as result of NYSERDA CSCNB Initiative activities	Independent panel, based on expertise and information from literature review, Delphi panel, interviews with code adoption professionals	Independent panel will provide consensus estimate of influence of code adoption acceleration	2024-2025
	Quantities of residential and commercial buildings constructed during time adoption was accelerated	Jurisdiction building permit data, Dodge data, Construction Monitor, Construction Market Data, US census	Request statewide building construction data; supplement as needed with other sources	2024-2025
	Savings from NYS code	Analyses conducted to support adoption	Compile ECCCNYS savings estimates	2024-2025
Savings from increased NYS code stringency	Code requirements resulting from the influence of the initiative	Independent panel, based on expertise and information from literature review, Delphi panel, interviews with code adoption professionals	Independent panel will provide consensus estimate of requirements influenced and extent of influence	2024-2025
	Energy savings from increased ECCCNYS stringency	Analyses conducted to support adoption; building energy simulations as needed	Compile ECCCNYS savings estimates	2024-2025
	Quantities of residential and commercial buildings constructed during time adoption was accelerated	Jurisdiction building permit data, Dodge data, Construction Monitor, Construction Market Data, US census	Request statewide building construction data; supplement as needed with other sources	2024-2025

1.77.1. Logic Model Components

The program theory underlying this initiative component is that initiative impacts, such as the influence on stretch code adoption, could have a second order effect on when codes are adopted in NYS, on their stringencyn

In NYS, adoption of stretch codes could make it more likely that some of the required measures could be incorporated in the next state code. The initiative might also help accelerate when NYS adopts its next code..

The anticipated outcomes are the changes to the state and model codes described above. The core indicators include the requirements adopted in new state and model codes and the timing of NYS code updates.

1.77.2. Estimate of NYSERDA Influence: Acceleration and Stringency

The independent panel will be asked to identify how the initiative affected state development, including what requirements resulted from the influence of the initiative and how the timing of state adoption was affected.

We will rely on information from the sources used to assess the other indirect savings. To credibly assess how the initiative influenced code development and timing, we also recommend conducting interviews with NYS and code developers. If available, Cadmus will review and summarize NYSERDA's own tracking of code advocacy efforts for the panel.

1.77.3. Estimate of Savings from ECCCNYS Acceleration and Increased Stringency and from National Model Code Stringency

To estimate code energy savings, we will compile data from other sources, such as studies conducted to support adoption of the ECCCNYS.

Cadmus will use the information provided by the independent panel to estimate the additional energy savings resulting from the initiative's influence. This will require using the estimates of the number of new buildings constructed to calculate savings from the other effects as well as the energy impacts of the specific code requirements.

1.77.4. Indirect Savings Calculation

We will combine all data and calculate additional indirect savings that could be attributed to the state and model code requirements and timing effects of the initiative. Given that these effects are secondary, we anticipate this analysis to be more of a qualitative assessment than a detailed quantitative analysis.

1.78. Eliminate Double-Counted Savings

There is the possibility that some initiative activities will contribute to the same outcomes and impacts as other activities. Cadmus will start with the existing initiative logic model and refine it as needed to identify paths through which different activities could produce similar outcomes. As described earlier, we anticipate overlap in the effects of the support provided to resource-constrained jurisdictions and the

stretch code pilots, so our review of potential double-counting will include an assessment of the interactions and potential overlap of these initiative activities.

We will use the revised logic model to guide development of the interview instruments and focus our data collection to distinguish among the effects of different initiative activities.

We will carry this process into the independent panel assessments by stressing that the panel should consider indirect impacts that are linked primarily to a single initiative activity. We will also ask the panel to identify any impacts that could be attributable to multiple initiative activities and provide estimates of the extent of any overlapping influences.

We will be responsible for using this information to make any necessary adjustments to the impact assessments to minimize double counting.

Appendix G. CEF Methodology

Memorandum

To:	Patricia Gonzales, PhD; NYSERDA
From:	Allen Lee, PhD, Karen Horkitz, and Jeremy Eckstein; Cadmus
Subject:	Proposed Methodology for Analyzing Indirect Energy Impacts of the Code to Zero Initiative
Date:	June 19, 2020 (Revised April 6, 2021)

1.79. Introduction

This memo proposes a methodology for analyzing the indirect energy impacts of the Code to Zero Initiative. The objective of this memo is to solicit feedback from NYSERDA and provide the basis for finalizing the methodology.

As noted in NYSERDA's *Code-to-Zero Evaluation Plan*, assessing the indirect impacts of the Initiative is linked to hypotheses testing. NYSERDA developed a set of testable hypotheses in the *Theory of Change for the Initiative* and Cadmus will work with NYSERDA to ensure that indicators and data collection processes are aligned to support the analysis. Although the actual analysis of indirect impacts will not occur for several years, it is important to design the methodology now to ensure that appropriate data are collected during the years prior to the analysis. Some of the activities included in this proposed plan are not reflected in the current evaluation plan: such activities are identified in the sections below. Cadmus will make adjustments to the evaluation plan where necessary, based on the final methodology agreed upon-.

Indirect impacts are market effects that are expected to accrue over the longer term from follow-on market activity that results from the activities NYSERDA undertakes in this Initiative. The Initiative activities are intended to influence the behavior of various stakeholder groups through ongoing training, demonstrations, and technical support. NYSERDA designed this Initiative to produce indirect impacts, as most of the energy impacts will result from market activities and changes that occur in the market over time in response to NYSERDA's market interventions.

1.80. Indirect Impacts Framework

This section discusses the basic framework required to estimate indirect savings from the Initiative.

1.80.1. Logic Model

NYSERDA developed a logic model to characterize the structure of the Code to Zero Initiative and to provide the basis for evaluating its impacts.[11] This logic model presents market barriers, Initiative activities (and resources), target audiences, outputs, near-term outcomes, and mid- and long-term outcomes. Cadmus extracted key portions of the logic model to guide our development and explanation of its proposed analysis methodology.

Table 48 lists the five major activities in the Initiative, along with their outputs and anticipated outcomes. The table also presents indicators that can be used to monitor the performance and progress of the Initiative. As described in the *Code-to-Zero Evaluation Plan*:

> "[P]rogram activity/output indicators represent measurable, quantifiable direct results of activities undertaken in the Initiative. Outputs are a key way of regularly tracking progress, especially in the early stages of an Initiative, before broader market changes are measurable. Outcome indicators can encompass near-term through longer-term changes in market conditions expected to result from the activities/outputs of an intervention."

Indicators are clear, verifiable metrics of how well the Initiative is achieving its goals, with outcomes ranging from accomplishing planned activities to driving fundamental market changes. For each activity, the table presents multiple indicators that can be used to track the progress of various components of the logic model. The outcome indicators will be assessed relative to a baseline value, which will be established through the initial steps of the evaluation, with progress measured periodically throughout the evaluation.

[11] The logic model appears in Appendix A of the *Clean Energy Fund Investment Plan: Codes Chapter,* dated April 19, 2019. https://www.nyserda.ny.gov/-/media/Files/About/Clean-Energy-Fund/CEF-Codes-Chapter.pdf

Table 48. Key Elements of Code to Zero Initiative Logic Model

Initiative Activity	Outputs	Near-Term Outcomes (1-3 Years)	Longer-Term Outcomes (More than 3 Years)	Indicators
Support for code compliance and enforcement	Audience-specific training delivered (13,250 trained in total); general support services to jurisdictions that pay into the System Benefits Charge	Improved code process effectiveness	Code compliance increases throughout New York State (NYS)	Number trained; compliance increases by 10%
Code enactment support of ECCCNYS and stretch code (NY Stretch 2020)	Five entities receive support services from NYSERDA • New York Department of State receives support to enact ECCCNYS • Jurisdictions receive technical support to enact stretch codes	Supported entities implement the Energy Conservation Construction Code of New York State (ECCCNYS) or enact stretch codes	Jurisdictions enact the stretch code and enact ECCNYS	Number of supported entities enacting ECCCNYS; number of jurisdictions enacting the stretch code
Pilots: Stretch to Zero	Three pilots with positive findings; findings disseminated	Pilots are scaled to additional communities, further demonstrating positive findings	Jurisdictions adopt the stretch code; stretch code concept is integrated into ECCCNYS by NYS Department of State	Number of pilots supported (3); 10 non-pilot jurisdictions adopt stretch code
Pilots: alternative code enforcement structure	Three pilots with positive findings; findings disseminated	Pilots are scaled to additional communities, further demonstrating positive findings	Jurisdictions with alternative enforcement structures demonstrate improved enforcement of the energy code	Number of pilots supported (3); 8 non-pilot jurisdictions adopt alternative enforcement structures
Code development and advancement	Integration of stretch code concepts into ECCCNYS and national model code	Technologies and strategies considered in ECCCNYS and model code	Concepts integrated into ECCCNYS; model code adopted that addresses all aspects of a building's energy use and energy production	Number of supported code changes adopted including stretch code requirements

1.80.2. Overview of Savings Potential

Each initiative activity could produce indirect energy savings, but the timing and mechanisms will vary. It is important to understand the outputs and outcomes from each activity and how they could produce energy savings.

The codes compliance and enforcement training activity is likely to produce the largest energy savings in the near term. This is because the training can be started and can reach large numbers of code officials and building professionals relatively quickly. Prior studies have demonstrated that immediately after such training, participants say that they plan to make changes in their code enforcement and compliance, and follow-up surveys have confirmed that the training led to behavior changes that improved enforcement and compliance.[12]

However, any energy savings resulting from greater compliance will be constrained by the current rate of noncompliance and the amount that compliance can be improved. To illustrate, if the latest energy code is intended to reduce the amount of building energy consumption by 10% compared to the prior code and compliance is at a level where buildings are achieving 90% of the expected savings, the maximum increase in savings from training would be 1% (10% of 10%) of the consumption under the prior code. This increase in savings would apply to the buildings associated with training attendees who were influenced by the training and possibly to buildings associated with other code officials or building professionals who were influenced by the trainees.

Although initiative activities other than training will likely take longer to produce energy savings, some have the potential to generate larger savings. For example, the stretch code pilots are intended to encourage nonparticipant jurisdictions to adopt stretch codes, and ultimately to lead to the adoption of some of the stretch code components into the state energy code. If the stretch code produced 10% savings relative to the base code, then all buildings in jurisdictions that adopt the stretch code would generate savings a full 10% above the base code (if they fully comply). Any stretch code components adopted in the next base state code will generate savings in all new buildings across the state. The combined savings from these effects could be much larger than the savings from increasing the compliance rate alone, but the magnitude of savings will depend on how many and which jurisdictions adopt the stretch code and which of those components are adopted in the base code.

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[12] NMR Group and Cadmus. March 10, 2020. *Massachusetts Codes and Standards Compliance and Support Initiative Residential and Commercial Immediate and Follow-up Surveys – All 2019 Reports.* MA19X04-B-CCSISVY.

1.80.3. Steps in Determining Program-Induced Indirect Savings

The overall process of determining program-induced indirect savings for each initiative activity entails several steps:

1. The evaluator refines and explains the logic model for how each activity leads to indirect impacts and savings and identifies the key parameters that will be used to estimate the impact of each initiative activity.
2. The evaluator uses the logic model to identify the outputs, outcomes, and indicators associated with each activity.
3. The evaluator works with the initiative team to identify sources of information for each indicator that will be tracked during the course of the initiative. Likely sources include initiative data, results from pilot projects, Delphi panel results, representative jurisdiction interviews, training participant surveys, and secondary sources.
4. The evaluator compiles the information from all relevant sources and the annual indicator data.
5. The evaluator creates a panel of independent code experts to assess the market impacts of specific initiative activities, based on a careful and systematic review of the evidence, and to determine the program-induced effects. The independent panel will include a mix of experts, not just from New York State but also from other parts of the country, who understand relationships between program activities and influence on compliance.
6. For initiative activities they assess, the independent panel members review the compiled information and estimate the parameters required to calculate the indirect energy impacts of the initiative for each activity (as specified in the component-specific sections of this document).
7. For all initiative components, the evaluator estimates values for all parameters required to calculate the indirect energy impacts that are not estimated by the independent panel (as described in the component-specific sections of this document).
8. The evaluator uses the estimated parameter values for specific activities to calculate the estimated indirect energy impacts.
9. The evaluator makes any adjustments required to avoid double-counting impacts.

NYSERDA provided the following guidance for developing a savings estimation methodology:

> "The program staff would like to explore adopting a savings methodology approach that may already be out in the field in use, but if there is not one that fits the NYSERDA program, then modifications to the current approach may be advisable. The current approach is a very detailed bottom-up approach with a lot of inputs and uncertainty. The staff would like to limit their inputs, have greater certainty in the selected inputs, and would prefer a more top-down methodology."

Cadmus took this guidance into account when developing these proposed methodologies and has relied on approaches already used to the extent possible. The different activities in the initiative, however, are very diverse, as are their mechanisms for affecting outcomes in the market. Therefore, we have tailored the methodology to fit the nature of each activity.

1.81. Training Impacts

This section presents Cadmus' proposed approach to evaluate indirect savings resulting from the initiative's code compliance and enforcement training activities.

The basic algorithm for calculating indirect savings due to training is shown in Equation 1, where each variable in the equation is specific to buildings that are affected directly and indirectly by the training.

Equation 4. Training Indirect Savings Calculation

$$Indirect\ Savings_{Training} = Compliance\ Rate\ Increase_{Training} \times Energy\ Savings\ Per\ Unit\ Compliance\ Rate\ Increase_{Training} \times New\ Buildings/SQFT\ Affected_{Training}$$

While this algorithm looks relatively straightforward, there are complexities. For example, the compliance rate must be expressed and measured in a way that reflects the effect of code compliance on energy savings. To produce reasonably accurate estimates of energy impacts, it may be necessary to disaggregate compliance by building components or by systems to account for building type and size. The affected buildings include those that trained code officials inspect for compliance and those that trained building professionals design or build. Table 49 summarizes the input variables used in Equation 1, their data sources, and the timing of when Cadmus will compile those inputs. Each variable is discussed in further detail below the table.

Table 49. Training Effects Input Variable Sources and Timing

Outcome Variable	Input Variables	Sources	Details	Timing
Compliance rate increase from training	Training effects on compliance rates	Independent panel estimate based on expertise and multiple sources; prior study findings; program tracking data; training surveys; jurisdiction in-depth interviews (IDIs); code	Independent panel reviews inputs from all sources; use experience and professional judgment to develop consensus estimates for change in compliance rate for residential and commercial buildings, new construction,	2024 (collecting sources to inform panel estimate over multiple years)

Outcome Variable	Input Variables	Sources	Details	Timing
		compliance (as estimated by Delphi panel)	and alterations resulting from training	
Energy savings per unit change in compliance rate	Energy use compared to compliance rate	Cadmus review of prior studies; building simulations (note that these results will also apply to the savings analysis of alternative enforcement effects)	Literature review of compliance rate versus energy use; building simulations (if needed); level of disaggregation determined and normalized by floor area	2024
Buildings affected by training	Building market characteristics	Dodge data; Construction Monitor data; construction market data; U.S. Census Bureau details	Census residential permits; other sources combined to cover commercial building market; building type and floor area compiled; profile of new construction and alterations developed	2024 (analysis for all years)
	Buildings/SQFT directly affected by trainees	Follow-up surveys	Number of buildings and floor area quantified by building type inspected or designed by trainees (accounting for possible overlap of code official and building professional counts)	Annual

1.81.1. Logic Model Components

The training targets code officials who are engaged in enforcing the code and building professionals who follow the code requirements by designing and constructing buildings. These trained participants are the output of the training activity, and the training output metric is the number of persons trained, possibly by profession.

The anticipated outcome is an increased level of compliance with the code. In the near term, the outcome is improved code process effectiveness, which captures both changes in the perceptions that building professionals have about the importance of the code (and their efforts to comply with the code) and in the effectiveness of the enforcement process to ensure compliance. In the longer term, specific compliance level targets can be established. For this initiative, NYSERDA set a statewide target of 10% compliance rate increase.

The indicators for the training activity include the number of people who take the training (an output) and the compliance level percentage (an outcome). As stated above, the compliance level must be measured in a way that can be used to estimate the effects of code compliance on energy consumption.

1.81.2. Estimate of Compliance Rate Increase

Cadmus will convene an independent panel of national code experts to estimate the average change in compliance in buildings associated with training participants. The independent panel will base their estimates on experience and professional judgment, combined with data compiled by Cadmus.

We will ask the independent panel to estimate the change in compliance in buildings affected by training participants in terms of specific code requirements, system-level compliance, and whole-building compliance—the same categories that were estimated by the Delphi panel. For commercial buildings, the panel will indicate whether the estimated change in compliance rates varies by building type and, for both commercial and residential buildings, whether the change in compliance rates varies by jurisdiction type. The panel will provide separate estimates for new construction and for additions and alterations.

Cadmus will collect and compile data from the sources listed in Table 50 to inform the independent code expert panel that assesses the increase in code compliance resulting from the training. We will present this information to panel members in a well-organized, clearly written document.

Table 50. Compliance Rate Increase Estimate Inputs, Sources, and Timing

Input	Source	Details	Timing
Other program findings	Literature review by Cadmus	Review prior studies for training effects	2021
Number of trainees	Program tracking data	Obtain all information on training attendees	Annual
Training effects on intentions	Immediate surveys	Surveys document what trainees learned and how they plan to use the information	Ongoing
Training effects on actions	Follow-up surveys	Surveys document specifics about what and how trainees have changed code compliance behavior based on training and with whom and what they have shared from training	Ongoing
Jurisdiction perceptions	Jurisdiction IDIs	Assess compliance rate by building type and system, the role of training and other activities in enhancing compliance, and areas for training to target	Annual
Compliance rate estimates and influences	Delphi panel	Current code compliance levels by building type, system, and key requirement (including with code change in May 2020)	2021, 2023

1.81.2.1. Literature Review and Initiative Data

Cadmus will research and document the study findings of how training programs have affected code compliance. We will also obtain training attendance data from NYSERDA and will organize these data by date, region, profession, and subject matter in a transparent and easy-to-process format.

1.81.2.2. Delphi Panel Information

The primary source of information for the independent code expert panel will be findings that Cadmus compiles from the Delphi expert panel. The Delphi panel's estimates of compliance rates are key inputs. The compliance rate is the percentage of code requirements that are complied with. The Delphi panel estimated compliance for individual code requirements (such as lighting power density), for major systems (such as mechanical systems), and for whole buildings for both new construction and alterations and additions.

The first Delphi panel process occurred from late 2019 to early 2020 and provided baseline compliance estimates for the 2016 ECCCNYS, which became effective in October 2016. The evaluation plan will require updating those Delphi panel estimates in 2021 and 2023. Given the code change in 2020, it will be important to use the 2021 Delphi panel estimates to establish baseline compliance rates for the new code. Furthermore, the subsequent Delphi panel estimates will be important evidence to establish estimates of the effect of training on compliance.

In addition to quantitative compliance estimates, the Delphi panel provides qualitative information that will support the independent code expert panel's estimates and provide added context. For example, the Delphi panel provides insights on challenges the market faces in complying with the energy code then describes how compliance challenges vary by building type and location. This descriptive information will be useful to the independent panel in judging the effect of the training on compliance.

1.81.2.3. Training Participant Information

Cadmus will extract and summarize information from the immediate surveys and follow-up surveys of training participants. The immediate survey will be administered during each training class and the follow-up surveys will be administered about six months after the training. We will design the surveys to gather details about what the participants learned and how they might use this information in their work as code official or building professional.

The data from these surveys will inform the independent panel about the influence of the training on participant behavior and will help panelists understand how the training affected enforcement of and compliance with the code. The immediate survey data will provide information about participants' intentions. The follow-up survey data will provide information about actions taken by the participants, how the training affected their behavior, and how they shared information and influenced the behavior of other professionals who might also affect code compliance.

1.81.2.4. Jurisdictional In-Depth Interview Data

Cadmus has interviewed representatives from three jurisdictions across NYS and documented the views and experiences of code officials and building professionals from diverse jurisdictions. The evaluation plan includes interviewing staff from these same jurisdictions year over year. These interviews provide information that can be compared to findings by the Delphi panel and may highlight unique perspectives or conditions that reflect jurisdictional differences, which are important to capture.

To assess the effects of training, the most useful information from the interviews is about challenges to code compliance, ways to enhance enforcement, the role of training, and any support other than training that would increase code compliance. Cadmus will summarize and share the relevant interview findings with the independent panel for their consideration.

1.81.3. Estimate of Buildings Affected and Unit Energy Savings

Indirect savings are an estimate of the savings resulting from changes in the compliance rate multiplied by an appropriate measure of the buildings/SQFT affected. Table 50 above identified the data sources required to estimate these values.

1.81.3.1. Building/SQFT Affected by Training

Cadmus will compile estimates of the building floor area or number of units constructed and the amount of alterations and additions that occur each year. We will use the training participant follow-up surveys to estimate the quantity of buildings affected by the training. We will design an appropriate method to accurately allocate the buildings/SQFT affected to building type, given the available data.

1.81.3.2. Unit Energy Savings

We will use existing information on the effect of different compliance rates on energy consumption, starting with prior studies for NYS. If necessary, we will supplement the available information by modeling building energy consumption with various assumptions about code compliance.

1.81.4. Indirect Savings Calculation

Cadmus will calculate the indirect energy savings from the training activities using Equation 1 (above) by multiplying the estimated compliance rate increase by the energy savings and buildings/SQFT affected. We will perform these calculations at the most disaggregated level possible as well as at an aggregated level.

1.82. Code Enactment Support Impacts

NYSERDA's Code to Zero Initiative includes two activities that will indirectly influence jurisdictions to adopt stretch codes:

3. General code enactment support. NYSERDA provides services (such as technical support and modeling) to jurisdictions with constrained resources and expertise. This activity can generate two type of indirect impacts: the first results when those jurisdictions receiving support go on to adopt a stretch code and the second results when those jurisdictions influence other jurisdictions to also adopt a stretch code. Additionally, NYSERDA provides support to the New York Department of State to enact the ECCCNYS.
4. Stretch code pilots. Through its stretch code pilots, NYSERDA supports a limited number of jurisdictions to adopt a stretch code. This activity can generate indirect benefits if those pilots also influence other jurisdictions (that NYSERDA did not directly assist) to adopt a stretch code.

Although these two initiative activities are distinct, supporting the enactment of NYStrech-2020 (general code enactment) and Stretch to Zero (pilots), we recommend assessing their indirect benefits using the same basic methodology. To accomplish this, we will analyze the indirect savings from stretch codes adopted outside the code enactment support and pilots and will assess how much influence the code support had on adoption and the influence of the stretch code pilots.

This section presents the proposed steps to analyze indirect savings from code enactment support, including stretch code pilots.

The basic method for assessing indirect energy savings is presented in Equation 2.

Equation 5. Code Enactment Support and Stretch Code Pilots Indirect Savings Calculation

$$Indirect\ Savings_{Stretch\ Code\ Adoption} = \sum(Potential\ Energy\ Savings\ Per\ Building\ / SQFT_{Stretch\ code,i} \times Compliance\ Rate_{Stretch\ code,i} \times New\ Building\ /SQFT\ Affected_{Stretch\ code,i} \times Attribution_i)$$

This equation assumes that the indirect result of the initiative to provide code enactment support and implementing stretch code pilots is that some jurisdictions are indirectly influenced to adopt a stretch code. These jurisdictions could have been supported by the initiative or could have been indirectly influenced by other jurisdictions or by NYSERDA's support. The equation sums the savings across all jurisdictions that were indirectly influenced to adopt a stretch code because of support provided by NYSERDA and adjusts these savings by compliance rate and by an attribution factor that captures how

much influence the initiative had on the jurisdiction's ability to adopt the code. Table 51 summarizes the inputs and sources required to calculate savings in Equation 2.

Table 51. Code Enactment Support Input Variable Sources and Timing

Outcome Variable	Input Variables	Source	Details	Timing
Potential stretch code savings per building	Savings from stretch code compared to base code	Energy modeling analysis by NYSERDA	Savings per residential building and per square foot for different commercial building types	2024
Stretch code compliance rate	Code compliance rate relative to base code compliance rate	Delphi panel informed by prior studies and Cadmus' inputs	Compile information from other studies, Cadmus' experience, and Delphi panel	2024
New buildings affected	Quantities of residential and commercial buildings in affected jurisdictions	Jurisdiction building permit data, Dodge data, Construction Monitor data, construction market data, and U.S. Census Bureau data	Request building construction data from affected jurisdictions (and supplement as needed with other sources)	2024
Attribution (stretch codes adopted as a result of NYSERDA activities)	Percentage of stretch code savings attributable to NYSERDA code enactment support and pilots	Independent panel estimate based on expertise and multiple sources: literature review. Delphi panel results, stretch code expert IDIs, adopting jurisdiction IDIs, and pilot participant interviews	Independent panel review inputs from all sources based on experience and professional judgment (with consensus estimates for percentage of stretch code savings attributable to NYSERDA code enactment support and pilots by adopting jurisdiction)	2024 (sources informing panel estimate collected over multiple years)

1.82.1. Logic Model Components

Key logic model components for NYSERDA's code enactment support and stretch code pilot activities are described below.

1.82.1.1. Code Enactment Support

The logic underlying code enactment support (such as with technical details and modeling services) is that providing this support to resource- or expertise-constrained jurisdictions will indirectly enable those jurisdictions to adopt a stretch code or to encourage other jurisdictions to adopt a stretch code.

The output of this code enactment support activity is jurisdictions that enact the NYStretch-2020 stretch code.

The anticipated outcome is that the initiative's support services will enable jurisdictions, including those that did receive and those that did not receive NYSERDA support, to enact the same stretch code.

The core indicators for this program activity include the number of jurisdictions supported by the initiative, the number of these jurisdictions that later adopt a stretch code, and the number of other jurisdictions that enact a stretch code and were influenced by this activity.

1.82.1.2. Stretch Code Pilots

The logic underlying the initiative activity of having stretch code pilots is that the jurisdictions that offer and adopt such stretch code pilots would influence other jurisdictions to adopt similar codes, particularly if the pilots demonstrate energy and environmental benefits and the code is cost-effective and easy to implement.

The output delivered by the stretch code pilots activity is pilot jurisdictions that adopt the Stretch to Zero stretch code. The initiative targets the recruitment of three pilot jurisdictions to adopt a stretch code and produce positive results that are broadly disseminated to other jurisdictions.

The anticipated outcome is that the initiative's pilots will influence about 10 non-pilot jurisdictions to adopt the same stretch code.

The core indicators for this program activity are the number of pilot jurisdictions recruited to adopt a stretch code and the number of non-pilot jurisdictions that adopt a stretch code. Another indicator is the number of jurisdictions aware of the findings from the pilots and the degree to which the pilot results influenced each jurisdiction to adopt a stretch code.

1.82.2. Estimating Program-Induced Effects

Cadmus will convene an independent panel of national code experts to estimate how much the support provided by NYSERDA impacted jurisdictions' ability to adopt a stretch code and how much the pilots and information provided by NYSERDA influenced jurisdictions in their decision to adopt a stretch code. The estimates from these experts will provide the attribution factor in Equation 2, and will be based on experience and professional judgment, combined with data compiled by Cadmus.

We propose to estimate program-induced effects and indirect savings for each adopting jurisdiction (unless a very large number of those jurisdictions are supported by the initiative and ultimately adopt a stretch code, in which case we will categorize jurisdictions (by size, urban versus rural, and other categories) and will develop estimates for each category.

Cadmus will collect and compile data from the sources listed in Table 52 to inform the independent panel. We will summarize this information in a structured format and present it to the independent panel so they can estimate the attribution of stretch code adoption to the pilots.

Table 52. Code Enactment Support and Stretch Code Pilots Attribution

Input Variables	Source	Details	Timing
Influence of initiative on stretch code adoption	Literature review; Delphi panel results; interviews of stretch code experts	Provide findings about influences on stretch code adoption	2021, 2023
Perceptions about stretch codes in NYS	Jurisdictions IDIs	Compile information for input to independent panel attribution assessment	Annual
Influence of NYSERDA jurisdiction support on stretch code adoption	IDIs with jurisdictions supported by NYSERDA	Identify and interview jurisdictions; independent panel estimates attribution based on interview data	2022, 2024
Influence of jurisdictions that adopt stretch code on other jurisdictions	IDIs with jurisdictions adopting stretch code influenced by other stretch code jurisdictions	Identify and interview jurisdictions; independent panel estimates attribution based on interview data	2022, 2024

1.82.2.1. Literature Review and Initiative Data

Our literature review of secondary sources will include case studies of advanced technologies that were incorporated in national model energy codes and stretch codes. We also will review NYStretch Energy Code–2020 and future iterations of NYStretch. We will supplement and combine details from the literature review with responses from targeted interviews of four experts who are knowledgeable about stretch codes.

1.82.2.2. Delphi Panel Information

One task performed by the first Delphi panel was developing a forecast of the percentage of jurisdictions that will adopt a stretch code each year through 2030 absent any involvement by NYSERDA to encourage adoption. The Delphi panel also provided observations about factors affecting stretch code adoption and barriers to adoption and presented their comparison of adopting the One-Cycle stretch code versus the Stretch to Zero code.

We will update the first Delphi panel findings with those from subsequent cycles, then we will combine and summarize this information for a presentation to the independent panel.

1.82.2.3. Jurisdictional In-Depth Interview Data

In the in-depth interviews, we will ask respondents about the status of and projections for stretch code adoption, and about the adoption rates projected by the Delphi panel, to gather any insights based on their experience.

We will compile and summarize the data collected from the interviews each year to identify any trends and effects of the initiative and will organize this information for a presentation to the independent panel.

1.82.2.4. Adopting Jurisdiction Interviews

Cadmus will design an interview instrument and will interview a sample of jurisdictions (or a census if the number of adopting jurisdictions is small) that adopt a stretch code. We will obtain information on what influenced them to adopt.

We also will interview representatives from non-pilot/ non-supported jurisdictions that adopted stretch codes during or after the pilot to determine code characteristics, awareness of the NYSERDA activities, and influence of NYSERDA activities on the design and adoption of the codes. These non-supported jurisdiction interviews will provide data needed to differentiate between the effect of the two initiative activities (code enactment support and stretch code pilots).

Cadmus will summarize the findings from these interviews and from any other data provided by the jurisdictions in a format to present to the independent panel.

1.82.3. Estimate of Buildings/SQFT Affected, Unit Energy Savings, and Compliance Rate

Estimating the indirect savings from adopting a stretch code requires estimating the compliance rate for the stretch code, savings from the stretch code, and an appropriate measure of the buildings/ SQFT affected. We will estimate compliance with the stretch code based on estimates from the Delphi panel, prior studies, and Cadmus' experience and will estimate savings and the number of affected buildings using jurisdiction building construction data.

1.82.4. Indirect Savings Calculation

Cadmus will calculate the indirect energy savings from the adoption of stretch codes using Equation 2. We will conduct this analysis either by individual jurisdiction or by jurisdiction category and will sum the results.

1.83. Alternative Code Enforcement Structure Impacts

This section presents the proposed steps to analyze indirect savings resulting from adoption of alternative code enforcement structures by non-pilot jurisdictions. The basic algorithm for calculating indirect savings resulting from non-pilot adoption of alternative code enforcement approaches is presented in Equation 6.

Equation 6. Alternative Enforcement Structure Indirect Savings Calculation

$$Indirect\ Savings_{Alt\ enforcement} = \sum (Attribution_i \times Compliance\ Rate\ Increase_{Alt\ enforcement,i} \times Energy\ Savings\ Per\ Unit\ Compliance\ Rate\ Increase_{Alt\ enforcement,i} \times New\ Buildings\ Affected_{Alt\ enforcement,i})$$

This equation assumes that adoption of an alternative enforcement structure can increase code compliance above what it would have been under the standard enforcement process. Greater compliance in turn leads to energy savings. The equation sums the energy savings across all jurisdictions that adopt an alternative structure in response to the findings from the three pilot jurisdictions. The savings are adjusted by an attribution factor to capture how much influence the pilots had on each jurisdiction's decision to adopt an alternative structure. Table 53 summarizes the inputs needed to estimate the indirect energy savings due to non-pilot jurisdictions adopting alternative code enforcement structures.

Table 53. Alternative Code Enforcement Input Variable Sources and Timing

Outcome Variable	Input Variables	Source	Details	Timing
Alternative enforcement structure adopted as a result of NYSERDA activities	Percent of alternative enforcement structure adoption attributable to NYSERDA pilots	Independent panel estimate, based on expertise and multiple sources: literature review, Delphi panel, pilot jurisdiction IDIs, IDIs with other jurisdictions adopting alternative enforcement structures	Independent panel reviews inputs from all sources; based on experience and professional judgment develop consensus estimate of influence of pilots on other jurisdictions adopting alternative enforcement structures	2024; Delphi panel 2021 and 2023
Compliance rate increase	Compliance rate increase	same as above	same as above	2024; Delphi panel 2021 and 2023
Energy savings per unit change in compliance rate	Energy use compared to compliance rate	Cadmus review of prior studies; building simulations. Results will	Review literature for compliance rate vs. energy use; perform building simulations if needed;	2024

Outcome Variable	Input Variables	Source	Details	Timing
		apply to training effects savings analysis too.	determine level of disaggregation; normalize by floor area	
Buildings affected	Quantities of residential and commercial buildings in affected jurisdictions	Jurisdiction building permit data, Dodge data, Construction Monitor, Construction Market Data, US census	Request building construction data from affected jurisdictions; supplement as needed with other sources	2024

1.83.1. Logic Model Components

The logic underlying this initiative component is that pilots adopting alternative enforcement structures would influence some other jurisdictions to adopt similar structures. If the pilots demonstrate benefits (such as greater compliance), the benefits outweigh any added costs or burdens, and if NYSERDA promulgates the findings effectively, the expectation is that other jurisdictions would want to take advantage of alternative enforcement structures and would adopt them.

The outputs delivered by the alternative code enforcement activity are pilot jurisdictions that adopt an alternative code enforcement approach. The initiative aims to conduct pilots with three jurisdictions, producing positive results that are disseminated broadly to other jurisdictions.

The anticipated outcome is that several non-pilot jurisdictions adopt alternative enforcement structures. The initiative projects that eight jurisdictions will be influenced to adopt alternative structures and will produce positive results that include improved code compliance.

The core indicators for this initiative component include the number of pilot jurisdictions recruited and the number of non-pilot jurisdictions that adopt an alternative enforcement structure. Another indicator is the number of jurisdictions aware of the findings from the pilot and the degree to which the results of the pilot influenced each jurisdiction to adopt an alternative structure.

1.83.2. Estimation of Attribution and Compliance Rate Increase

The independent panel will provide two types of information to inform Cadmus' assessment of the indirect savings from adoption of alternative enforcement structures. First, we will ask the panel to estimate how much the pilots and information provided by NYSERDA influenced jurisdictions' decision to adopt an alternative structure. This will provide the attribution factor in Equation 6, above.

Second, the panel will estimate the average change in compliance in buildings because of the change in enforcement structure. This is the second term in Equation 6. This process will follow a procedure similar to that described earlier for effects of training on code compliance.

We propose to analyze each adopting jurisdiction unless a very large number adopt an alternative structure. If the latter, we will categorize jurisdictions and develop estimates for each category.

We will compile and summarize data from multiple sources about the alternative compliance structures implemented through the initiative in a structured format for presentation to the independent panel to provide the basis for the panel to estimate attribution and increases in code compliance rates.

1.83.2.1. Literature Review and Initiative Data

Cadmus will review and summarize findings from prior studies of alternative enforcement structures, including the structure design, components, advantages, and disadvantages, if available.

1.83.2.2. Delphi Panel Information

We will summarize information from the Delphi panel about alternative code enforcement structures. The first Delphi panel survey (late 2019 to early 2020) obtained estimates of the share of jurisdictions that currently implement alternative enforcement structures and observations about the potential benefits of such structures and likely jurisdiction concerns.

We will request similar information from subsequent Delphi panels every other year. We will expand the survey to solicit feedback on how the structures being adopted affect code compliance. We will compile and summarize the Delphi panel findings for presentation to the independent code expert panel.

1.83.2.3. Jurisdictional In-Depth Interview Data

Cadmus will review information from the interviews conducted with professionals in the three jurisdictions selected for in-depth interviews and document perceptions about alternative enforcement structures, awareness of jurisdictions that have adopted them, and experience with alternative structures.

We will compile and summarize data collected from the interviews each year, identify any trends and effects of the initiative, and organize the information for presentation to the independent panel.

1.83.2.4. Adopting Jurisdiction Interviews

Cadmus will interview participants in the jurisdictions that adopted alternative enforcement structures during the pilot. We also will interview representatives from non-pilot jurisdictions that adopted such

structures during or after the pilot to determine characteristics of the enforcement structures, awareness of the pilots, and influence of the pilots on the design and adoption of the enforcement structures. Interviews will be conducted with up to 10 jurisdictions.

We will summarize the findings from these interviews and any other data provided by the jurisdictions in a format for presentation to the independent panel. Data compiled by NYSERDA related to alternative enforcement structures may also be shared with the independent panel in addition to or in lieu of jurisdiction interviews.

1.83.3. Estimation of Other Equation Parameters

As in estimating training impacts, estimating the indirect savings from alternative enforcement structures requires multiplying the changes in compliance rate by an appropriate measure of the quantity of buildings affected and an estimate of the savings resulting from the change in compliance rate. We will follow a similar procedure to the one described above for the indirect savings from training.

This analysis for the enforcement structure changes will be simpler than for the training impacts. We will assume that all buildings in the jurisdictions are affected and that the effects are not dependent on specific code officials.

1.83.4. Indirect Savings Calculation

Cadmus will calculate the indirect energy savings from the adoption of alternative enforcement structures using Equation 6. We will conduct the analysis at either the individual jurisdiction level or by jurisdiction category and sum the results. We will multiply the attribution factor times the estimated compliance rate increase times the energy savings and the number of buildings affected.

1.84. State and National Code Development Impacts

This section presents the proposed steps to analyze savings resulting from indirect influences of the initiative on national model code and on NYS energy code development and adoption. The basic algorithm for calculating indirect savings from the influence of the initiative on code development and adoption is shown in Equation 3.

Equation 7. Code Development and Adoption Indirect Savings Calculation

$$Indirect\ Savings_{Code\ D\ and\ A} = Savings_{Adoption,NYS} + Savings_{Development,NYS} + Savings_{Development,Model\ codes}$$

Where:

$Indirect\ Savings_{Code\ D\ and\ A}$ = Indirect savings from influence on code development (D) and adoption (A)

$Savings_{Adoption,NYS}$ = Indirect savings from influence on the timing of adoption of the ECCCNYS

$Savings_{Development,NYS}$ = Indirect savings from influence on the stringency of the ECCCNYS

$Savings_{Development,Model\ codes}$ = Indirect savings from influence on the stringency of residential and commercial model codes

This equation breaks the indirect savings into those from effects on the ECCCNYS and on the national model codes. For the NYS code, the equation accounts for the time that the initiative advances code adoption as well as the added stringency of the code. For the national model codes, we assume they continue to follow their normal cycle, but the initiative could have an effect on the final stringency. The stringency of the model codes affects savings in NYS by setting the threshold for stringency that the state might increase through amendments. Table 54 summarizes the inputs required to estimate the indirect energy savings from the initiative's influence on code adoption timing and stringency.

Table 54. Code Development Impact Input Variable Sources and Timing

Outcome Variable	Input Variables	Source	Details	Timing
Savings from accelerating NYS code adoption	Months ECCCNYS adoption accelerated as result of NYSERDA Code-to-Zero initiative activities	Independent panel, based on expertise and information from literature review, Delphi panel, interviews with code adoption professionals	Independent panel will provide consensus estimate of influence of code adoption acceleration	2024; Delphi panel 2021 and 2023
	Quantities of residential and commercial buildings constructed during time adoption was accelerated	Jurisdiction building permit data, Dodge data, Construction Monitor, Construction Market Data, US census	Request statewide building construction data; supplement as needed with other sources	2024
	Savings from NYS code	Analyses conducted to support adoption; building energy simulations as needed	Compile ECCCNYS savings estimates; perform building energy simulations to fill gaps as needed	2024
Savings from increased NYS code stringency	Code requirements resulting from the influence of the initiative	Independent panel, based on expertise and information from literature review, Delphi panel, interviews with code adoption professionals	Independent panel will provide consensus estimate of requirements influenced and extent of influence	2024
	Energy savings from increased ECCCNYS stringency	Analyses conducted to support adoption; building energy simulations as needed	Compile ECCCNYS savings estimates; perform building energy simulations to fill gaps as needed	2024

Outcome Variable	Input Variables	Source	Details	Timing
	Quantities of residential and commercial buildings constructed during time adoption was accelerated	Jurisdiction building permit data, Dodge data, Construction Monitor, Construction Market Data, US census	Request statewide building construction data; supplement as needed with other sources	2024
Savings from increased model code stringency	Code requirements resulting from the influence of the initiative	Independent panel, based on expertise and information from literature review, interviews with code adoption professionals	Independent panel will provide consensus estimate of requirements influenced and extent of influence	2024
	Energy savings from increased model code stringency	Analyses conducted to support adoption; building energy simulations as needed; ICC and ASHRAE documentation	Compile model code savings estimates (ICC and ASHRAE); perform building energy simulations to fill gaps as needed	2024

1.84.1. Logic Model Components

The program theory underlying this initiative component is that initiative impacts, such as the influence on stretch code adoption, could have a second order effect on when codes are adopted in NYS, on their stringency, and on the stringency of national model codes. These impacts differ from the other impacts discussed here because there is no initiative activity that directly targets state or national code adoption. That is, these impacts would be anticipated to result from other outputs or outcomes associated with the initiative. The logic model for the Code to Zero Initiative highlights this by showing these impacts as mid- to long-term outcomes.

In NYS, adoption of stretch codes could make it more likely that some of the required measures could be incorporated in the next state code. The initiative might also help accelerate when NYS adopts its next code. At the national level, initiative outcomes, such as stretch code adoption, could influence what measures are included in the next model codes by demonstrating their feasibility and cost-effectiveness.

Because there are no initiative activities directed at the state code or national model codes, these impacts do not follow the logic model structure that presents activities and outputs. All activities and outputs that influence the state and national model codes are embedded in the other initiative activities discussed previously.

The anticipated outcomes are the changes to the state and model codes described above. The core indicators include the requirements adopted in new state and model codes and the timing of NYS code updates.

1.84.2. Estimate of NYSERDA Influence: Acceleration and Stringency

The independent panel will be asked to identify how the initiative affected state and model code development, including what requirements resulted from the influence of the initiative and how the timing of state adoption was affected.

We will rely on information from the sources used to assess the other indirect savings. To credibly assess how the initiative influenced code development and timing, we also recommend conducting interviews with NYS and model code developers. If available, Cadmus will review and summarize NYSERDA's own tracking of code advocacy efforts for the panel.

1.84.3. Estimate of Savings from ECCCNYS Acceleration and Increased Stringency and from National Model Code Stringency

To estimate code energy savings, we will compile data from other sources, such as studies conducted to support adoption of the ECCCNYS and development of the model codes. As necessary, we will perform building energy simulations to provide energy savings estimates for code requirements if information from other sources is inadequate.

Cadmus will use the information provided by the independent panel to estimate the additional energy savings resulting from the initiative's influence. This will require using the estimates of the number of new buildings constructed to calculate savings from the other effects as well as the energy impacts of the specific code requirements.

1.84.4. Indirect Savings Calculation

We will combine all data and calculate additional indirect savings that could be attributed to the state and model code requirements and timing effects of the initiative. Given that these effects are secondary, we anticipate this analysis to be more of a qualitative assessment than a detailed quantitative analysis.

1.85. Eliminate Double-Counted Savings

There is the possibility that some initiative activities will contribute to the same outcomes and impacts as other activities. Cadmus will start with the existing initiative logic model and refine it as needed to identify paths through which different activities could produce similar outcomes. As described earlier, we anticipate overlap in the effects of the support provided to resource-constrained jurisdictions and the stretch code pilots, so our review of potential double-counting will include an assessment of the interactions and potential overlap of these initiative activities.

We will use the revised logic model to guide development of the interview instruments and focus our data collection to distinguish among the effects of different initiative activities.

We will carry this process into the independent panel assessments by stressing that the panel should consider indirect impacts that are linked primarily to a single initiative activity. We will also ask the panel to identify any impacts that could be attributable to multiple initiative activities and provide estimates of the extent of any overlapping influences.

We will be responsible for using this information to make any necessary adjustments to the impact assessments to minimize double counting.