

Massachusetts Electric and Gas Program Administrators

**Follow-up Interviews with CCSI
Commercial Training Attendees—
Revised Draft**

February 8, 2016

**Prepared by:
Cadmus Group, Inc.**



Massachusetts Electric and Gas Program Administrators

Follow-up Interviews with CCSI Commercial Training Attendees— Revised Draft

February 8, 2016

Copyright © 2016 Tetra Tech, Inc. All Rights Reserved.

Part of the Special and Cross-Cutting Evaluation Program Area

Tetra Tech
6410 Enterprise Lane, Suite 300 | Madison, WI 53719
Tel 608.316.3700 | Fax 608.661.5181
www.tetratech.com



TABLE OF CONTENTS

1. Executive Summary	1-1
1.1 Use of Training Information in the Field	1-1
1.2 Sharing Information from the Training	1-1
1.3 Code Compliance and Enforcement Environment	1-2
1.4 Considerations for Improving the CCSI Training	1-2
2. Introduction	2-1
2.1 Commercial Classroom Training	2-1
2.2 Follow-up Interview Design	2-1
2.3 Sampling	2-2
2.4 Respondents	2-4
3. Use of Training Information in the Field	3-1
3.1 Municipal Building code employees and Building Inspections and Permit Review	3-2
3.1.1 On-site Inspections by Municipal Building Code Employees	3-3
3.1.2 Permit Application or Plan Reviews by Municipal Building Code Employees	3-3
3.2 Builders' and Others' Commercial Projects Worked on Since Training	3-4
3.3 Changes Made to Work after Attending Training	3-5
3.3.1 Municipal building code employees	3-6
3.3.2 Builders and others	3-7
3.4 Why No Changes were Made after Attending Training—Builders and Others	3-10
4. Most Useful Information from Training	4-1
4.1 Municipal Building Code Employees	4-1
4.2 Builders and Others	4-2
5. Sharing of Information and Recommending Training	5-1
5.1 Parties with whom Information has been Shared	5-1
5.2 Information Shared with Other Parties and Use	5-4
5.3 Recommending Training to Other Parties	5-10
6. Sources of Information in Addition to CCSI	6-1
6.1 Training Attended Since CCSI Training	6-1
6.2 Other Sources of Information on Building Codes	6-1
6.2.1 Municipal building code employees	6-2
6.2.2 Builders and others	6-2
7. Code Compliance and Enforcement Environment	7-1
7.1 Builders and Others' Interaction with Code Officials	7-1
7.2 Customer Interest in Energy Efficiency	7-2



7.3	Prioritization of Energy Efficiency	7-3
7.3.1	Municipal building code employees	7-3
7.3.2	Builders and others	7-5
7.4	Situations Code Officials Encounter in the Field	7-7
7.5	Time Spent on Enforcement of and Compliance with the Energy Code	7-7
7.6	Code Compliance Documentation Filed	7-9
7.6.1	Municipal building code employees	7-10
7.6.2	Builders and others	7-11
7.7	Length of Time from Permitting to Certificate of Occupancy	7-13
8.	Suggestions for Improving the CCSI Training and Other Comments	8-1
8.1	Additional Training topics	8-1
8.2	Suggestions for Improving Energy Code Technical Support Initiative	8-3
APPENDIX A:	Interview Guides	A-1
A.1	Follow-up In-depth Interview Guide for Commercial Training Attendees— Municipal Building Code Employees	A-1
A.2	Follow-up In-depth Interview Guide for Commercial Training Attendees— Builders and Others	A-7



1. EXECUTIVE SUMMARY

As part of the ongoing evaluation of the Massachusetts Code Compliance Support Initiative (CCSI), Cadmus conducted follow-up in-depth interviews (IDIs) with 21 individuals who had attended one or more commercial classroom training sessions approximately six months earlier. Four respondents are municipal building code employees and 17 are builders, architects, equipment suppliers, or energy efficiency professionals (referred to as “builders and others”). The interviews were intended primarily to determine if and how the subjects are applying in the field what they learned in the training. The interviews also explored how the information from the training is shared, what changes are occurring for code compliance and enforcement, and any suggestions for improving the training.

1.1 USE OF TRAINING INFORMATION IN THE FIELD

On average, since attending the training, municipal building code employees reported they have used the information in 34 percent of the work they have completed; builders and others reported using the information in 35 percent of their work. Respondents are using the training in a variety of ways, some of which include design practices, inspections, compliance of different building systems and components, and making recommendations to peers, customers, and end users.

Over half of the respondents (12 out of 21, or 57 percent) said they had made some changes in their work as a result of attending the training. Municipal building code employees were more likely to say they had made changes as a result of the training (67 percent for inspections and 75 percent for building permit review) than builders and others (53 percent for all work). Areas identified as most affected by these changes included new construction, project management, and providing code-related assistance to others.

Municipal building code employees identified the code overview and the discussion on compliance options as the two most useful parts of the training. For the builders and others group, a little over one-third of the 16 that answered the question (6 out of 16, or 38 percent) said the information about lighting provisions—particularly day-lighting, occupancy sensors for exterior lighting, plug-load controls, and LED lighting—was the most useful; 31 percent (5 out of 16) remarked that the overview of code provisions was the most useful; and another 31 percent (5 out of 16) said building envelope topics, particularly air sealing requirements, glazing, and discussion on moisture control were the most useful.

The most common reasons respondents gave for not making any changes to their work after attending the training were that they already knew the information and that the training did not directly apply to their job positions.

1.2 SHARING INFORMATION FROM THE TRAINING

Nearly four-fifths of respondents (17 out of 21, or 81 percent) had shared some of the information from the trainings with other parties. Municipal building code employees were more likely to share the information (four out of four) than were builders and others (13 out of 17, or 76 percent). Among those who did share information, all of the municipal building code employees shared information with builders, contractors, and design professionals. Over one-half (7 out of 13, or 54 percent) of the builders and others who shared information from the



training did so with design professionals and 46 percent (6 out of 13) with builders and contractors. The majority of both municipal building code officials and builders and others respondents (10 out of 17, or 59 percent) said that of the various parties with whom they shared information, most were using it.

One-third (7 out of 21) of the respondents said that since attending the initial CCSI training they had attended one or more training sessions or gatherings, including conferences and industry association meetings, to discuss building codes. Respondents also identified their two main sources of information on building code requirements; these were peers and colleagues (12 out of 21, or 57 percent) and professional/industry associations (also 12 out of 21, or 57 percent). Respondents said other important sources were the code itself, the Internet, industry publications, updates from manufacturers, and continuing education courses.

1.3 CODE COMPLIANCE AND ENFORCEMENT ENVIRONMENT

Most builders and others (11 out of 17, or 65 percent) reported increased interest in energy efficiency among their customers during the past year; of these, all but one (10 of the 17, or 59 percent) added that their customers were willing to pay more for energy efficiency. Three of four municipal building code employees (75 percent) reported energy efficiency as a medium-level priority relative to other areas they are responsible for; these three said health, safety, and structural codes come first. All 17 builders and others reported that checking for energy efficiency was a high priority. Over three-fourths (13 out of 17, or 76 percent) said energy efficiency is a high priority because it is central to their business practices. Nearly one-third (5 out of 17, or 29 percent) added that their clients are the driving force in how they prioritize energy efficiency in their business.

All four municipal building code employees said the priority of energy efficiency had not changed since attending the training and would likely not change in the future. One-third of builders and others (6 out of 17, or 35 percent) said that the priority for checking energy efficiency had increased in the last year, while the remaining two-thirds (11 out of 17, or 65 percent) said that it had not. Over half of the respondents who were neither builders nor municipal building code employees (7 out of 12, or 58 percent) said builders had become more concerned with complying with the code in the last year.

1.4 CONSIDERATIONS FOR IMPROVING THE CCSI TRAINING

Half of the respondents that offered suggestions for improving training (8 out of 16, or 50 percent) suggested improving CCSI training and other courses by adding information about specific code sections such as ventilation, air sealing, and window requirements. One-quarter (4 out of 16) suggested including more case studies and real life examples to help participants understand practical applications of the code provisions. Additional suggestions and requests were to clarify when and where each of the different codes and code variations are enforced, explain details of energy savings realized through code changes, and provide more solution-oriented rather than requirement-oriented material, among others.

Fifteen of the 17 builders and others (88 percent) who offered more overarching suggestions recommended ways to improve the duration or the types of training offered. One-third (5 out of 15) recommended that the training be more in depth. An additional one-third (5 out of 15)



suggested that training vary for different market actors and another two said there should be a course for beginners.

Finally, all but one of the 21 respondents said they would encourage others to attend the training because it was thorough, informative, and a good experience overall. Respondents expressed their appreciation for the trainings giving them a good introduction to the energy code and bringing together municipal building code employees, builders, and others to discuss situations encountered in the field.



2. INTRODUCTION

Cadmus, as part of the cross-cutting team, conducted follow-up in-depth interviews (IDIs) with 21 individuals who had attended one or more commercial classroom training sessions. Four respondents were municipal building code employees and 17 were builders, architects, equipment suppliers, or energy efficiency professionals. The interviews were intended primarily to determine if and how the subjects are applying in the field what they learned in the training. The cross-cutting team allowed at least six months between the training sessions and the follow-up IDIs. The training sessions were conducted from November 2014 through June 2015; the team interviewed the 21 attendees from June through November 2015.

2.1 COMMERCIAL CLASSROOM TRAINING

The Code Compliance Support Initiative (CCSI) sponsored ten commercial classroom training sessions, lasting between three and three-and-one-half hours each, between November 20, 2014, and June 17, 2015. Six concentrated on envelope and building science, one on HVAC and indoor air quality, and three on lighting, lighting controls, and other electrical provisions. From the enrollment data and completed immediate surveys, Cadmus estimated the commercial training had 427 unique attendees.

2.2 FOLLOW-UP INTERVIEW DESIGN

The follow-up interview guides were designed to assess how the training has influenced attendees' activities in Massachusetts in the past several months. They address these areas of the training:

- Activities since attending training session(s) depending on the type of trainee—building inspections, building permit review, projects under design, projects under construction, and completed projects
- How and if the work done since the training had made use of the information provided
- Most useful part of the training and suggestions for improvement
- Whether respondents had shared what they learned with others and how this information was being used
- Whether the respondents recommend the training to others.

The interview guides also addressed perceived changes in code enforcement and the market for energy efficiency in these areas:

- Type of information filed with building departments to document energy code compliance
- Other training the respondents had attended and sources of information used
- For builders and others, whether customers had become more interested in energy efficiency and how willing they were to pay more for it in the last year or so



- For builders and others, whether interactions with code officials had changed over the past year
- For municipal building code employees, serious issues related to energy efficiency encountered over the past year or so and how they have been addressed
- For municipal building code employees, factors that influenced the effort to check for the energy efficiency aspects of code compliance.

Appendix A contains copies of the interview guides for municipal building code employees, builders, and others.

2.3 SAMPLING

To determine a sample for this study, interviewers selected training attendees at random from a list generated from the immediate surveys completed at the conclusion of each training session. Survey respondents self-identified as builder/other, equipment supplier, or code official. The code officials survey type was targeted first to ensure enough training attendees participated in the follow-up IDIs. Code officials were reached by both phone and e-mail, when provided. Once the list of possible municipal building code employees was exhausted, the equipment supplier and builder/others survey types were targeted. Possible respondents were reached by both phone and e-mail, when provided. All follow-up IDIs were scheduled and conducted over the phone.

The participants who were eligible for the follow-up IDIs participated in training between November 2014 and June 2015. The follow-up IDIs were conducted in June 2015 and again in November 2015, allowing at least six months between the training sessions and the follow-up IDIs. Table 2-1 shows the distribution of training participants between the commercial training events attended by year for the two trainings.

Table 2-1. Year of Commercial Training Attended

Year of Commercial Training Attended	Number of Attendees Listed
2014	112
2015	109
Total	221

The total population of commercial training attendees available for the interviews consisted of 221 respondents. The first set of IDIs, conducted in June 2015, focused exclusively on training attended in 2014 to ensure at least 6 months had passed between the trainings and follow-up IDIs. The beginning population of 112 attendees was narrowed down by eliminating duplicate surveys for the same participant, surveys completed anonymously, and surveys without sufficient contact information. The final population from the 2014 training consisted of 80 possible IDI participants.

The population set of 80 possible participants was sorted by the type of respondent, identifying the participant as either a code official or builder and others. Just over half of the respondents (46 out of 80, or 57 percent) were builders and others, while the remaining 34 respondents (43 percent) identified as code officials (Table 2-2).



Table 2-2. Type of Survey Participant from 2014 Training

Type of Participant	Number of Attendees Listed
Code Officials	34
Builders/Others	46
Total	80

Since the sample list consisted of a similar number of code officials and builders and others, the entire list was randomized and the interviewer called each of the respondents. Cadmus also sent an e-mail to each of the possible IDI participants. The interviewer called through the list until 10 interviews were conducted; each respondent was called at least one time. One additional respondent was interviewed as he or she returned the phone call of the interviewer at a later time. The interviewer noted that respondents were often difficult to reach via telephone; code officials were particularly difficult to reach. The June 2015 follow-up IDI respondents consisted of two code officials and nine builder and other respondents (Table 2-3).

Table 2-3. June 2015 Follow-Up Interview Respondents

Position	Number of Respondents
Code Officials	2
Builders/Others	9
Total	11

The second set of IDIs, conducted in November 2015, focused on attendees at commercial training in 2015. The beginning population of 109 attendees, as illustrated in Table 2-1, was further narrowed down by eliminating duplicate surveys for the same participant, surveys completed anonymously, and surveys without sufficient contact information. The final sample frame consisted of 70 possible IDI participants.

The sample of 70 possible participants was sorted by the type of participant, identifying the participant as either a code official or builder and others. Eighty percent of respondents (56 out of 70) were builders and others, while the remaining 14 respondents (20 percent) identified as code officials (Table 2-4).

Table 2-4. Type of Survey Participant from 2015 Training

Type of Participant	Number of Attendees Listed
Code Officials	14
Builders/Others	56
Total	70

In an attempt to get a larger number of code official IDI participants, the recruitment for the second set of interviews concentrated first on the 14 code officials. The interviewer began by making contact with each of the code officials via e-mail and following up the e-mail contact with a phone call. Four of the code officials were out of the office during the timeframe in



which the IDIs were conducted, five declined the interviews, and the interviewer left two messages for three of code officials. The remaining two respondents elected to participate in the IDIs.

Once the code official sample was exhausted, the interviewer randomized the builder and other respondents and made initial contact via e-mail. The e-mails were followed up by a phone call until eight interviews were completed; 41 builders and others were called in total.

The November 2015 IDIs consisted of two code official respondents and 8 builder and other respondents (Table 2-5).

Table 2-5. November 2015 Follow-Up Interview Respondents

Position	Number of Respondents
Code Officials	2
Builders/Others	8
Total	10

Due to the limited population size for the commercial follow-up interviews in 2015, the study had not set any quotas for the two categories of respondents (building code employees versus builders and others), as had been done for the residential follow-up interviews. Since the response rate for building code employees was lower than that of other trainees, and it is important to get reliable feedback from this group, the next set of follow-up interviews will take steps to increase the response rate for this group. This includes setting quotas and carefully allocating the available sample of building code employees between the residential and commercial follow-up interviews. (Many building code employees attend both the residential and commercial trainings, so they could be interviewed as part of either study.) The study may also consider having more contacts by the PAs to emphasize the importance of building code employees providing feedback.

2.4 RESPONDENTS

The 21 respondents worked in various fields that make use of the training provided by the CCSI. Four of the 21 of the respondents (19 percent) worked for municipalities enforcing the building code—their occupations included building commissioner, energy manager, and two code officials. The other 17 respondents worked as builders, architects, subcontractors, equipment suppliers, energy modelers, and energy efficiency professionals.

The respondents were asked to list the Massachusetts municipality in which they did most of their work. Table 2-6 lists the 21 respondents' occupations¹ as well as how many work in municipalities under the 2012 International Energy Conservation Code (IECC), the stretch code, or both.²

¹ Subcategories are listed, with indentations, under the main categories for all tables in this report.

² The base code for commercial buildings allows them to meet either the 2012 IECC or ASHRAE 90.1-2010. The stretch code has been adopted by close to half of the Massachusetts cities and towns. For large commercial buildings, the stretch code requires performance 20% better than required by



Two of the four municipal building code employees worked in cities and towns that are under the stretch code while the other two worked in cities and towns under the 2012 IECC. Six of the 17 builders and others respondents (35 percent) worked in municipalities that are under both the 2012 IECC and the stretch code. Eight respondents worked in municipalities under just the stretch code and three in the builders and others group worked in municipalities that strictly use the 2012 IECC.

Table 2-6. Follow-Up Interview Respondents

(Number of respondents, n=21)

Position	Total Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
All municipal building code employees	4	2	2	0
Code officials	2	2	0	0
Building commissioners	1	0	1	0
Energy managers	1	0	1	0
All builders and others	17	3	8	6
Architects	5	0	2	3
Project manager/planners	2	0	1	1
Energy efficiency consultants	2	0	2	0
Energy engineers	2	0	2	0
Energy planners	1	1	0	0
Commissioning project managers	1	0	0	1
Equipment suppliers	1	1	0	0
Specifications writers	1	0	1	0
Inspectors	1	1	0	0
Owners	1	0	0	1
All respondents	21	5	10	6

The 21 respondents attended one or more of the courses offered by CCSI on envelope and building science, HVAC and indoor air quality, lighting, lighting controls, and other electrical provisions, as noted in Table 2-7. Thirteen of the 21 respondents (62 percent) attended commercial envelope training, two attended commercial lighting training, and one attended

ASHRAE 90.1 -2007 and for medium-size commercial buildings, the code requires meeting specific prescriptive requirements or the same requirement as large commercial buildings.



commercial HVAC training. Additionally, five respondents noted that they had attended both the commercial envelope and commercial lighting trainings. Respondents who attended more than one training were asked to answer with respect to the last training they attended at least six months prior.

Table 2-7 Types of Training Attended

Type of Training Attended	Total Number of Respondents	Type of Respondent	
		Municipal Building Code Official	Builders and Others
Commercial envelope	13	2	11
Commercial lighting	2	1	1
Commercial HVAC	1	1	0
Commercial envelope and commercial lighting	5	0	5



3. USE OF TRAINING INFORMATION IN THE FIELD

A key goal of the follow-up interviews was to assess how the training attendees were using what they had learned in their everyday jobs. To begin, interviewers asked the four municipal building code employees to estimate the percentage of commercial projects they had completed that made use of the information they had learned through the training. Interviewers also asked these employees to describe how they had used the training. Table 3-1 summarizes this information.

On average, municipal building code employees reported using the lessons learned from the training in 34 percent of the work they have completed. Both of the code officials said they had used the information to provide education in their jurisdiction, by explaining the code to applicants, or by providing education to architects. Respondents had also used the information to conduct field inspections, review plans, and determine code compliance.

Table 3-1. Percentage of Work Using Information from Training—Municipal Code Employees (n=4)

Type of Respondent	Percentage of Work	How Training is Being Used
Code official	50	Explaining code sections to applicants
Code official	35	Field inspections; providing education to architects
Energy manager	25	Reviewing envelope additions
Building commissioner	25	Determining compliance options; complying with prescriptive requirements
Combined average	34	--

As with municipal building code employees, interviewers asked builders and others to estimate the percentage of work they had completed that made use of the information they learned through the training and to describe how the training has been used. Table 3-2 summarizes this information.

Among all builders and others, 82% of respondents (14 out of 17) reported that they used the training in some aspect of their work. Note that one of the 17 respondents indicated they were not using the training in any of their work (answered zero percent) and two said that the training had not been applicable to their work.

On average, the training was used in 27 percent of the work completed since attending the training. Respondents were using the training in a variety of ways, such as design practices, inspections, compliance of different building systems and components, and making recommendations to peers, customers, and end users.



Table 3-2. Percentage of Work Using Information from Training—Builders and Others
(Builders and Others, n=17)

Type of Respondent	Percentage of Work	How Training is Being Used
Energy engineer	80	Energy modeling
Equipment supplier	70	Making product recommendations to engineers and end-users
Architect	60	New construction; roof renovations
Commissioning project manager	50	Plan review
Specifications writer	50	Material selection; writing performance requirements
Architect	30	Envelope compliance
Architect	25	Building design
Energy engineer	20	HVAC design
Project manager	20	Making energy related recommendations to customers
Sustainable design consultant	15	Informing clients of rebates and incentives
Energy efficiency consultant	15	Implementing occupancy and day-lighting strategies
Architect	10	New construction
Architect	10	General energy code work for projects
Inspector	10	Plan review for inspections and issuing permits
Owner	0	Not using the training
Project manager	0	Not applicable
Energy planner	0	Not applicable
Combined average	27	--

The following subsections examine the work performed by municipal building code employees, how they used the training in inspections and plan reviews, the changes all respondents believe they had made due to the training, and the reasons why some trainees had not made any changes to their work as a result of the training session(s).

3.1 MUNICIPAL BUILDING CODE EMPLOYEES AND BUILDING INSPECTIONS AND PERMIT REVIEW

Interviewers asked municipal building code employees to identify whether they performed only site inspections, only plan/permit review, or both as part of their work. As shown in Table 3-3, three of the four municipal building code employees performed both site inspections and permit/plan review. One municipal building code employee, an energy manager, performed only permit/plan review as part of his position.



Table 3-3. Type of Work Performed by Follow-Up Interview Respondents
(Municipal Building Code Employees, n=4)

Type of Work Performed	Number of Respondents
Only site inspections	0
Only permit/plan review	1
Both site inspections and permit/plan review	3

3.1.1 On-site Inspections by Municipal Building Code Employees

The follow-up IDIs asked municipal building code employees to estimate how many commercial on-site inspections they had conducted or participated in since attending the training. The number of inspections varied by respondent, from zero (does not perform inspections) to 20 inspections.

Interviewers then asked respondents to estimate what percentage of those inspections were final inspections, how many total square feet were in all of the inspected buildings, and the percentage of the total square feet inspected that was for final inspections. Table 3-4 summarizes the answers provided by the three respondents who conducted commercial inspections as part of their positions. None of the respondents could provide the total floor area inspected.

Table 3-4. Inspections Performed by Municipal Building Code Employees
(Municipal Building Code Employees, n=3)

	Respondent 1	Respondent 2	Respondent 3
Total inspections	20	2	15
Percent of total that were final inspections	5%	50%	30%
Percent of total sq. ft. for final inspections	25%	50%	50%

3.1.2 Permit Application or Plan Reviews by Municipal Building Code Employees

The follow-up IDIs then asked municipal building code employees to estimate how many commercial building permit applications or plans they had reviewed or participated in reviewing since attending the training and the number of buildings involved. Answers varied significantly by respondent and are summarized in Table 3-5.



Table 3-5. Permit Applications or Plans Reviewed by Municipal Building Code Employees
(Municipal Building Code Employees, n=4)

	Respondent 1	Respondent 2	Respondent 3	Respondent 4
Total permit/plan reviews	75	4	Not sure	8
Number of total buildings	75	4	Not sure	8

All respondents who provided an estimate of the total number of permit applications and plans reviewed since attending the training said the number of buildings permitted and the number of applications/plans reviewed were the same.

3.2 BUILDERS' AND OTHERS' COMMERCIAL PROJECTS WORKED ON SINCE TRAINING

Builders and others were asked to estimate the number of commercial projects permitted under the energy code they had worked on since attending the training. Fourteen of the 17 respondents stated they had worked on some projects permitted under the energy code. The other three answered that they had not.

As shown in Table 3-6, an average of 14.8 projects had been permitted under the energy code and worked on since the training, although the number of projects varied greatly from one energy professional to another.

Two project managers and an energy efficiency consultant reported that they had not worked on any projects permitted under the energy code since the training. Interviewers asked these three respondents when they expected to work on a project permitted under the energy code. Two respondents said they expected to work on a project permitted under the energy code in the next three months; the third respondent expected to work on one in the next 7 to 12 months.



Table 3-6. Number of Commercial Projects Worked on Since Training
(Builders and Others, n=14)

Respondent	Number of Projects
Architect	70
Equipment supplier	70
Architect	15
Owner	12
Sustainable design consultant	10
Inspector	10
Commissioning project manager	6
Architect	3
Architect	3
Architect	2
Specifications writer	2
Energy engineer	2
Energy engineer	1
Energy planner	1

3.3 CHANGES MADE TO WORK AFTER ATTENDING TRAINING

To get a better idea of how the training had influenced attendees' work, interviewers asked a series of questions focused on changes made as a result of the training. Municipal building code employees were asked two questions:

"Have you changed how you conduct inspections for the energy code as a result of the training(s) you attended" and

"Have you changed how you review building permit applications/plans as a result of the training (s) you attended."

Builders and others were asked a similar question:

"Have you changed the work that you do to better comply with the energy code as a result of the training(s) you attended?"

The interviewers asked all respondents who said they had made any changes to their work after attending the training to explain how they had changed what they do in the field. To the extent possible, the interviewers tried to get the respondents to describe the areas affected by these changes. The responses, as described in this section, varied from focusing on specific areas to more general changes.



3.3.1 Municipal building code employees

A. Changes made to inspections

As already noted, all respondents filled out immediate survey forms after their trainings. Table 3-7 compares the responses of municipal code employees to the immediate survey question of when they expected to first use what they had learned in the training session with whether the respondents reported changing how they conduct inspections in the follow-up interviews. All four code employees indicated in the immediate survey that they would be using something they learned at the training within the next six months. Two code employees confirmed that they had, in fact, used what they learned in the training in that time period, the other two indicated that they still had not used what they learned in performing their job. The two who reported that they had not made changes said that the topics had not been relevant to their work.

Table 3-7. When Expected to First Use Training Information and Changes Made

Expected to first use training in immediate survey	Whether made changes to their work	
	Yes	No
Code Officials		
As soon as I walk out the door	1	1
Sometime in the next three months	0	1
In the next four to six months	1	0
In the next seven to twelve months	0	0
More than a year from now	0	0

Two of the three municipal building code employees who conducted inspections as part of their job position said they had made some changes as a result of the training. The first respondent said that she has more knowledge, in general, to apply to inspections since attending the building envelope training, particularly in regards to duct sealants and insulation requirements. She said the training had allowed her to “*spend less time looking up the nuances of the code.*”

The second respondent also said that the code provided a solid knowledge base to apply when conducting inspections and he found himself spending less time verifying the measures of the code that were focused on during the building envelope training. To further explain how this general knowledge has been applied to his work, the respondent added:

“I have more detailed knowledge of the code requirements now, so instead of relying on mechanical engineers for answers, I can solve problems myself. I can also speak with engineers in greater detail about the code provisions.”

Both respondents said that they expect what they learned in the training to influence inspections in the future.

The third municipal building code employee who conducted inspections as part of his job position said he had not changed how he conducted inspections as a result of the HVAC



training he attended because “*not enough new inspections have been needed.*”

B. Changes made to permit reviews

Three of the four municipal building code employees who performed permit application or plan reviews as part of their position said they had changed how they perform reviews as a result of the training.

The first respondent, a code official, said the building envelope training had helped her look with more detail at the applications submitted and that she understood the required documentation better. Another respondent remarked that the HVAC training had enabled him to focus more on the code’s HVAC requirements and he believed the knowledge from the training will be even more useful as the code becomes more stringent. The third respondent said the building envelope training had allowed him to spend less time reviewing plans since his base knowledge of the code had increased as a result of the training.

One of the four municipal building code employees who performed permit application or plan reviews as part of his position noted that the training had not changed how permits are reviewed because his jurisdiction had not had a great enough need for permit review since then.

C. Other changes as a result of training

Lastly, interviewers asked municipal building code employees if there were areas other than inspections and permit/plan review where the training had influenced their work. Two of the four municipal building code employees said that there were other areas impacted by the training. One respondent, an energy manager that attended the building envelope training, said he was “*better able to answer questions regarding the requirements for additions and usage change of buildings.*” The other respondent, a building commissioner that attended the HVAC training, noted that he could now provide greater technical assistance and could “*proactively help with code requirements and building science questions.*”

3.3.2 Builders and others

As with the code employs, all builders and other respondents had been provided immediate survey forms after their trainings. However, some surveys from these trainings did not include respondent names, or were not filled out. Because of that, we found only 15 responses. Table 3-8 compares the responses to the immediate survey question of when they expected to first use what they had learned in the training session with whether the respondents reported changing anything in their work. All respondents who filled out the immediate survey indicated that they expected to use something they learned in the training within three months. Nine respondents confirmed that they has already used what they had learned in the training. For the remaining six, they reported that they either had already known the subject matter covered in the training, or that they still intended to apply what they learned, but it had not been necessary yet in their work. As the table shows, those who planned to use the information immediately were more likely to confirm that they had used the information.



Table 3-8. When Expected to First Use Training Information and Changes Made

Expected to first use training in immediate survey	Whether made changes to work	
	Yes	No
Builders / Others		
As soon as I walk out the door	8	2
Sometime in the next three months	1	4
In the next four to six months	0	0
In the next seven to twelve months	0	0
More than a year from now	0	0

Nine of the 17 builders and others respondents (53 percent) indicated that they had changed the work they did to better comply with the energy code as a result of the training, and they specified the areas most affected by these changes. As shown in Table 3-9, the most notable effect of the training was the improvement in general knowledge, awareness, and familiarity with the code. Five of the nine respondents (56 percent) said the improvement in general knowledge was key to how they were doing business now. An energy engineer that attended the building envelope training said, *“My familiarity with the code has improved and I’ve seen an increase in how efficient I am in all of my projects. I have to work with several variations of the code and I am able to switch between them much easier and without confusion.”*

A project manager that also attended the building envelope training noted that his knowledge and awareness of code requirements had increased and that he was seeing the benefits in his work with others:

“I am more aware of energy provisions and the options for compliance now. As someone who works outside of the design, construction, and enforcement industries, knowledge is really important to be able to relate to the people on my projects. I am now an active participant in the discussion of energy efficient features.”

Another respondent, a specifications writer that attended the building envelope training, added that she was using the training to *“double check performance requirements and have conversations with project teams to make sure they are using materials that comply with the code.”*

Table 3-9. Areas Affected by Builder and Other Trainee Changes
(multiple response; n=9)

Areas	Number of Respondents
<i>n</i>	9
Familiarity with code requirements/general awareness	5
Material and product selection	2
Efficiency/speed of work	2
Greater attention to detail	2
Better participant in discussion of energy features with peers and colleagues	2
Performance requirement verification	1
Easier to market improvements to owners	1
Relayed information to employees or subcontractors	1
Focus on wireless sensors	1

Interviewers asked the builders and others who identified changes made to their work as a result of the training to also consider what they would be doing differently had they not attended the training and what projects had been most affected by what they learned (see Table 3-10). One-third of the respondents (three out of nine, or 33 percent) said they would not be doing anything differently. Two respondents stated that their activities would remain the same, but that they could now do them more efficiently.

Table 3-10. Activities Builders and Others Would Be Doing Differently without Training
(multiple response; n=9)

Activities	Number of Respondents
<i>n</i>	9
No activities would be different	3
Same activities but not as efficiently	2
Role in design decisions would be smaller	1
Less time spent on details now aware of	1
Providing recommendations for non-compliant materials	1
Using different products	1

Table 3-11 summarizes the projects that builders and others identified as most affected by what they learned in the training. One-third of respondents (three out of nine, or 33 percent) said new construction projects were most affected by the training. Other projects mentioned included office buildings, multifamily homes, low-budget projects, rehabilitation projects, modeling projects, and project management.



Table 3-11. Builders’ and Others’ Projects Most Affected by Training
(Number of respondents, n=9)

Projects	Total Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
New construction	3	0	2	1
Project management	2	0	1	1
Office buildings	1	1	0	0
Multifamily homes	1	0	1	0
Modeling projects	1	0	1	0
Low-budget projects	1	0	1	0
Rehabilitation projects	1	0	1	0

3.4 WHY NO CHANGES WERE MADE AFTER ATTENDING TRAINING—BUILDERS AND OTHERS

Eight of the 17 builders and others respondents (47 percent) indicated that they had not changed the work they did to better comply with the energy code as a result of the training. As shown in Table 3-12, half of these respondents (four out of eight, or 50 percent) who had not made any changes said the training did not apply to their work. These respondents included an energy planner, inspector, energy efficiency consultant, and sustainable design consultant. The other half (four out of eight, or 50 percent) indicated that they had not made any changes because they already knew the information presented. Two of these four went on to say that the work they were currently doing already focused on energy efficiency. One, an architect that attended the building envelope training, elaborated, *“I already design buildings that will achieve energy savings 30% better than code. My clients are very energy efficiency oriented and come to our practice for our expertise in above code design.”*



Table 3-12. Why Builders and Others Made No Changes
(numbers of respondents; n=8)

Respondent	Reason	Number of Respondents
Energy planner	Does not apply to work	1
Inspector	Does not apply to work	1
Energy efficiency consultant	Does not apply to work	1
Sustainable design consultant	Does not apply to work	1
Architect	Already knew the information	1
Owner	Already knew the information	1
Architect	Already knew the information/ focus already on efficiency	1
Commissioning project manager	Already knew the information/ focus already on efficiency	1



4. MOST USEFUL INFORMATION FROM TRAINING

A key goal of the follow-up interviews was to identify what areas the attendees found most useful in the training and why. The question posed to them was:

“To the best of your recollection, can you tell me which part or parts of the training(s) you found most useful and why?”

The results, as detailed in the following subsections, varied from focusing on specific topics that respondents found useful to more general feedback about the usefulness of the training.

4.1 MUNICIPAL BUILDING CODE EMPLOYEES

Table 4-1 shows which part or parts of the training the four municipal building code employees found most useful. Half (two out of four) said that the training was useful in general and half said the most useful part was the overview of compliance options. Respondents also listed the instructor and his inclusion of real-life experiences, references to the Whole Building Design Guide, and lighting requirements for zoning as the most useful topic areas discussed during the training session(s).

Table 4-1. Most Useful Information from Training—Municipal Building Code Employees
(multiple response; n=4)

Most Useful Part of Training	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
General	2	1	1	0
Compliance options	2	0	2	0
Code requirement overview	1	1	0	0
Lighting (zoning)	1	1	0	0
Real-life experiences	1	0	1	0
Outstanding instructor	1	0	1	0
Reference to Whole Building Design Guide	1	0	1	0

A building commissioner that attended the HVAC training elaborated on compliance options being the most useful part of the training by saying *“compliance alternatives are a significant part of my job and really important to understanding the energy code in general.”*

A code official that attended the building envelope training noted the importance of a great instructor and real-life examples, stating:

“The training was just really well done. I can’t say enough about the instructor. An architect gave the presentation and that is what really made the training successful. He had a lot of real life stories—great ones—things he had seen done correctly and



incorrectly. He shared all of that with the class and it put everything into perspective. Great to receive information about the code that goes beyond just code provisions.”

4.2 BUILDERS AND OTHERS

Table 4-2 shows which part or parts of the training builders and others found most useful. Sixteen of the 17 builders and others respondents provided one or more parts of the training that were useful. One owner, however, noted that the lighting training she attended was more of an overview and that she “*didn’t find it to be useful.*”

A little over one-third of builders and others (6 out of 16, or 38 percent) said the information provided about lighting provisions, particularly day-lighting, occupancy sensors for exterior lighting, plug-load controls, and LED lighting, was the most useful part of the training. Roughly one-third (5 out of 16, or 31 percent) remarked that the overview of code provisions was the most useful part of the training, and another 31 percent (also 5 out of 16) said building envelope topics, particularly air sealing requirements, glazing, and discussion on moisture control were the most useful part . Builders and others tended to give more general answers, with 4 out of 16 (25 percent) reporting that the most useful part of the training to them was the comparison between the codes (IECC versions, stretch code, ASHRAE 90.1). Another four listed compliance options as the most useful part of the training.

Additional answers provided by the respondents were about the quality of the instructor selected to give the course, the opportunity to socialize with other industry professionals, multifamily provisions, energy savings, utility incentives, and the interactive portions of the presentation that encouraged audience participation.

Table 4-2. Most Useful Information from Training—Builders and Others
(multiple response; n=16)

Most Useful Part of Training	Total Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
All lighting	6	0	0	0
Day-lighting	2	1	1	0
Lighting (general)	1	0	1	0
Plug-load controls	1	1	0	0
Occupancy sensors for exterior lighting	1	0	1	0
LED lighting	1	0	1	0
All envelope areas	5	0	0	0
Air sealing	2	0	2	0
Glazing	1	0	0	1
Review of envelope assemblies	1	0	1	0
Moisture control	1	0	1	0
Overview of code provisions	5	1	4	0



Most Useful Part of Training	Total Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Compliance options	4	0	0	4
Comparing different codes v/ identifying differences	4	1	1	2
Great presenters	2	0	2	0
Real-life examples / best practices	2	0	1	1
Social opportunity with other stakeholders	2	0	2	0
Multifamily provisions	1	0	1	0
Focus on building as a whole	1	0	1	0
Graphics, visuals	1	0	1	0
Energy savings	1	0	0	1
Incentives for compliance	1	0	1	0
Future of the energy code	1	0	0	1
Reinforcement of the importance of energy codes	1	0	0	1
Interactive activities incorporated into training	1	0	0	1

An architect that attended the building envelope training noted the instructor, practical applications, and course graphics as the most useful parts of the training, stating:

“The visuals used throughout the training were exceptional. The graphics made it really easy for me to remember things. I felt like I was in college again and receiving the best lecture of my life. It wasn’t just some presentation about numbers, it was what a building system needs comprehensively. He talked about how different materials come together and made it really easy to understand. And [the instructor] wasn’t reading off anything, he was more like a college professor—using his PowerPoint really effortlessly and clearly. He helped me relate to the code and that was really valuable.”

A specifications writer that also attended the building envelope training commented on the instructor and practical applications as well, noting the usefulness of the comparison of the codes used throughout Massachusetts:

“The overview of everything was very good and I really liked how the trainer effortlessly went from an overview to practical applications. [The instructor’s] examples helped me understand the stretch code more since I don’t use it much. And there were tables which compared the old code and the new code and then clarified where the stretch code fit in—that was really helpful.”

This respondent further explained the value of having industry professionals together in one room:



“It was really useful to have code officials, engineers, builders, and architects attend the same training since they all have a unique perspective on the code. It was helpful to get a broad range of responses from the audience. I’m impressed with how many code officials are on board with energy efficiency!”

Another building envelope training attendee, an architect, remarked that the most useful part of the presentation was the use of interactive tools by the audience. He described a hand-held clicker that was used to ask the audience questions at the end of each section:

“I took notes on the session and the thing I wrote down over and over again was about the hand-held clickers. What a great idea! At the end of each section, we would all use these clickers to answer one or two basic multiple-choice questions and could see what the audience was voting in real time. This was really an innovative way to get and keep people engaged. It gave us all a chance to think about what was presented and then decide how to apply it to real life.”

An energy engineer commented on the usefulness of specific topics, such as glazing, covered by the building envelope training:

“I really loved that the instructor focused so much on glazing. So many of the buildings I work on are glass and glazing is a critical piece of the puzzle. I definitely have a better understanding of the glazing requirements and have used the information in my analyses and to figure out utility incentives.”



5. SHARING OF INFORMATION AND RECOMMENDING TRAINING

The follow-up interviewers also probed with whom the attendees had shared information from the training, what information was shared, how the information was being used, and whether the attendees had recommended the training to their colleagues. The questions were:

“Please think of different parties you interact with, such as people in your building department, colleagues from other jurisdictions, builders, contractors, and others (municipal building code employees)/ such as people working on your project, colleagues, code officials, and others (builders/others). Have you shared information from the training(s) with others?”

“Can you tell me what information you shared and with whom?”

“Do you believe the party/parties is/are making use of the information you have shared? How are they using this information?”

“Would you recommend that your colleagues attend the Energy Code Technical Support Initiative training? Why or why not?”

The resulting feedback, as presented in the following subsections, shows that a variety of information from the training was shared with a diverse group of stakeholders. Nearly all attendees would recommend the training to their colleagues; some respondents said they had already done so and that these other parties had also attended a training.

5.1 PARTIES WITH WHOM INFORMATION HAS BEEN SHARED

The interviewers asked respondents if they had shared information from the training with other parties with whom they typically interacted. As shown in Table 5-1, close to four-fifths of respondents (17 out of 21, or 81 percent) had shared some of the information from the training with other parties. All four of the municipal building code employees stated that they had shared information from the training, while slightly over three-fourths (13 out of 17, or 76 percent) of the builders and others had shared information. Two builders and others had not shared the training at all.

Note that, although two respondents said they had not shared the information by directly referencing the training, one was using skills learned at the training to point out design deficiencies to peers during design review and believed this had led to both a knowledge transfer and increased compliance with the code by the respondent’s firm. The other respondent had attended the training with colleagues, all of whom had shared the information.



Table 5-1. Training Information Shared with Other Parties
(All respondents; n=21)

Training Info Shared with Others?	Number of Respondents	Type of Respondent	
		Municipal Building Code Employee	Builder/Other
Yes	17	4	13
No	2	0	2
Not directly	2	0	2

The interviewers then asked the respondents who said they had shared information (n=17) with whom they had shared it. As shown in Table 5-2, all four municipal building code employees had shared information from the trainings with builders, contractors, and design professionals. One municipal building code employee also shared the information with engineers.

Table 5-2. Parties with Whom Municipal Building Code Employees Shared Training Information
(multiple response; n=4)

Party Information was Shared with	Total Number of Respondents
Builders/contractors	4
Design Professionals	4
Engineers	1

As shown in Table 5-3, roughly half of the builders and others (54 percent) had shared information with design professionals. Other parties builders and others shared training information with include builders and contractors (46 percent), engineers (31 percent), and tradespeople and consultants (23 percent).



Table 5-3. Parties with Whom Builders and Others Shared Training Information
(multiple response; n=13)

Party Information Was Shared with	Total Number of Respondents
Design professionals	7
Builders/contractors	6
Engineers	4
Tradespeople/consultants	3
Clients/building owners	2
Energy modelers	2
Code officials	1
Specification writers	1
Project managers	1
Energy saving companies	1

The majority of respondents (10 out of 17, or 59 percent) believed most of the various parties that they shared information with were using it. Three of the respondents said that only some of the other parties were using the information or that they could only assume the information was being used. Finally, four other respondents said they were not sure if the other parties were using the information or did not know if it was being used in a tangible way (Table 5-4).



Table 5-4. Whether Information Shared with Others Is Being Used
(multiple response; n=17)

Parties Receiving Information from the Training	Yes	Some are	Assume so	Not sure	Not in a tangible way
<i>n</i>	10	0	3	2	2
Design professionals	9	0	1	0	0
Builders/contractors	8	0	2	1	0
Engineers	3	0	0	0	1
Tradespeople/consultants	2	0	0	1	0
Energy modelers	2	0	0	0	0
Clients/building owners	1	0	0	0	1
Code officials	1	0	0	0	0
Specification writers	1	0	0	0	0
Project managers	1	0	0	0	0
Energy saving companies	1	0	0	0	0

5.2 INFORMATION SHARED WITH OTHER PARTIES AND USE

The interviewers also asked respondents to describe the information they had shared with other parties. Table 5-5 shows the training information attendees shared with design professionals. Most of the design professionals that attendees shared information with were provided general code knowledge or information regarding code changes and the differences between the codes used throughout Massachusetts.



Table 5-5. Information Shared with Design Professionals
(multiple response; n=11)

Information Shared	Total Number of Respondents
Code information/changes	10
All Lighting	3
Daylighting	2
Controls	1
All insulation and envelope areas	2
Insulation requirements	1
Air barriers	1
Compliance options	1
Supporting documentation for permit applications	1
Multifamily common areas	1

Table 5-6 shows the information respondents shared with builders and contractors. This information varied from very detailed responses to more general code knowledge. The majority of respondents said they shared information about the building envelope and electrical systems, particularly insulation and lighting controls. They also shared code changes and compliance options.



Table 5-6. Information Shared with Builders and Contractors
(multiple response; n=9)

Information Shared	Total Number of Respondents
All insulation and envelope areas	3
Insulation	2
Fenestration requirements	1
All electrical	3
Lighting controls/ reduction	2
Exterior lighting	1
Code information/changes	2
Compliance options	1
All HVAC	1
Air/vapor barriers	1
Material selection	1
Supporting documentation for permit applications	1

Table 5-7 shows the information from the training that respondents shared with all other parties. Respondents most often shared information with engineers about general code provisions and changes, particularly lighting. The remaining groups received varying information from the respondents.



Table 5-7 Information Shared with All Other Parties
(multiple response; n=16)

Information Shared	Party Receiving Information				
	Engineers	Tradespeople/ consultants	Clients/ building owners	Energy modelers	All Others
<i>n</i>	5	3	2	2	4
All lighting	2	0	0	0	0
Lighting controls	1	1	0	0	0
Exterior lighting	1	0	0	0	0
Code information/changes	1	1	0	2	1
Building positioning	1	0	0	0	0
All insulation and envelope areas	0	1	0	0	0
Fenestration	0	0	0	1	0
Insulation	0	1	0	0	0
HVAC	0	1	0	0	0
Utility incentives	0	0	1	0	1
Compliant product/materials	0	1	0	0	1
Energy savings	0	0	1	0	1
Don't remember/didn't say exactly what was shared	0	0	1	0	0

Feedback on how the various parties used the information passed on from training attendees is broken into broad categories in Table 5-8, Table 5-9, and Table 5-10 by the party using the information (not by respondent type).

Table 5-8 shows how the information respondents shared with design professionals was being used. Design professionals were using the information to design code compliant buildings, including existing buildings, additions, and retrofits. Design professionals were also using the information to provide code knowledge to colleagues, complete permit applications, and review the work of other designers.



Table 5-8. How Information Is Being Used by Others: Design Professionals
(multiple response; n=11)

How Information is Being Used	Total Number of Respondents
To ensure designs are compliant	6
To provide knowledge to colleagues	2
To ensure additions and retrofits are compliant	2
To ensure compliance of building envelopes	1
To ensure existing buildings are compliant	1
Clarify when to comply with which code	1
To provide review of other projects	1
To complete permit applications	1

Table 5-9 shows how the information respondents shared with builders and contractors was being used. Builders and contractors were using the information to help them meet the code in general (three out of nine, or 33 percent), as well as specifically to help them meet insulation, HVAC, air barrier, and lighting requirements. Two of the nine respondents said the shared information was being used to determine the best compliance option for a project.

Table 5-9. How Information Is Being Used by Others: Builders and Contractors
(multiple response; n=9)

How Information is Being Used	Total Number of Respondents
To meet code - general	3
To determine best compliance option	2
To meet insulation requirements	1
To meet HVAC requirements	1
To meet air barrier requirements	1
To meet lighting requirements	1
To complete permit applications	1
Don't know how information was used	1

Table 5-10 summarizes how the information that respondents shared with all other parties mentioned was being used. Most often these other parties were using the information to meet code (engineers, tradespeople/consultants, energy modelers), perform energy or therm model analyses (energy modelers), optimize energy savings (clients/building owners, energy modelers), or provide energy code documentation (engineers, energy modelers).



Table 5-10. How Information Is Being Used by Others: All Other Parties
(multiple response; n=16)

How Information is Being Used	Engineers	Tradespeople/ consultants	Clients/ building owners	Energy modelers	All Others
<i>n</i>	5	3	2	2	4
To meet code (all)	2	3	1	2	0
To meet HVAC requirements	0	1	0	0	0
To meet insulation requirements	0	1	0	0	0
To meet lighting requirements	2	1	0	0	0
Completing permit applications	1	0	0	0	0
Documentation	1	0	0	1	0
To help end users, clients, facilities save money	0	0	0	0	1
Optimize energy savings	0	0	1	1	0
Energy/therm modeling	0	0	0	2	0
Don't know how information was used	0	2	0	0	2

These following quotes provide more context about what information was shared and how it was used.

A code official, an energy manager that attended the building envelope training, noted that he had shared information with many people throughout his department and with design professionals and builders:

“There seems to be a lot of confusion in the building community about when to comply with the IECC, the stretch code, 90.1, or a combination of the three. Training has helped me address much of that confusion.”

An architect that also attended the building envelope training noted discussing the training topics in a more general way with his colleagues and how the training had improved his role in the office:

“Every time someone from our office attends a training, the office does an internal review of what was learned [...] I am probably the most informed in the office in respect to energy codes and the training has helped position me as the technical person that explains code provisions to coworkers.”



An equipment supplier that attended both the lighting and envelope training sessions who shared code updates and the products that pertain to updates with energy service companies (ESCO) noted how the ESCOs were using the information:

“The ESCOs, in turn, are using this information to help end users and facilities save more energy and receive more utility incentives. Everyone wins.”

A code official explained his role in sharing the information he received from the lighting training he attended:

“Architects, civil engineers, and contractors are all well aware of the work they do for energy conservation, but I don’t think wiring contractors are aware of their impact aside from when they are installing LED lights. They aren’t really aware of additional lighting controls and lighting reduction techniques inside the building or of the exterior lighting zones. It’s my job to make sure they know the ins and outs of the code, including what I trained on, and the fact that they have requirements under this code that are mandatory and have changed since the previous version.”

5.3 RECOMMENDING TRAINING TO OTHER PARTIES

The interviewers asked the 21 respondents if they would recommend the Energy Code Technical Support Initiative trainings to others. All but one reported they would encourage others to attend the training because it was thorough, informative, and overall a good experience. The respondent who would not recommend the training, an owner that attended the lighting training session, explained that it is a “*great concept and a good idea*” and liked that it was supported by utilities, but she believed the course needed to be more focused on “*energy efficiency concepts*” and “*it’s just not completely tied together yet.*”

The trainees offered many reasons for recommending the trainings to their colleagues or others in the industry. A senior specifications writer that attended the building envelope session added:

“This is a really complex code and it’s important for the future that we move forward and do things as well or better than what the code requires. I don’t think the code officials will ever be able to monitor every aspect of the code so lots of people need to attend these trainings to be aware of the goals and to help fill in the gaps.”

An energy engineer explained why he would recommend the HVAC training to building owners:

“[The training] provides a set of concepts and tools that makes it easier to understand the energy conservation measures we are selling. I’d recommend it to anyone... especially owners! An office building of 30 years ago trying to raise itself to contemporary standards knows its operating costs are much higher than that of others, so these owners need to know how to lower operating costs to compete with other buildings.”

A building official that attended a lighting training session also expressed the importance of the entire industry taking the same training:



“Buildings, architects, and inspectors should all be going to the same training sessions so that we can move towards uniformity of our understanding of what to enforce and how.”



6. SOURCES OF INFORMATION IN ADDITION TO CCSI

The follow-up interviews presented an opportunity to identify the primary sources of information that municipal building code employees, builders, and others consult regarding building code requirements. The questions posed to them were:

“Since [DATE(S) of CCSI TRAINING(S)], have you attended any other trainings, webinars, or gatherings discussing building codes?”

“Other than the [CCSI TRAINING(S)] and [any other trainings, webinars, or gatherings discussing building codes attended since DATE(S) of CCSI TRAINING(S)], what are your main sources of information on building code requirements?”

The following subsections detail the responses from training attendees on any training sessions they have attended since the CCSI training and their sources of information on building codes.

6.1 TRAINING ATTENDED SINCE CCSI TRAINING

One-third (7) of the 21 respondents said they had attended one or more training sessions or gatherings to discuss building codes since attending the CCSI training. These took a variety of forms, including webinars, presentations, conferences, industry association meetings, classroom seminars, and online courses. Builders and others (6 of 17 respondents) were more likely to report having attended a training or gathering discussing building codes since the CCSI training than municipal building code employees (one of four respondents). The six builders and others consisted of an energy modeler, equipment supplier, energy engineer, sustainable design consultant, and two architects.

When asked to describe the type of training or gathering they attended, respondents generally recalled the sponsor, the topic, or both. Since attending the CCSI training, five respondents said they had attended other CCSI training courses with topics such as mechanical provisions, indoor air quality, lighting requirements, and building envelope. The other two respondents said they regularly attend Environmental Business Council, Boston Society of Architects, and code committee meetings throughout the year and that these meetings focused on code updates, new technologies, and other code-related special topics.

6.2 OTHER SOURCES OF INFORMATION ON BUILDING CODES

When asked to name their main sources of information on building code requirements, respondents gave the individual or organization supplying the information, the information medium, or both. The two most commonly mentioned information sources among all respondents were peers and colleagues (12 out of 21, or 57 percent) and professional/industry associations (12 out of 21, or 57 percent). Respondents also mentioned the code itself, the Internet, industry publications, updates from manufacturers, and continuing education courses.

Municipal building code employees and builders and others consulted many of the same information sources, including the code itself, peers and colleagues, professional/industry associations, and the Whole Building Design Guide. Builders and others were more likely to



cite the code itself or codebook as a primary source of information, while municipal building code employees were more likely to cite peers and colleagues.

6.2.1 Municipal building code employees

All four municipal building code employees named at least one source for information on the building code requirements that they used. As shown in Table 6-1, peers and colleagues were the most frequently mentioned information source for building code requirements. Other information sources were the IECC codebook, Internet, Whole Building Design Guide, academic journals, and local building association meetings.

Table 6-1. Main Building Code Information Sources for Municipal Building Code Employees
(multiple response; n=4)

Information Sources	Number of Respondents
All municipal building code employees who utilize information sources other than training	4
Peers and colleagues	3
The code itself/code book	1
Internet/web search	1
Building Official District Meeting	1
Builder Association meetings	1
Whole Building Design Guide	1
Academia	1
Academic journals	1

6.2.2 Builders and others

All 17 of the builders and others also named at least one source of information on building code requirements that they used. As shown in Table 6-2, Internet/web searches and professional associations were the information sources mentioned most often, followed by the code itself and peers and colleagues. They also identified industry publications, updates from manufacturers, and continuing education courses as information sources on building code requirements.



Table 6-2. Main Building Code Information Sources for Builders and Others
(multiple response; n=17)

Information Sources	Number of Respondents
All builders and others who utilize information sources other than training	17
All Internet/web search	10
General	4
International Code Council online	2
Oak Ridge website	1
Building Science Corporation website	1
Building science bloggers	1
Greenbuildingadvisor.com	1
All Industry/professional associations	10
Boston Society of Architects	2
ASHRAE	2
LEED	2
MA Board of Building Regulations and Standards	2
USGBC	1
General	1
The code itself/code book	8
Peers and colleagues	8
All industry publications	3
General	1
Building Science Corp newsletter	1
Whole Building Design Guide	1
Updates from manufacturers	1
Continuing education courses (AEC Daily, McGraw Hill)	1



7. CODE COMPLIANCE AND ENFORCEMENT ENVIRONMENT

A key goal of the follow-up interviews was to identify perceived changes in code enforcement and the market for energy efficiency. This section examines builders and others' perceptions of their interactions with code officials and of their customers' interest in energy efficiency. The majority of the builders and others reported that interactions with code officials had not changed in the last year or that they were not directly involved in interactions with code officials (16 out of 17, or 94 percent).

The interviewers also asked municipal building code employees and builders and others about their perceptions of the priority given to checking energy efficiency during inspections. All respondents considered energy efficiency to be a medium or high priority relative to the other components of building inspections, as detailed in the subsections below.

Other subsections look at the energy efficiency issues municipal building code employees encountered in the field; factors influencing the amount of time municipal building code employees spent checking for the energy efficiency aspects of code compliance; information filed at local building departments to document energy code compliance for commercial construction; and the length of time buildings of varying sizes and types take from permitting to receiving a certificate of occupancy.

7.1 BUILDERS AND OTHERS' INTERACTION WITH CODE OFFICIALS

Interviewers asked builders and others if their interactions with code officials and code enforcement in regard to energy efficiency had changed in the last year or so. As shown in Table 7-1, more than one-half of the builders and others (9 out of 17, or 53 percent) said they did not interact directly with code officials. The majority of the remaining respondents (7 out of 8, or 88 percent) said their interactions with code officials regarding energy efficiency had not changed over the last year. One respondent answered that his interactions had changed, adding that *"code officials have stepped up in terms of knowledge and assistance. Everyone is stressed and we turn to code officials for guidance."*

Table 7-1. Changes in Interactions with Code Officials
(number of respondents; n=17)

Have your interactions with code officials regarding energy efficiency changed?	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Yes	1	0	1	0
No	7	1	2	4
No interaction with code officials	9	2	5	2

One architect who answered "no" to interactions with code officials having changed over the last year added that, *"the code officials in Massachusetts seem fairly progressive already so there hasn't been a lot of change in the last year. Definitely in the last five years, but not a lot of change recently."*



Respondents who noted they do not interact with code officials varied by occupation—they included an energy engineer, energy efficiency consultant, sustainable design consultants, and inspectors. Many added that the nature of their projects was what drove their interactions with code officials, noting they worked on renovations rather than new construction or primarily reviewed plans from other designers rather than drafting their own, both of which did not require much, if any, interaction with code officials.

7.2 CUSTOMER INTEREST IN ENERGY EFFICIENCY

The majority (11 out of 17, or 65 percent) of builders and others said that their customers had become more interested in energy efficiency in the last year or so (Table 7-2). When asked if customers were willing to pay more for energy efficiency in the last year, over half (10 out of 17, or 59 percent) said yes and did not qualify their answers. One additional respondent answered that customers were more willing to pay for more energy efficiency if it was financially beneficial.

Table 7-2. Changes in Customer Interest in Energy Efficiency
(number of respondents; n=17)

Have your customers become more interested in energy efficiency?	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Yes	11	2	6	3
No	5	0	2	3
Does not apply	1	1	0	0
Are customers willing to pay more for energy efficiency?				
Yes	10	2	6	2
Some are/it depends	1	0	1	0
No	4	0	1	3
Does not apply	2	1	0	1

The interviewers also asked the builders and others to explain why customers had or had not become more interested in energy efficiency in the last year. The builders and others offered many reasons why interest in energy efficiency had increased in the last year.

One designer said he had seen a greater interest in energy efficiency in the last year but not from his clients. *“The funders of projects are concerned about efficiency now.”* Another added that, *“The younger generation seems especially interested in the environment and that continues to grow as universities and occupations continue to educate them on the importance of efficiency.”*

An architect said economics was a reason why interest had not been rising, but added that other factors helped offset that:



“Economics—low gas and oil prices— have made efficiency not as urgent in the last year. My clients are realizing LEED and high performance buildings are more marketable though, so interest continues to rise.”

An energy engineer explained that interest *“is entirely driven by local costs and, as utility costs rise, interest in energy efficiency rises. Electricity is stable now, and natural gas has dropped, so there haven’t been any changes in interest in the last year.”*

Others said their customers were not really more interested, but rather were just more aware. Many reported that their customers had always been interested in high efficiency, so it was hard to quantify if they could be more aware.

7.3 PRIORITIZATION OF ENERGY EFFICIENCY

The follow-up interviewers asked respondents how checking for energy efficiency during inspections was prioritized relative to other areas, whether that priority had changed after attending the training (municipal building code officials), or whether that priority had changed in the last year (builders and others). The interviewers asked both groups if they thought the priority would increase in the future.

Specifically, the interviewers asked code officials these questions:

“Would you say checking the energy efficiency of a project is a low, medium, or high priority in building inspections, relative to the other things you and other members of your building department have to look for? Why? Has this priority changed since you attended [TRAINING(S)]? Do you anticipate the priority given to checking energy efficiency will increase in the future? [IF YES] Why is that?”

The interviewers asked builders and others a similar set of questions:

“Would you say ensuring the energy efficiency of a project is a low, medium, or high priority in your projects, relative to the other things you or the building department has to check? Why? Has this changed over the past year or so? If yes, how has it changed?”

7.3.1 Municipal building code employees

Table 7-3 summarizes how municipal building code employees prioritized checking for energy efficiency relative to other areas and their reasoning behind those prioritizations.



Table 7-3. Energy Efficiency Prioritization—Municipal Building Code Employees
(number of respondents; n=4)

Reasons for Energy Efficiency Prioritization	Priority of Energy Efficiency		
	High	Medium	Low
<i>n</i>	1	3	0
Code increases have led to higher prioritization	1	0	0
Health/safety/structural come first	0	3	0

Three of the four municipal building code employees reported that checking for efficiency was a medium priority, and all added that health, safety, and structural codes came first. One official said, “*The department is responsible for so many other aspects of the building process. Energy is a big piece of it, but not our top priority. We focus on life safety first.*” Another respondent who answered that energy efficiency was a medium priority noted:

“Energy efficiency is a medium priority when compared to life and safety codes and that is probably being generous. Massachusetts does a better job than most states, but that priority will never be at the same level as safety.”

In explaining energy efficiency as a medium priority, the third respondent stated:

“It’s not a low priority because energy conservation is important; we want to make buildings run more efficiently. But, it’s also not a high priority because we need to focus more on structural integrity than energy efficiency.”

The one respondent who answered that energy efficiency was a high priority said it was because the code required it to be.

The interviewers then asked the municipal building code employees if their prioritization of energy efficiency had changed since they attended the training. All four said their prioritization had not changed since they attended the training.

The interviewers then asked the municipal building code employees if they anticipated that the priority given to checking energy efficiency would increase in the future (see Table 7-4). All four code official respondents reported that the priority of energy efficiency would not change in the future. Three cited health, safety, and structural codes as higher priorities. “*Energy will always take the back seat to safety,*” one respondent added. Another code official stated, “*The priority won’t increase, but more focus will be put on it as awareness for energy increases.*”

Table 7-4. Whether Priority for Checking Energy Efficiency Will Increase in Future
(number of respondents; n=4)

Why Priority Will or Will Not Change	Will Priority Change in Future?	
	Yes	No
<i>n</i>	0	4
Health/safety/structural will continue to be higher priorities	0	3
Important to meet all aspects of code and not prioritize one over another	0	1

The remaining respondent who did not cite health, safety, and structural codes as the reason the priority of energy efficiency would not increase added, “*All code requirements should have equal enforcement.*”

7.3.2 Builders and others

The interviewers asked the builders and others about the prioritization they or their building department gave to checking the energy efficiency of a project relative to other areas. They also asked the respondents to describe the reasoning for these prioritizations (Table 7-5).

Table 7-5. Reasons for Energy Efficiency Prioritization by Builders and Others
(number of respondents; n=17)

Reasons for Energy Efficiency Prioritizations	Priority of Energy Efficiency		
	High	Medium	Low
<i>n</i>	17	0	0
Energy efficiency is central to their business practices	13	0	0
Clients are interested	5	0	0
Priority MA gives to energy transfers into business practices	2	0	0
High utility rates	1	0	0
Increases as awareness increases	1	0	0
Required by code	1	0	0

All 17 of the builders and others respondents said that checking for energy efficiency was a high priority. More than three-fourths (13 out of 17, or 76 percent) stated that it was central to their business practices. Nearly one-third (5 out of 17, or 29 percent) added that clients were the driving force in their prioritization of energy.

Two respondents said energy was a high priority for them because of the importance the Commonwealth of Massachusetts puts on energy. One architect added, “*Energy efficiency seems to be a priority throughout the state so architects have to design with that efficiency in mind.*” The other respondent noted, “*Massachusetts prioritizes energy and that has translated into the work that I am doing for my clients.*”



that builders are more interested in having the envelope done correct the first time than having to go back and make corrections during construction. Builders are even bringing me on site to perform inspections to identify problems before they are really problems.”

One of the 12 respondents, an owner, thought that some builders were more concerned with compliance than others and added that this was more due to a lack of understanding of code requirements than a decision not to comply.

The four remaining respondents—two architects, an energy planner, and a project manager—said they did not think builders were more concerned about complying with the code. One architect added, “Most builders will do whatever you tell them, but don’t care one way or another.”

Table 7-7. Others’ Perceptions of Builders’ Concern Regarding Code Compliance
(number of other respondents; n=12)

Are builders more concerned about complying with code?	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Yes	7	1	3	3
Some are/it depends	1	0	0	1
No	4	1	1	2

7.4 SITUATIONS CODE OFFICIALS ENCOUNTER IN THE FIELD

Interviewers asked code officials to recall any serious issues related to energy efficiency they had encountered during inspections over the past year or so. One of the four code officials recalled two energy efficiency issues she had encountered in the field—improper installation of vestibules and vestibules not installed where required. She said these issues occurred in roughly 10 percent of the projects in her area and can generally be resolved by the architect on record before a certificate of occupancy is issued. When asked if she felt the issues were more prevalent in certain building types, geographic areas, or for certain builders, she said that the main issue was “*design professionals that aren’t current on code requirements.*”

Two of the four respondents said they had seen many issues, but none they would consider serious. The remaining respondent noted that he had not seen any serious issues.

7.5 TIME SPENT ON ENFORCEMENT OF AND COMPLIANCE WITH THE ENERGY CODE

Interviewers asked code officials to describe the factors that determined the amount of time they spent checking for the energy efficiency aspects of code compliance. As shown in Table 7-8, the most commonly mentioned factor was the size of the building mentioned by three of the four code officials. Two respondents also noted building use was a leading factor.

Additional factors noted by the respondents included age of the building, type of construction, experience with the contractor, and completeness of documentation.



Table 7-8. Factors Impacting Time Spent Enforcing Energy Code
(multiple response; n=4)

Factors	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Size of the building	3	2	1	0
Use of the building	2	1	1	0
Age of building (new vs. retrofit)	1	0	1	0
Type of construction	1	0	1	0
Experience with the builder/contractor	1	0	1	0
Completeness of documentation	1	0	1	0

Interviewers asked builders and others if they put in more effort and/or spent more time in the last year complying with the energy code than they had previously. Two-thirds of respondents (11 out of 17, or 65 percent) said they had put in more effort and/or spent more time than last year.

The 11 respondents who answered yes were then asked to explain where they put in more time and/or effort. The majority of the respondents (6 out of 11, or 55 percent) spent more time and effort meeting or becoming aware of the code requirements. Many remarked that as the code becomes more stringent, more time is needed to meet the requirements. Other common answers included paying attention to details, determining the appropriate compliance path for a project, designing lighting systems, and achieving the desired efficiency levels of clients. One architect stated that, “*Projects are becoming increasingly complicated and require more effort to achieve clients’ desired efficiency levels.*” Another architect added that he had “*noticed customers are paying much more attention to and requesting energy features,*” and he had spent more time fulfilling those requests in the last year (see Table 7-9).



Table 7-9. Where Additional Time/Effort is Spent in Past Year
(multiple response; n=11)

Activities	Number of Respondents	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Meeting code requirements/ awareness of code requirements	6	1	2	3
Attention to detail	2	0	2	0
Achieving clients' desired efficiency	2	0	1	1
Compliance path for project	2	1	0	1
Designing lighting systems	2	1	0	1
Working with peers/colleagues	1	0	0	1
Design alternatives	1	0	0	1
Energy calculations	1	1	0	0
Alterations	1	0	1	0
Designing HVAC systems	1	0	0	1
Designing building envelopes	1	0	0	1

Five of the remaining six respondents simply answered that they had not spent any additional time or effort complying with the code in the last year.

One respondent answered “yes and no,” adding:

“As I become more familiar with the code, I spend less time on each project. But, building design is getting more innovative all of the time. I have seen many more designs that are complex in the last year and those take more time to verify compliance.”

7.6 CODE COMPLIANCE DOCUMENTATION FILED

Interviewers asked code officials to briefly describe the type of information filed at their building department to document energy code compliance for commercial construction. Interviewers also asked:

“What percent of the projects you review submit the following:

- *COMcheck files with supplemental checklists for mandatory requirements*
- *COMcheck files with no supplemental information*
- *Prescriptive checklists.”*

Interviewers asked builders and others if they were involved in filing information to document energy code compliance for commercial construction with the local building department, and if



so, to briefly describe the type of information filed and whether it has changed since attending the training. Additionally, interviewers asked:

“For what percent of the projects do you submit the following:

- *COMcheck files with supplemental checklists for mandatory requirements*
- *COMcheck files with no supplemental information*
- *Prescriptive checklists.*”

7.6.1 Municipal building code employees

When asked to describe the type of information filed at their building departments to document energy code compliance, three of four code officials (75 percent) mentioned COMcheck reports and stamped mechanical drawings. Code officials also noted full design drawings, narratives, and code reviews from licensed architects or engineers as information that is filed at their building departments for energy code compliance (Table 7-10).

Table 7-10. Information Filed at Code Officials’ Building Departments
(multiple response; n=4)

Type of Information Filed	Number of Responses	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
COMcheck reports	3	2	1	0
Stamped mechanical drawings	3	2	1	0
Full design drawings	1	0	1	0
Narratives	1	0	1	0
Code review from licensed architect or engineer	1	1	0	0

When asked what percentage of the projects reviewed included COMcheck files with supplemental checklists for mandatory requirements, COMcheck files with no supplemental information, or prescriptive checklists, the respondents’ answers varied as summarized in Table 7-11.

Table 7-11. Percent of Information Filed at Code Official’s Building Departments
(multiple response; n=4)

Type of information Filed	Percentage Answered by Respondent				
	1	2	3	4	Average
COMcheck files with supplemental checklists	50	100	100	50	75
COMcheck files with no supplemental information	50	0	0	50	25
Prescriptive checklists	25	0	100	25	38



On average, respondents stated that 75 percent of projects reviewed included COMcheck files with supplemental checklists, 25 percent included COMcheck files with no supplemental information, and 38 percent included prescriptive checklists.

7.6.2 Builders and others

Seven builders and others—four architects, a project manager, an owner, and a sustainable design consultant—said they were involved in filing information to document energy code compliance for commercial construction with the local building department. The type of information filed varied greatly with two of these seven respondents (29 percent) saying they filed design drawings and specifications, energy strategy reports, home energy reports for multifamily units, and COMcheck files (see Table 7-12).

Table 7-12. Information Builders and Others File at Building Departments
(multiple response; n=7)

Type of Information Filed	Number of Responses	Building Code in Municipalities Covered		
		2012 IECC	Stretch Code	Both Codes
Design drawings and specifications	2	0	1	1
Energy strategy report	2	0	1	1
HERS report (multifamily)	2	0	2	0
COMcheck file	2	0	0	2
Code plans	1	0	1	0
Summary of egress/accessibility	1	0	1	0
Existing building evaluation form	1	0	0	1
Code compliance report	1	0	0	1
Analysis performed (if necessary)	1	0	0	1
Contract	1	0	0	1
Article 37 Green Building report	1	0	1	0
Historical building exemption report	1	0	0	1



Additional types of information filed include code plans, summaries of egress and accessibility, existing building evaluation forms, code compliance reports, analysis performed (if/when necessary), contracts, Article 37 green building reports, and historical building exemption forms.

An architect elaborated on the historical exemption report, stating:

“Much of the work we do involves historical buildings. In many instances, meeting code will harm the building so I have to include a report on why the renovation will cause damage. For example, I just filed an insulation report to show why increasing the insulation and meeting code will degrade the interior of the building.”

The same architect stated that he was responsible for an existing building evaluation form, adding:

“[My firm] mostly deals with existing buildings, which always require an Existing Building Evaluation Form. The form has many sections and one of them is dedicated to energy efficiency. We have to fill this out and include with it a statement on how the building will comply with the code.”

Another architect said the type of information the firm filed to document energy code compliance at local building departments had changed since attending the training:

“The jurisdiction is just starting to require reports devoted explicitly to describing envelope energy strategies. These reports will be filed with the building department as well as being kept on-site to explain to contractors how to properly install envelope components. The hope is that these reports will cut down on errors in the field.”

Respondents who said they were responsible for filing information to document energy code compliance for commercial construction with the local building department were asked to estimate what percentage of the projects required COMcheck files with supplemental checklists for mandatory requirements, COMcheck files with no supplemental information, or prescriptive checklists to be submitted. Respondents’ estimates varied and are summarized in Table 7-13. (Note that one respondent did not provide an answer to this question.)

Table 7-13. Percent of Information Filed at Builders’ and Others’ Building Departments
(multiple response; n=6)

Type of information Filed	Percent Answered by Respondent					
	1	2	3	4	5	6
COMcheck files with supplemental checklists	0	5	100	80	100	100
COMcheck files with no supplemental information	0	5	0	80	0	Not sure
Prescriptive checklists	Not sure	5	0	Not sure	0	Not sure

Based on respondents who were able to answer, on average, 64 percent of the projects required submittal of COMcheck files with supplemental checklists for mandatory requirements, 21 percent required COMcheck files with no supplemental information, and



roughly 2 percent required prescriptive checklists. It is worth noting that these respondents' estimates of the share of projects for which prescriptive checklists were required is much less than the estimates provided by the municipal employees.

7.7 LENGTH OF TIME FROM PERMITTING TO CERTIFICATE OF OCCUPANCY

Interviewers asked all training attendees (n=21), based on their experience, to estimate the number of months it usually took for different sizes and classes of buildings to go from the date permitted to the date it receives a certificate of occupancy. Many respondents chose not to answer if they had not worked on buildings of a certain class or of a certain size range. Table 7-14 shows the number of respondents for each question, average length of time (in months), and range of time given for each building class and size to go from permitting to certificate of occupancy.

Table 7-14. Length of Time from Permitting to Occupancy
(all training attendees; n=varies)

Building Type	Office			Retail			Warehouse			
	Size Range (sq. ft.)	<20,000	20,000–50,000	>50,000	<20,000	20,000–50,000	>50,000	<20,000	20,000–50,000	>50,000
Number of Respondents Who Answered	12	10	10	11	9	9	9	9	9	10
Average length of time, months	9.96	15.25	25.20	10.09	16.67	21.56	6.83	9.00	13.15	
Range of length of time given, months	0.5–24	0.5–24	15–48	6–24	12–36	14–36	0.5–12	1–12	1.5–18	



8. SUGGESTIONS FOR IMPROVING THE CCSI TRAINING AND OTHER COMMENTS

Another key goal of the in-depth interviews was to gather improvement suggestions from training participants. Most respondents offered specific suggestions for improving the CCSI training as well as more general comments for promoting code enforcement and energy efficiency. These suggestions and comments came up throughout the interviews. The interviewers also posed three questions before concluding each interview:

“Can you think of additional topics you wish the [TRAINING(S)] had included?”

“Is there anything we have not covered that you would like to add?”

“Do you have any suggestions for how the Energy Code Technical Support Initiative can be improved to help you enforce the code (municipal building code employees)/comply with (builders and others) the energy code?”

Recommendations from the three questions have been divided into two categories—additional training topics and ways to improve the initiative—and are summarized below.

8.1 ADDITIONAL TRAINING TOPICS

Interviewers encouraged all training attendees to recommend additional topics they wished the sessions had covered. Over three-fourths of the respondents (16 out of 21, or 76 percent) provided one or more recommendations for training topics, as listed in Table 8-1. In many cases, they offered general ideas to improve the course, such as making the course more design-focused or to include examples of successful design documents, rather than additional course topics. These suggestions are also included in Table 8-1.

Half (8 out of 16, or 50 percent) of the respondents who offered recommendations for course topics suggested specific code sections, such as ventilation, air barriers, and window requirements. An architect that attended the building envelope training said:

“The industry is desperately lacking window experts and our knowledge of window performance is incredibly deficient. We need a series of window trainings that are targeted to architects and design professionals as well as manufacturers and suppliers. Window companies and manufacturers are putting out a lot of myths and this initiative should help set the record straight... and we need architects to understand that it is all a matter of using the right windows in the right direction for maximum efficiency.”

One-quarter (4 out of 16) of the respondents suggested including more case studies and real life examples for participants to understand the practical applications of the code provisions. An architect that attended a building envelope training session mentioned the importance of case studies in energy code training:

“The course materials lacked case studies. The code applies differently to different building types—I would love a future presentation to focus on 3–4 buildings types and to have the instructor comb through the details of each. In general, the formulas



discussed at the training do not apply equally to each building type and that can be problematic in the design world and won't achieve the best results.”

Additional suggestions and requests included clarifying when and where each of the different codes and code variations are enforced, detail of energy savings realized through code changes, and more solution-oriented, rather than requirement-oriented, material, among others.

Five of the 21 respondents did not offer a suggestion for additional course topics, including the municipal building code official that attended the HVAC training.

Table 8-1. Suggestions for Additional Course Topics
(multiple response; n=16)

Additional Course Topics to Cover	Total Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended Envelope and Lighting Training
All training attendees who offered suggestions for additional course topics	16	11	2	3
All specific areas	8	5	1	2
Air barriers	2	2	0	0
Window performance	2	2	0	0
Ventilation	1	0	0	1
Exterior lighting requirements	1	0	1	0
Infiltration	1	1	0	0
Tenant Lighting	1	0	0	1
Include more case studies/real life examples/good design documents	4	3	0	1
Clarity on when/where code is being enforced	3	2	1	0
Energy savings realized through code changes	2	1	1	0
Identify main differences between codes (IECC, stretch, ASHRAE 90.1, LEED, etc.)	2	2	0	0
Solution, rather than requirement, oriented	2	1	0	1
Design focused	1	0	1	0
Emphasis on code changes	1	1	0	0



Additional Course Topics to Cover	Total Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended Envelope and Lighting Training
Passive-house issues	1	1	0	0
Envelope design for historic masonry rehab	1	1	0	0
Specialty types of commercial construction	1	0	0	1
Hands-on activities	1	1	0	0
Innovation in commercial projects	1	1	0	0
Add glossary page to handouts with acronyms	1	1	0	0
Add goals or objectives slide	1	1	0	0

8.2 SUGGESTIONS FOR IMPROVING ENERGY CODE TECHNICAL SUPPORT INITIATIVE

Seventeen of the 21 respondents (81 percent) offered suggestions for improving the energy code technical support initiative. Fifteen of the 17 respondents (88 percent) who offered training suggestions recommended ways to improve either the duration or the types of training offered. Of the 15 respondents, 5 recommended that the training be more in depth. An architect describing the commercial envelope training commented:

“The presentation was too dumbed down in an attempt to reach a wider audience, which made it almost entirely irrelevant to me. When a training is that simplified, it doesn’t capture the nuances in the code that would be of use to architects or anyone else with more than a basic knowledge of the code.”

Additionally, 5 of the 15 respondents (33 percent) suggested that different training should be offered to different market actors and another two said there should be a course for beginners. A project manager that attended a building envelope training elaborated from the perspective of someone who needed a beginner course:

“As someone with limited knowledge of the code, I thought the course was often geared towards someone with more technical experience and that made it hard for me to always stay engaged. For example, the outline we were given had many acronyms on it that I am not used to, like NFRC. The community likely understands the acronyms, but I don’t and I wasted a lot of time trying to write them down to figure out later. Even seeing the list of requirements without any background on what I was looking at was daunting. I found myself wondering if Mass Save expected attendees to have a certain level of knowledge before taking the course. If they do require a certain threshold, does or should Mass Save offer an introductory course for junior architects and people like myself that gives a better background of the code, the basics, a timeline on implementation?”



As shown in Table 8-2, other common suggestions were to upload the slides, handouts, and other course material onto the Mass Save website (6 out of 17, or 35 percent), offer online technical assistance, and offer yearly refresher courses.

Table 8-2. Suggestions for Improving the CCSI Trainings
(number of respondents; multiple response)

How to Improve the CCSI Training	Total Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended Envelope and Lighting Training
Number of respondents who offered suggestions for improvement	17	11	3	3
All suggestions for adjusting types and duration of trainings	15	10	3	2
Training too high level, need more detail	5	3	1	1
Do different trainings for different market actors	5	3	1	1
Do different training for beginners	2	1	1	0
Offer refresher courses yearly	2	2	0	0
Offer shorter training	1	1	0	0
Put slides and handouts on the Mass Save website	6	5	1	0
All suggestions about getting more people to attend	2	2	0	0
Get more licensed contractors to attend	1	1	0	0
Get more architects to attend	1	1	0	0
Offer online technical assistance	2	1	0	1
Add technical resources to the Mass Save website	1	1	0	0
Partner with industry leaders	1	1	0	0
Create code comparison document	1	1	0	0
Record the speaker	1	1	0	0

Four of the 21 respondents did not offer a suggestion for improving the CCSI trainings, including the municipal building code official that attended the HVAC training.



The following quotes from training attendees elaborate on the suggestions and ideas listed in Table 8-2. Although not all are practical, the respondents were passionate in what they hoped to see in training and in the industry as a whole.

An architect that attended building envelope training suggested that Mass Save partner with industry leaders to explain the benefits of using alternative materials:

“I attended an excellent presentation on the code and, specifically, how to deal with curtain walls that was put on by Roxul Insulation. The presentation was really a room full of experts discussing ideas and innovative insulation applications. For example, Roxul makes mineral walls, something few people know. The presentation covered the many applications of mineral walls, densities, thicknesses, and why they should be considered over using foam to avoid VOCs and offgas. Take advantage of the expertise of the industry! The code is moving towards alternatives so let the experts talk about them. This is the information we need and want.”

Another architect that attended a building envelope training session believed the industry would benefit from the creation of a “cheat sheet” for market actors to reference when switching between codes:

“There are currently too many places and different codes to draw information from. Ideally, myself and others in Massachusetts would be provided a ‘cheat sheet’ or other graphic representation that compared the different codes used throughout the state, particularly the prescriptive provisions of the current code, the next code cycle, and the stretch code. I can see this being available online but also as a download to print off and take into the field.”

“The problem I see is that courses are being offered for continuing education credits on a code that hasn’t been implemented yet. So architects and other people involved in the training get back to their offices and can’t remember if the provisions they just learned about are part of the current code, the one in the future, or the stretch code – or fully understand what the difference between them is. This is causing quite a bit of rework in the design world since system components are designed differently between codes and are used to achieve compliance in different ways.”



APPENDIX A: INTERVIEW GUIDES

A.1 FOLLOW-UP IN-DEPTH INTERVIEW GUIDE FOR COMMERCIAL TRAINING ATTENDEES—MUNICIPAL BUILDING CODE EMPLOYEES

Name: _____ Title: _____

Company or City/Town: _____ Telephone: _____

Email: _____

Name for Incentive Check: _____ No Incentive Accepted: _____

Address for Incentive Check: _____

Interview date: _____ Time: _____

Introduction: Hello, may I speak to [_____] ? My name is _____, and I'm calling from Cadmus on behalf of the sponsors of the Mass Save[®] Energy Code Technical Support Initiative. We are conducting follow-up interviews with code officials who have attended the commercial building energy code trainings offered by this Initiative to understand how the information from the trainings is being used in the field. We offer compensation of \$100 for your time in responding to this interview which should take about 30 to 45 minutes; the check could be made payable to you, your employer, or a charity; you do not have to accept compensation for this interview. Your responses will be kept confidential; we will combine them with those of other respondents for the findings and analyses we present to the sponsors of this Initiative. We can do this interview now or schedule for a more convenient time. [If need to confirm legitimacy, refer to William Blake of National Grid at 781-907-1583 or William.Blake@nationalgrid.com.]

[VERIFY OCCUPATION, JURISDICTION, TITLE, AND EMAIL; IF RESPONDENT SAYS S/HE HAS ANOTHER OCCUPATION AS WELL, INSTRUCT HIM/HER TO ANSWER QUESTIONS IN CAPACITY AS A BUILDING CODE OFFICIAL]

Intro 1. I have information from the program sponsors indicating that you attended the [ALL TRAINING(S)] on [DATE(S)]. Is that correct?

- a. Yes
- b. No [THANK AND TERMINATE]

Intro 1a. [USE ONLY IF RESPONDENT HAS ATTENDED BOTH RESIDENTIAL AND COMMERCIAL TRAININGS] For this interview I would like to cover just the [COMMERCIAL TRAININGS] you attended on [DATE(S)].



Intro 2. I would also like to confirm that your jurisdiction is using the new Massachusetts commercial building energy code based on IECC 2012-ASHRAE 90.1-2010/is using the energy stretch code/is using both the new Massachusetts commercial building energy code based on IECC 2012-ASHRAE 90.1-2010 and the stretch code.

- a. Yes
- b. No; [ASK] Please explain which code you are using _____

Intro 3. Please tell me whether you perform only plan/permit review, only site inspections, or both as part of your work? [RECORD]

Thank you. For the rest of the interview, I will refer to the [CODE FROM ABOVE] simply as the [new building energy code/stretch code].

Training Feedback

- 1. To the best of your recollection, can you tell me which part or parts of the commercial building code TRAINING(S) you found most useful and why? [IF REQUESTED, PROVIDED TRAINING TOPICS]
- 2. Can you think of additional topics you wish the [TRAINING(S)] had included?
 - a. [PROBE] What additional topics would you have liked the training to cover?

Sharing Information

- 3. Please think of different parties you interact with such as people in your building department, colleagues from other jurisdictions, builders, contractors, and others. Have you shared information from the [TRAINING(S)] with others?
 - a. [IF YES] Can you tell me what information you shared and the party(ies) involved?
 - b. [IF YES] Can you tell me how they are using this information?

Other Sources of Information

- 4. Since [DATE], have you attended any other trainings, webinars, or gatherings discussing commercial building energy codes?
 - a. [IF YES] Please tell me the names and approximate dates of these events.
 - b. What was the focus of these events?
- 5. Other than the [TRAINING(S)] and [EVENTS IN QUESTION 4], what are your main sources of information on the building codes and methods of enforcement?

Use of Training

- 6. About what percentage of your commercial [project reviews and/or inspections (from Intro 3)] since attending the [TRAINING(S)] has made use of the information that you learned through the training? [RECORD %]
 - a. Don't know/Not applicable
- 7. [If Q6 >0%] How have you used the training?
 - a. [Record] _____



8. [ASK IF INTRO 3. INDICATES INSPECTIONS ARE CONDUCTED] Since you attended [TRAINING(S)] on [DATE(S)], can you give me an estimate of how many commercial on-site inspections you have conducted or participated in on buildings permitted under the [new building energy code/stretch code]?
- What percent of these inspections would you estimate were final inspections?
 - And approximately how many total square feet were included in all these inspected buildings permitted under the [new building energy code/stretch code]?
 - What percent of the total square feet inspected would you estimate was for final inspections?

	Construction permitted under new building energy code, if applicable		Construction permitted under new stretch code, if applicable	
	# Buildings	Sq. Ft.	# Buildings	Sq. Ft.
Total inspections				
Final inspections (%)				

9. [IF 8 = 0] Do you normally conduct commercial inspections in your position?
- [IF YES] When would you expect to next conduct an inspection?
 - In the next three months
 - In the next four to six months
 - In the next seven to twelve months
 - More than a year from now
 - Never
 - Unsure
10. [IF 8>0] Have you changed how you conduct energy code inspections as a result of the training(s) you attended?
- [IF YES] Can you please tell me how your inspection process has changed? [PROBE, IF NECESSARY:]
 - Do you pay more attention to certain areas and, if so, which ones?
 - Has the time spent on inspections changed and, if so, by how much (minutes or hours)?
 - Do you verify measures that were focused on in the training or other measures differently than before the training? If so, how has this changed?
 - [IF NO] Why would you say the training has not affected how you conduct inspections? [PROBE, IF NECESSARY:]
 - Was the training relevant to how you do inspections?



- ii. Do you feel you already did everything you should to enforce the code?
 - iii. Has there not been enough time to incorporate what you have learned?
- 11. [IF 10=NO] Do you expect what you have learned at the TRAINING(S) will influence your inspections in the future?
 - a. [IF YES] How and when do you expect TRAINING(S) to influence your inspections?
- 12. [ASK IF INTRO 3 INDICATES PLAN/PERMIT REVIEWS ARE CONDUCTED] Since you attended [TRAINING(S)] on [DATE(S)], can you give me an estimate of how many commercial building permit applications or plans you have reviewed or participated in reviewing and how many [BUILDINGS] in total were involved?
 - 12a. [IF 12=0] Do you normally review building permit applications/plans in your position?
 - 12b. [IF 12a=YES] When would you expect to next review an application?
 - a. In the next three months
 - b. In the next four to six months
 - c. In the next seven to twelve months
 - d. More than a year from now
 - e. Never
 - f. Unsure
- 13. [IF 12>0] Have you changed how you review building permit applications/plans as a result of the training(s) you attended?
 - a. [IF YES] Can you please tell me how your review process has changed? [PROBE, IF NECESSARY:]
 - i. Do you pay more attention to certain areas and, if so, which ones?
 - ii. Has the time spent on permit review changed and, if so, by how much?
 - iii. Do you verify measures that were focused on in the training or other measures differently than before the training? If so, how has this changed?
 - b. [IF NO] Why would you say the training has not affected how you review permit applications? [PROBE, IF NECESSARY:]
 - i. Was the training not relevant to how you do inspections?
 - ii. Do you feel you already did everything you should to enforce the code?
 - iii. Has there not been enough time to incorporate what you have learned?
- 14. [IF 13=NO] Do you expect what you have learned at the TRAINING(S) will influence your building permit application/plan reviews in the future?
 - a. [IF YES] How and when do you expect TRAINING(S) to influence your reviews?
- 15. Are there areas other than inspections and permit/plan review where the training(s) has/have influenced your work?
 - a. [IF YES] Can you describe those tasks and how the training(s) has/have influenced your work?



- b. [IF YES] And what would you be doing differently had you not attended the training?
16. Can you briefly describe the type of information filed at your building department to document energy code compliance for commercial construction?
- a. [IF YES] Please briefly describe the type of information filed and whether it has changed since you attended [TRAINING(S)].
 - b. What percent of the projects you review submit the following:
 - i. COMcheck files with supplemental checklists for mandatory requirements ____%
 - ii. COMcheck files with no supplemental information ____%
 - iii. Prescriptive checklists ____%
17. We would like to know from your experience how long it usually takes from the date a commercial building is permitted to when it receives its certificate of occupancy. Please give me your best estimate for office buildings, retail stores, and warehouses in the following size ranges:
- a. Office _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.
 - b. Retail _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.
 - c. Warehouse _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.

General

18. Would you say checking the energy efficiency of a project is a low, medium, or high priority in building inspections, relative to the other things you and other members of your building department have to look for?
- a. Why do you say this?
19. Has this priority changed since you attended [TRAINING(S)]?
- a. [IF YES] How has it changed?
20. Do you anticipate the priority given to checking energy efficiency will increase in the future?
- a. [IF YES] Why do you say this?
21. What, if any, serious issues related to energy efficiency code requirements have you encountered during inspections over the past year or so?
- a. [IF MENTIONED IN QUESTION 21] Please describe what happened and how it was addressed?
 - b. [IF MENTIONED IN QUESTION 21] How often do these issues occur?
 - c. [IF MENTIONED IN QUESTION 21] Are these issues more prevalent in certain building types, geographies, or for certain builders? How so?
22. In general, what factors determine the amount of time you spend checking for the energy-efficiency aspects of code compliance?
- a. [PROBE] Is time and/or the availability of personnel an issue?



Closing

23. Would you recommend that your colleagues attend the Energy Code Technical Support Initiative trainings?
 - a. Which training(s) in particular?
 - b. Why or why not?
24. Do you have any suggestions for how the Energy Code Technical Support Initiative can be improved to help you to enforce the energy code?
25. Is there anything we have not covered that you would like to add?

Thank you so much for your time!



A.2 FOLLOW-UP IN-DEPTH INTERVIEW GUIDE FOR COMMERCIAL TRAINING ATTENDEES—BUILDERS AND OTHERS

Name: _____ Title: _____

Company or City/Town: _____ Telephone: _____

Email: _____

Name for Incentive Check: _____ No Incentive Accepted: _____

Address for Incentive Check: _____

Interview date: _____ Time: _____

Introduction: Hello, may I speak to [_____] ? My name is _____, and I'm calling from Cadmus on behalf of the sponsors of the Mass Save® Energy Code Technical Support Initiative. We are conducting follow-up interviews with those professionals who have attended the commercial energy code trainings offered by this Initiative to understand how the information from the trainings is being used in the field. We offer compensation of \$100 for your time in responding to this interview which should take about 30 to 45 minutes; the check could be made payable to you, your employer, or a charity; you do not have to accept compensation for this interview. Your responses will be kept confidential; we will combine them with those of other respondents for the findings and analyses we present to the sponsors of this Initiative. We can do this interview now or schedule for a more convenient time. [If need to confirm legitimacy, refer to William Blake of National Grid at 781-907-1583 or William.Blake@nationalgrid.com.]

[VERIFY OCCUPATION, TITLE, EMAIL, AND ADDRESS FOR SENDING CHECK]

Intro 1. I have information from the sponsors indicating that you attended the code [TRAINING(S)] on [DATE(S)]. Is that correct?

- a. Yes
- b. No [THANK AND TERMINATE]

Intro 1a. [USE ONLY IF RESPONDENT HAS ATTENDED BOTH RESIDENTIAL AND COMMERCIAL TRAININGS] For this interview I would like to cover just the [COMMERCIAL TRAININGS] you attended on [DATE(S)].

Intro 2. I would also like to confirm that you work in [CITY/TOWN(S)], which enforce(s) the new Massachusetts commercial building energy code based on the IECC 2012-ASHRAE 90.1-2010/enforce(s) the energy stretch code/enforce(s) both the new Massachusetts commercial building energy code based on IECC 2012-ASHRAE 90.1-2010 and the stretch code.



- a. Yes
- b. No; explain which code they are using _____

[For subcontractors and equipment suppliers, note the type of work done/equipment supplied]

Thank you. For the rest of the interview, I will refer to the [CODE FROM ABOVE] simply as the [new building energy code/stretch code].

Training Feedback

1. To the best of your recollection, can you tell me which part or parts of the commercial building code [TRAINING(S)] you found most useful and why? [IF REQUESTED, PROVIDE TRAINING TOPICS]
2. Can you think of additional topics you wish the [TRAINING(S)] had included?
 - a. [PROBE]What additional topics would you have liked the training to cover?

Sharing Information

3. Please think of different parties you interact with such as people working on your project, colleagues, code officials, and others. Have you shared information from the [TRAINING(S)] with others?
 - a. [IF YES] Can you tell me what information you shared and the party(ies) involved?
 - b. [IF YES] Can you tell me how they are using this information?

Other Sources of Information

4. Since [DATE], have you attended any other trainings, webinars, or gatherings discussing commercial building energy codes?
 - a. [IF YES] Please tell me the names and approximate dates of these events.
 - b. What was the focus of these events?
5. Other than the [TRAINING(S)] and [EVENTS IN QUESTION 4], what are your main sources of information on the building code requirements?

Use of Training

6. About what percentage of the work you have done since attending the [TRAINING(S)] has made use of the information that you learned through the training? [RECORD %]
 - a. Don't know/Not applicable
7. [If Q6 >0%] How have you used the training?
 - a. [Record] _____
8. How many commercial projects permitted under the [new building energy code/stretch code] have you worked on since attending the training? [RECORD]
9. [IF 8=0] When do you expect to work on a commercial project permitted under the [new building energy code/stretch code] provisions?



- a. In the next three months
- b. In the next four to six months
- c. In the next seven to twelve months
- d. More than a year from now
- e. Never
- f. Unsure

10. [IF 8>0; BUILDERS/SUBCONTRACTORS ONLY; ASK QUESTIONS ABOUT [NEW BUILDING ENERGY CODE/ STRETCH CODE] DEPENDING ON ANSWER TO INTRO 2] Since you attended [TRAINING(S)] on [DATE(S)], about how many of the commercial projects you worked on involved construction permitted under the [new building energy code/stretch code]? Approximately what was the total square footage of those projects? Please also let me know what approximate percent of the total floor area is in different stages (planning, under construction, in final inspection)?

	Construction permitted under new building energy code, if applicable	Construction permitted under stretch code, if applicable
Number of buildings		
Total square feet		
% of buildings in planning stage?		
% of buildings under construction?		
% of buildings in final inspections?		

11. Have you changed the work that you do to better comply with the [new building energy code/stretch code] as a result of the training(s) you attended?
- a. [IF YES] Can you please tell me how your work has changed?
 - b. [IF YES] And what would you be doing differently had you not attended the training?
 - c. [IF YES] Which projects have been most affected by what you learned from the training(s)?
 - d. [IF NO TO Q11] Can you tell me why there have been no changes? [PROBE: Was the training not relevant to their work? Do they feel they already did everything properly to code? Is there no time to incorporate what they have learned?]
12. Do you expect what you have learned at the [TRAINING(S)] will influence your work in the future?



- a. [IF YES] How and when do you expect [TRAINING(S)] to influence your work?
 - b. [IF NO] Why do you say this?
13. [BUILDERS/SUBCONTRACTORS/ARCHITECTS ONLY] Are you involved in filing information to document energy code compliance for commercial construction with the local building department?
- a. [IF YES] Please briefly describe the type of information filed and whether it has changed since you attended [TRAINING(S)].
 - b. What percent of the projects you work on require you to submit the following:
 - i. COMcheck files with supplemental checklists for mandatory requirements ____%
 - ii. COMcheck files with no supplemental information ____%
 - iii. Prescriptive checklists ____%
14. We would like to know from your experience how long it usually takes from the date a commercial building is permitted to when it receives its certificate of occupancy. Please give me your best estimate in months for office buildings, retail stores, and warehouses in the following size ranges:
- a. Office _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.
 - b. Retail _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.
 - c. Warehouse _____ <20,000 sq. ft. _____ 20,000 to 50,000 sq.ft. _____ >50,000 sq.ft.

General

15. Would you say ensuring the energy efficiency of a project is a low, medium, or high priority in your projects, relative to the other things you have to comply with?
- a. Why do you say this?
16. Has this priority changed over the past year or so?
- a. [IF YES] How has it changed?
17. [BUILDERS/CONTRACTORS/ARCHITECTS ONLY] Have your interactions with code officials and the code enforcement process regarding energy efficiency changed in the last year or so?
- a. [IF YES] What changes have you experienced?
18. Have you put in more effort and/or spent more time in the last year in complying with the energy code than previously?
- a. [IF YES] Please explain where you put in more effort/spend more time.
19. Have your customers become more interested in energy efficiency in the last year or so?
- a. Why or why not?
20. Would you say customers have been more willing to pay more for energy efficiency in the last year?
- a. Yes
 - b. No



21. [EQUIPMENT SUPPLIERS/CONTRACTORS/ARCHITECTS ONLY] Would you say builders have been more concerned about complying with code in the last year?
- a. Yes
 - b. No

Closing

22. Would you recommend the Energy Code Technical Support Initiative trainings to others? Why or why not?
23. Do you have any suggestions for how the Energy Code Technical Support Initiative can be improved to help you comply with the energy code?
24. Is there anything we have not covered that you would like to add?

Thank you so much for your time!