Massachusetts Electric and Gas Program Administrators

Follow-up Interviews with CCSI Commercial Training Attendees

February 16, 2017

Prepared by:

Cadmus

Massachusetts Electric and Gas Program Administrators

Follow-Up Interviews with CCSI Commercial Training Attendees

February 16, 2017

ii

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

TABLE OF CONTENTS

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

iv

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

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 60 individuals who had attended one or more commercial classroom training sessions approximately six months earlier. The respondents in this study attended training sessions from February 2015 through April 2016. Thirty respondents were municipal building code employees and 30 were architects, engineers, equipment suppliers, or energy efficiency professionals (referred to as "building professionals"). For commercial buildings, the professions in this group are usually very influential in decisions regarding design, energy efficiency, and code compliance.

Cadmus conducted the interviews primarily to determine if and how the subjects were applying in the field what they learned in the training. The interviews also explored how the information from the training was being shared, what changes were occurring for code compliance and enforcement, and suggestions provided by the respondents for improving the training. This report is the second on the commercial code training. The first, published January 27, 2016, reported on findings from IDIs with 21 respondents.

1.1   MOST USEFUL INFORMATION FROM TRAINING AND USE IN THE FIELD

A key goal of the follow-up interviews was to assess how the attendees were using what they had learned in their everyday jobs. Interviewers asked participants a series of questions to determine the type of worked they performed, how the training was being used in their work, and reasons (if relevant) why trainees had not made any changes to their work as a result of the training courses.

Municipal building code employee attendees participated in various inspection and permit/plan review activities throughout Massachusetts:

- Eight-seven percent of respondents (26 out of 30) performed both site inspections and permit/plan review.

- Municipal building code officials estimated that they had performed 2,344 inspections collectively since attending the training.

- Of those, 1,067 inspections (46 percent) were performed for projects permitted under the 2012 IECC and the remaining 55 percent (1,277 inspections) were performed for projects permitted under the stretch code

- One-thousand of the inspections performed for stretch code projects were completed by one respondent, a state building commissioner

- Of those that responded, municipal building code officials estimated that they conducted 1,242 permit application or plan reviews collectively.

Two-thirds of the building professional respondents stated they had worked on one or more projects permitted under the energy code since attending training (1,129 buildings). It is important to note, however, that respondents who had attended training more than one year previously gave the number of projects they had worked on during only the last year.

Many municipal building code employees made changes to their work as a result of attending the training:

- Over half (58 percent) of municipal building code employees who conducted inspections as part of their job said that, as a result of the training, they had made changes to their process, primarily by making the processes more thorough
- Forty-three percent of municipal building code employees who reviewed permit applications also made changes to their process as a result of the training
- Municipal code employees typically paid more attention to certain aspects of the project, such as insulation and air sealing, during inspections, and increased their permit review of recessed lighting, HVAC ratings, and exterior walls
- Municipal building code employees said there were areas other than inspections and permit/plan review where the training had influenced their work, including a greater overall awareness of the energy code and better participation in discussions on energy related topics.

Twenty-four of the 30 municipal building code employees responded to the question regarding what parts of the training were most useful in practice:

- Over one-third (38 percent) of those noted the most useful part of the training concerned topics on the building envelope
- The second-most useful parts were real-life examples and experiences provided by the instructors (21 percent).

Fifty percent of building professionals said they had changed their work to comply better with the code as a result of the training.

- Building professionals usually said the training increased their familiarity with the code and general awareness of requirements
- One-third of those whose work was affected by the training said they had modified their practices to better reflect code requirements and to use appropriate resources
- Building professionals also said the training influenced areas of their work not covered by the IDI, most notably that the training made them a better participant in discussions of energy features.

Twenty-three of the 30 building professional respondents identified one or more parts of the training that were useful:

- Nearly half of those respondents (43 percent) said the most useful part of training was the overall information on code changes and updated requirements.
- Over one-third (39 percent) listed information on HVAC requirements as the most useful.
- These results differed significantly from the findings in the prior IDI report, primarily because respondents this year were more likely to have attended HVAC training and those last year most commonly attended lighting training. As a result, previous respondents mostly noted lighting requirements as the most useful part of training.
- Overall, building professionals believed the training applied to all projects, including those under the stretch code.

The municipal building code employees and building professionals who said in the immediate survey (conducted after the training) that they planned to use the information immediately were more likely to confirm in the IDIs that they had used information from the training.

Thirty-seven percent of the 30 municipal building code employees stated that they had not made any changes to their on-site inspections or plan review as a result of the CCSI courses they participated in; 50 percent of the 30 building professionals also made no changes to their work.

- Municipal building code employees who said they were not using the training information said their most common reasons were that they were already doing a thorough job and did not get much new information from the training

- Building professionals who said they had not changed their work as a result of the training usually said this was because they were already doing what the code required or were already building projects above code.

In response to feedback from the prior IDI survey, training attendees have been provided training handouts since August 2015. When asked if they used the materials, the majority of attendees who responded indicated that they had.

- Sixty-nine percent of attendees who responded indicated that they had used the materials provided at the training

- Nearly half (44 percent) of those who responded used the materials frequently

- The majority of respondents (60 percent) used the materials as a reference or for review purposes

- Twenty-two percent handed out the materials to others for educational purposes.

1.2   SHARING INFORMATION FROM THE TRAINING

More than 90 percent of both the municipal code employees and building professionals said they shared information from the training with other parties.

- Over half (59 percent) of the municipal building code employees shared information with colleagues in their office and other building departments

- One-third of the municipal building code employees shared the information with builders and contractors.

- The majority (81 percent) of the building professionals who shared information from the training also did so with their colleagues

- This was contrary to results from the previous IDI study in which municipal building code employee and building professional respondents did not mention sharing the information with their colleagues.[1]

---

[1] No information was collected on why respondents from the previous year did not mention sharing information from the training with colleagues while 2016 respondents did. Cadmus could provide speculations as to why the shift occurred; however, such speculations would not be supported by data.

Respondents shared a variety of information from the training with a diverse group of stakeholders.

- When asked to describe the type of information shared with colleagues, over half (54 percent) of the respondents said they had shared the training handouts and just under half said they shared information about the code and changes between code versions

- Respondents who said they shared training information with builders and contractors shared general information about the energy code and changes or updates to it

- Just under half said they shared training handouts with builders and contractors

- Eighty percent of the respondents who shared information with others believed that it was being used.

Nearly all (98 percent) of the respondents that provided a response when asked if they would recommend the training to other parties said yes and for various reasons: it was informative and useful, kept the industry up to date with changes in the code, and the speakers were excellent, among others. This is consistent with 2015 respondents; all but one (20 out of 21, or 95 percent) reported they would encourage others to attend the training because it was thorough, informative, and overall a good experience.

1.3 KEY SOURCES AND INFORMATION AND MASS SAVE TECHNICAL ASSISTANCE

To better understand where and how training participants received information about building energy codes, interviewers asked respondents where they would first look for information if they had a question about the energy code or a code-related issue. The most common source of information among all respondents was the code itself (72 percent). Training participants also frequently consulted the internet and their peers and colleagues for information.

A new goal for the IDIs this time was to determine the importance of the Mass Save Energy Code Technical Support Initiative as a source for code information. Only six respondents identified the technical support services provided by Mass Save as a resource they would *first use* if a code-related question or issue came up. However, these results may not fully represent the importance of the Mass Save Energy Code Technical Support Initiative; some respondents provided more than one answer when asked where they would first look for information about the energy code while others only provided one source. Those who had used the Mass Save services generally reported satisfaction.

- The respondents who identified the technical support services as a resource they would first use were generally satisfied with both the website and email or telephone support provided by the initiative and believed the services were important

- Nearly two-thirds (63 percent) of respondents who did not identify technical support services provided by Mass Save as a main source of code-related information said they were aware of them

- The majority of those aware of the service (62 percent) had not used the service at all

- Although not asked to elaborate, several respondents currently not using the service added that this was because they were able to answer code-related questions using

the code books or peers and colleagues first and did not otherwise have a need for the technical support

- Respondents (4) who were not satisfied with the service noted the length of time for the technical support representatives to provide an answer as the main reason.

Additionally, over one-half (52 percent) 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. All respondents who attended additional training sessions found them to be useful.

1.4   CODE COMPLIANCE AND ENFORCEMENT ENVIRONMENT

A key goal of the follow-up interviews was to characterize the code compliance and enforcement process and identify perceived changes in code enforcement and the market for energy efficiency.

Overall, municipal building code officials viewed energy efficiency as a priority.

- Over one-third of the municipal building code employees (38 percent) reported that checking for energy efficiency was a high priority and another 52 percent said it was a medium or medium-high priority

- Respondents that said checking for energy efficiency was a low priority said health, safety, and structural codes had more importance.

- The majority of respondents (86 percent) said their prioritization had not changed since they attended the training; 61 percent believed that the priority of energy efficiency would increase in the future.

- Municipal building code employees most commonly mentioned department workload as the main factor that determined the amount of time spent checking for energy code compliance. However, 45 percent of respondents said they had not experienced any issues enforcing the energy code.

All building professionals that provided a response reported that ensuring the energy efficiency of a project was a high priority.

- More than three-fourths (79 percent) said that it was central to their business practices and that is was often why customers selected their firms or services

- Thirty-four percent added that their clients are the driving force in how they prioritize energy efficiency in their business

- All but one respondent said the priority had not changed since they attended the training

- The majority (93 percent) of building professionals believed the priority given to checking for efficiency would increase in the future.

We asked building professionals if their interactions with code officials and the code enforcement process had changed in the last year or so.

- Nearly three-fourths of building professionals (70 percent) said their interactions with code officials regarding energy efficiency had not changed.

When asked 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 building professional respondents (69 percent) answered *"no."*

- The majority (67 percent) of those that indicated they had spent more time in the last year complying with the energy code than previously said they spent more time and effort meeting the code requirements, mostly because of the complexity of the code.

Although municipal building code employees gave various descriptions of the type of information filed at their building departments to document energy code compliance, over one-half (56 percent) identified COMcheck reports as the most common type of information filed.[2] Building professionals involved in filing information to document energy code compliance for commercial construction with the local building department identified COMcheck files and load calculations as the most common type of information filed.

With respect to the market for energy efficiency, just over one-half of building professionals (53 percent) reported increased interest in energy efficiency among their customers during the past year. The reasons varied and included rebates, increased funding for energy efficiency programs, desire to obtain a green building certification, shorter payback periods, utility programs, and incentives. Over half (57 percent) of building professionals also said their customers were willing to pay more for energy efficiency in the last year.

1.5 CONSIDERATIONS FOR IMPROVING THE CCSI TRAINING

Interviewers encouraged all training attendees to recommend ways the training could be improved, including additional topics they wished the sessions had covered.

- Over half of the respondents (52 percent) provided one or more recommendations for training topics and improvements.

- Most commonly, respondents (48 percent) said the training would be improved by increasing attendance of specific groups of industry professionals. This suggestion came from respondents who believed the training was not geared toward their own occupations and from respondents who believed other industry professionals would benefit most from the training.

- In addition to suggesting increased attendance by industry professionals, respondents also suggested that training courses be designed to include a broader range of attendees, such as building owners, building users (employees), electrical and wiring engineers, and the general public. Additional suggestions and requests were to provide greater details about specific topics, such as boilers and equipment sizing; conduct separate courses for different market actors; and include more case studies and real-life examples.

---

[2] We note that this is nearly twice the percentage Cadmus found in a recent study of code compliance documentation across 12 Massachusetts jurisdictions.

One-half of all respondents also provided suggestions for improving the Energy Code Technical Support Initiative to help them better enforce or comply with the energy code in the future.

- Two-thirds (67 percent) said that developing and distributing resources aimed at implementing the energy code would be most useful

- Specifically, respondents suggested providing a standardized checklist or cheat sheet for inspections, plan review, and field use by contractors

- Other suggestions were better marketing of Mass Save as a resource, distributing a newsletter or blog discussion industry topics, and increasing the frequency of training, among others.

1.6   RECOMMENDATIONS

Cadmus categorized recommendations for improving the CCSI into three key categories: improving training, improving technical support services, and improving energy code enforcement. Greater detail for the following recommendations is included in Section 10, Conclusions and Recommendations.

To improve the training and its effectiveness, we recommend the following:

- Improve the quality and content of training handouts and encourage attendees to share training handouts in the workplace

- Add modules to the training that explore topics beyond basic energy code knowledge and project types

- Include on-site and hands-on modules

- Increase marketing of the training to industry groups that are currently underrepresented at the training, such as building contractors and equipment suppliers

- Use the training to encourage greater communication between municipal building code employees and building professionals.

To improve the technical support services and increase user satisfaction, we recommend the following:

- Implement an effort specifically for marketing the technical support offered by Mass Save

- Improve the response time of the technical support services

- Create a medium for distributing code-related information and topics of interest to industry professionals.

We provide these recommendations to improve commercial building energy code enforcement throughout Massachusetts:

- Develop energy code implementation resources such as checklists for inspections and plan review similar to those available from the U.S. Department of Energy[3]

- Emphasize to both the code enforcement community and industry the necessity of submitting the documentation required to verify energy code compliance

- Document and communicate to code officials the characteristics of code enforcement best practices.

---

[3] https://www.energycodes.gov/compliance/evaluation/checklists

2. INTRODUCTION

Cadmus, as part of the cross-cutting team,[4] conducted follow-up in-depth interviews (IDIs) with 60 individuals who had attended one or more commercial code classroom training sessions sponsored by the Code Compliance Support Initiative (CCSI). Thirty respondents were municipal building code employees and 30 were architects, engineers, equipment suppliers, or energy efficiency professionals (referred to as "building professionals"). This second group is referred to as "builders and others" in prior studies of the CCSI. For commercial buildings, the professions in this group are usually very influential in decisions regarding design, energy efficiency, and code compliance.

The primary goal of these interviews was to determine if and how the skills and knowledge obtained from the training sessions are being applied in the field by training attendees, as well as to informally assess the code enforcement and compliance environment throughout Massachusetts. To give participants time to implement new knowledge from the training, Cadmus contacted participants at least six months after the training session attended. The respondents in this study attended training sessions during February 2015 through April 2016; the team interviewed the 60 attendees between June and October 2016.

2.1 COMMERCIAL CLASSROOM TRAINING

The CCSI sponsored 18 commercial classroom training sessions, lasting between three and three-and-one-half hours each, between February 2, 2015, and April 14, 2016. Seven training sessions concentrated on envelope and building science, six on mechanical provisions, and five on lighting, lighting controls, and other electrical provisions.

2.2 FOLLOW-UP INTERVIEW DESIGN

Cadmus designed the follow-up interview guides to assess how attending the training session(s) has influenced attendees' activities in Massachusetts in the past several months. The guides address the following:

- Respondents' activities since attending the training session(s), organized by 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 aspects 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 would recommend the training to others.

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

---

[4] The cross-cutting CCSI team is comprised of Tetra Tech, NMR Group, Inc., and Cadmus staff.

2-1

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

- Type of information filed with building departments to document energy code compliance

- Other training the respondents had attended and sources of information used

- [For building professionals] 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 building professionals] 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 and building professionals.

2.3   SAMPLING

To determine a sample for this study, interviewers began with a list of training attendees generated from Eventbrite registration and the immediate surveys completed following the conclusion of each training session. The list of possible respondents was narrowed down by eliminating attendees who had participated in training prior to 2015, were interviewed in previous years, represented a utility company (or similar conflict of interest), or had insufficient contact information. For respondents who had attended both a residential and a commercial training in the relevant period, Cadmus and NMR (responsible for conducting a comparable residential evaluation) split the sample evenly to ensure participants were not contacted for more than one interview.

Eligible participants for the follow-up IDIs participated in commercial training between February 2015 and April 2016. Attendees were selected as part of the sample only if they had attended training a minimum of six months prior to when the follow-up IDIs was conducted. As such, the sample was expanded each month to include additional attendees whose training occurred six months prior.

Table 2-1 shows the final distribution by year of a total of 270 participants who had attended commercial training events and were qualified to participate in the follow-up IDIs.

Table 2-1. Year of Commercial Training Attended

Year of Commercial Training Attended	Eligible Participants
2015	227
2016	43
Total	**270**

Survey respondents self-identified as builder or other, equipment supplier, or code official, and the 270 possible participants were sorted accordingly. As shown in Table 2-2, just over

half of the respondents (148 out of 270, or 55 percent) were code officials, while the remaining 122 respondents (45 percent) identified as building professionals.

Table 2-2. Type of Survey Participant

Type of Participant	2015 Attendees	2016 Attendees	Total Attendees
n	227	43	270
Code Officials	115	33	148
Building Professionals	112	10	122

Because the sample list consisted of a similar number of municipal building officials and building professionals, Cadmus randomized the entire list and contacted the possible respondents by both phone and e-mail (when provided). The goal for this set of IDIs was to interview 30 building professionals and 30 code officials. The interviewer called through the sample until 30 interviews from each participant group were conducted; every respondent was called and e-mailed at least one time. The sample disposition is included in Table 2-3 below. All 60 follow-up IDIs were conducted over the phone.

Table 2-3. Sample Disposition

Disposition	N
Completed Interviews	60
Code Officials	30
Building Professionals	30
Eligible Non-Interviews	173
One Contact Attempt – Unable to Schedule	1
Two Contact Attempts – Unable to Schedule	14
Three Contact Attempts – Unable to Schedule	6
Four Contact Attempts – Unable to Schedule	6
Five Contact Attempts – Unable to Schedule	48
Six Contact Attempts – Unable to Schedule	29
Refusal	62
Scheduled/ Not Completed	7
Not Eligible Non-Interviews	28
Ineligible/Did Not Attend	7
Retired/ No Longer at Company	21
Unknown Eligibility Non-Interview	9
Wrong Number	9
Total Sample	270

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

2.4   RESPONDENTS

The 60 respondents selected to participate in the IDIs worked in various fields that make use of the training provided by the CCSI. Half of the 60 respondents (30) worked for municipalities enforcing the building code—their occupations included building commissioner, state building commissioner, building inspector, and state building inspector; several individuals also held more than one primary occupation, such as a zoning and enforcement officer who also conducted inspections for the jurisdiction. The remaining 30 respondents worked as design professionals, energy efficiency consultants, project managers, engineering service providers, equipment suppliers, lighting designers, and university employees.

The respondents were asked to list the Massachusetts municipality in which they did most of their work. Table 2-4 lists the occupations of the 60 respondents as well as the code under which they perform their services.[5] Because of recent updates to the energy code in Massachusetts in many jurisdictions, respondents indicated that they worked in municipalities under the 2012 or 2015 International Energy Conservation Code (IECC), the stretch code, or various combinations of codes as shown in the table.[6]

---

[5] Subcategories are listed, with indentations, under the main categories for all tables in this report.
[6] The trainings were conducted when base code for commercial buildings allowed them to meet either the 2012 IECC or ASHRAE 90.1-2010. The stretch code has been adopted by more than half of the Massachusetts cities and towns as of November 16, 2016. For large commercial buildings, the stretch code requires performance 20 percent better than required by ASHRAE 90.1-2007. For medium-size commercial buildings, the code requires meeting specific prescriptive requirements or the same requirement as large commercial buildings.

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

Table 2-4. Follow-Up Interview Respondents
(Number of respondents; n=60)

Position	Total Respondents	Building Code in Municipalities Covered in 2015-16					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period[7]	All Codes
All Code Officials	**30**	**14**	**9**	**3**	**0**	**4**	**0**
Building commissioners	13	8	4	0	0	1	**0**
Building inspectors	12	5	2	2	0	3	**0**
State building commissioners	1	0	1	0	0	0	**0**
State building inspectors	1	0	0	1	0	0	**0**
Inspector and zoning enforcement officers	1	0	1	0	0	0	**0**
Inspector and directors of facilities	1	1	0	0	0	0	**0**
Inspector and project managers	1	0	1	0	0	0	**0**
All building professionals	**30**	**1**	**8**	**14**	**2**	**0**	**5**
Energy engineers	10	1	8	0	1	0	**0**
Architects	5	0	0	4	1	0	**0**
Energy efficiency consultants or HERS rater	5	0	0	5	0	0	**0**
Project manager/planners	2	0	0	2	0	0	**0**
Engineering services providers	2	0	0	2	0	0	**0**
Equipment suppliers	2	0	0	0	0	0	**2**
Lighting designers	2	0	0	0	0	0	**2**
University employee	2	0	0	1	0	0	**1**
All respondents	**60**	**15**	**17**	**17**	**2**	**4**	**5**

---

[7] Several respondents noted that their jurisdictions are currently in a concurrency period (referred to as "Con. Period" in the tables). A concurrency period generally refers to the period of time in which a new energy code has been adopted, but is not yet in effect and the project manager or owner may select to comply with the newly adopted energy code or the currently enforced energy code.

Fourteen of the municipal building code employees (47 percent) worked in cities and towns that enforce the 2012 IECC and an additional nine (30 percent) worked in cities and towns that enforce the stretch code. Thirteen percent (4 out of 30) worked in municipalities that were in a concurrency period and 10 percent (3 out of 30) enforced both the stretch code and the 2012 IECC.

Fourteen of the building professional respondents (47 percent) worked in municipalities that are under both the 2012 IECC and the stretch code. Eight respondents (27 percent) worked in municipalities under just the stretch code and another five worked across several municipalities and were expected to follow all codes. Two respondents in the building professionals group worked under the 2015 IECC and one worked strictly with the 2012 IECC.

2.5   TYPE OF TRAINING ATTENDED

The 60 respondents attended one or more of the courses offered by CCSI on envelope and building science; HVAC and indoor air quality; and lighting, lighting controls, and other electrical provisions. Respondents who attended more than one training were asked to answer questions about the last training they attended at least six months prior. Table 2-5 indicates the type of training attended by each respondent for which the IDI was conducted.

Table 2-5. Types of Training Attended
(Number of respondents; n=60)

Type of Training Attended	Total Respondents	Type of Respondent	
		Municipal Building Code Official	Building Professionals
Commercial envelope	24	19	5
Commercial lighting	8	6	2
Commercial HVAC	28	5	23

Nearly half of the total respondents (28 out of 60, or 47 percent) attended commercial HVAC training; of those, 82 percent (23 out of 28) were building professionals. Additionally, 40 percent (24 out of 60) of the total respondents attended commercial envelope training, the majority of which were municipal building code officials (19 out of 24, or 79 percent). The remaining eight respondents, 6 code officials and 2 building professionals, attended commercial lighting training.

The type of training attended varied by respondent type. The majority of municipal code officials (23 out of 30, or 77 percent) attended commercial HVAC training while the majority of building professionals (19 out of 30, or 63 percent) attended commercial envelope training.

2.6   FOLLOW-UP IN-DEPTH INTERVIEWS FROM PREVIOUS YEAR

In 2015, Cadmus conducted 21 IDIs consisting of four municipal building code employees and 17 building professionals. Where appropriate, Cadmus compared the results from the current study to results of the previous study.[8]

---

[8] Cadmus. January 27, 2016. Massachusetts Electric and Gas Program Administrators: Follow-up Interviews with CCSI Commercial Training Attendees—Revised Draft.

2-7

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

3. 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 all respondents 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 overall.

3.1 MUNICIPAL BUILDING CODE EMPLOYEES

Twenty-four of the 30 municipal building code employees responded to the question regarding what parts of the training were most useful in practice. Table 3-1 shows which part or parts of the training were identified. Over one-third of the respondents (9 out of 24, or 37.5 percent) found topics related to the building envelope to be the most useful.

Additionally, five of the respondents (21 percent) listed real-life examples and experiences as the most useful part of the training and another 17 percent (four respondents) said that the training was useful in general. Other topics that code officials found useful included information related to code changes, documentation requirement details, overview of all code requirements, and common mistakes and errors, among others.

Of the six respondents who did not specify a part or parts of the training they found to be useful, five respondents noted that they could not remember training specifics and one respondent did not consider attending the training useful in general.

Table 3-1. Most Useful Information from Training—Municipal Building Code Employees (multiple responses; n=24)

Most Useful Part of Training	Total Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
All envelope responses	9	6	3	0	0	0	0
Envelope air sealing	4	3	1	0	0	0	0
Total calculations	1	1	0	0	0	0	0
Insulation installation	1	0	1	0	0	0	0
Knee walls	1	1	0	0	0	0	0
Cold bridges	1	1	0	0	0	0	0
Continuity of air barriers	1	0	1	0	0	0	0
Real-life examples or experiences/best practices	5	2	2	1	0	0	0

Most Useful Part of Training	Total Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
General	4	2	0	2	0	0	0
Code changes/update	3	2	0	0	0	1	0
Documentation details/requirements	3	1	2	0	0	0	0
All HVAC responses	2	1	0	0	0	1	0
Fan calculations	1	0	0	0	0	1	0
System integration	1	1	0	0	0	0	0
Code requirement overview	2	1	0	1	0	0	0
Details for plan review/ inspection	2	1	0	0	0	1	0
Common mistakes/errors	2	0	2	0	0	0	0
Commissioning	1	1	0	0	0	0	0
Systems approach to buildings	1	1	0	0	0	1	0
Handouts	1	1	0	0	0	0	0
New technology/innovation	1	0	0	0	0	1	0
Stretch code specifics	1	1	0	0	0	0	0
Audience participation/questions	1	1	0	0	0	0	0
Knowledgeable presenter	1	1	0	0	0	0	0

The following quotes from training attendees explain in greater detail the most useful parts of the training. For example, an inspector who attended the HVAC training explained how the training detailed the parts of the HVAC system that need to be inspected:

> "The training was geared toward looking at code requirements for inspection purposes and the technical components of the HVAC system that should be observed in the field. I inspect the whole building and sometimes you overlook the details. This training really did a good job of getting into the weeds of some of the more technical requirements."

Another inspector who attended envelope training explained how identifying common mistakes through real-life examples was most useful:

> "What to look for as common mistakes was most useful to me as an inspector. Most training brings contractors up to speed and focuses less on code officials and what to look for as mistakes. In many cases, the mistakes are concealed and we still need to

be able to identify them. This training really had a good focus on real-life examples of what to look for out in the field."

Similarly, a building commissioner who attended envelope training noted that the focus on building sealing was most useful to the projects in his jurisdiction because it was a common error among contractors:

"The sections on building sealing [were must useful]; the training hit a lot on that as well. That is our biggest issue in the field right now, a lot of contractors aren't really sure what they are doing with building sealing, so we've been able to pull a lot from that and apply it to our inspections."

An inspector who attended lighting training remarked on the innovation in lighting design and why it was important for him to attend as a building official:

"One of the most interesting concepts to me is the product technology being thought up or invented, especially in lighting. The innovation is just amazing. The presentation was geared towards engineers, architects, and designers - people that should be using the technology in their projects. In terms of being a building official, it's really important to me to be aware of new technologies. I may see a set of plans or the schematic design, but I may not realize what exactly is happening in lighting innovations and I may not recognize the technology when doing inspections. This training has helped with that."

Finally, the respondent who did not find training useful, a building commissioner who attended lighting training, explained:

"In my opinion, the content of the seminar and requirements to comply with that part of the energy code would require documentation from a Massachusetts electrical engineer; therefore, requiring me to accept his or her affidavit with no actual inspection from my department. The content of the seminar is not within the education of a building commissioner and if a building commissioner was so trained to review that part of commercial energy code section by becoming an electrical engineer or licensed electrician, the time that would be involved could and probably would require additional staffing."

In the previous IDI study, Cadmus found that half (two out of four) of the municipal building code respondents said that the training was useful in general and half said the most useful part was the overview of compliance options. Compliance options were not identified as a useful part of the training in results from the 2016 study.

3.2   BUILDING PROFESSIONALS

Twenty-three of the 30 building professional respondents identified one or more parts of the training that were useful (Table 3-2). Ten of these 23 (43 percent) said that the information related to code changes and to an update of code requirements was the most useful part of the training. Over one-third (9 out of 23, or 39 percent) listed HVAC topics as the most useful part. For example, an engineer who attended mechanical training said:

"The ventilation portion was the best, specifically the detail on how important ventilation is in heating and cooling. Things like the need for getting the right airflow, how you can

get sick or suffocate, VOCs. Ventilation rates and system design make a big difference in productivity and a lot of buildings have trouble with that."

Additional topics or ways in which the code was most useful included the overview of all code requirements, lighting controls, the quality of the instructor selected to give the course, the material and equipment needed to meet code, and the interpretations of the code, specifically how Massachusetts interprets the intent of the code, among others.

An architect who attended mechanical training explained why the code overview portion of the training was most useful to his occupation:

"The code overview portion of the training is most useful to me, personally. Getting into the very specific details is less useful. I don't work directly with code compliance. We are consultants for sustainable design, so really the designs are already complete when they come to us. We just give suggestions for further efficiency."

Table 3-2. Most Useful Information from Training—Building Professionals
(multiple responses; n=23)

Most Useful Part of Training	Total Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
Code changes/update	10	1	0	8	0	0	1
All HVAC responses	9	0	0	0	0	0	0
HVAC sizing	3	0	0	3	0	0	0
Economizers	3	0	0	3	0	0	0
HVAC system design	2	0	0	2	0	0	0
Ventilation	1	0	0	1	0	0	0
Code requirement overview	3	0	0	2	1	0	0
Lighting controls	3	0	0	2	0	0	1
Knowledgeable presenter	2	0	0	1	0	0	1
Code interpretation, MA-specific interpretation	2	0	0	2	0	0	0
Equipment/materials to meet code	2	0	0	1	0	0	1
General	1	0	0	1	0	0	0
Stretch code specifics	1	0	0	0	0	0	1
Audience participation/questions	1	0	0	0	0	0	1
Contacts in the industry	1	0	0	1	0	0	0

Most Useful Part of Training	Total Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
Firsthand experience/best practices	1	0	0	1	0	0	0
Multifamily requirements	1	0	0	1	0	0	0
Tradeoffs	1	0	0	1	0	0	0
Envelope air sealing	1	0	0	1	0	0	0
Piping insulation	1	0	0	1	0	0	0

Of the eight participants who did not provide an answer to which part or parts of the training were most useful, six said that the training was too long ago to remember useful information in detail. The other two respondents, an architect and a heating and cooling distributor, did not find the training useful in any way.

These results differed significantly from those presented in the prior IDI report, primarily because respondents this year were more likely to have attended HVAC training and those last year most commonly attended lighting training. In the previous IDI study, building professionals respondents most commonly noted lighting provisions, particularly day-lighting, occupancy sensors for exterior lighting, plug-load controls, and LED lighting, as the most useful part of the training. Building professionals also found building envelope topics useful. Although still noted in the current study, fewer respondents said lighting provisions were the most important and more were inclined to list HVAC requirements as the most useful topics.

4.   USE OF TRAINING INFORMATION IN THE FIELD

Another key goal of the follow-up interviews was to assess how the attendees were using what they had learned in their everyday jobs. Interviewers asked participants a series of questions to determine the type of worked they performed, how the training was being used in their work, and reasons (if relevant) why trainees had not made any changes to their work as a result of the training courses. The following sections detail the work performed by municipal building code employees and building professionals as well as the impact the training has had in their respective occupations.

4.1   MUNICIPAL BUILDING CODE EMPLOYEES AND BUILDING INSPECTIONS AND PERMIT REVIEW

To begin, 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 4-1, 87 percent of respondents (26 out of 30) performed both site inspections and permit/plan review. In one case, the respondent noted overseeing plan review and inspection rather than being the one to perform the work.

Table 4-1. Type of Work Performed by Municipal Building Code Employees (n=30)
(Number of respondents; n=30)

| Type of Work Performed	Number of Respondents
n	30
Only site inspections	1
Only permit/plan review	3
Both site inspections and permit/plan review	26

Interviewers used the information from this question to ask additional questions appropriate to the type of work performed by the individual.

4.1.1   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. Twenty-four of the 30 respondents were able to provide an estimate; the number of inspections varied by respondent, from zero (does not perform inspections) to over 1,000 inspections. The remaining six respondents either could not provide an estimate or did not perform inspections as part of their position.

As shown in Figure 4-1, municipal building code officials estimated that they had performed 2,344 inspections collectively since attending the training. Of those, 1,067 inspections (46 percent) were performed for projects permitted under the 2012 IECC and the remaining 55 percent (1,277 inspections) were performed for projects permitted under the stretch code. Interestingly, 1,000 of the inspections performed for stretch code projects were completed by one respondent, a state building commissioner. Additionally, one respondent noted that he had performed inspections under the 2015 IECC, but could not provide an estimate of the number of inspections.

**Figure 4-1. Number of On-site Inspections Performed Since Training
(number of respondents; n=24)**

■ Construction permitted under 2012 IECC
■ Construction permitted under stretch code
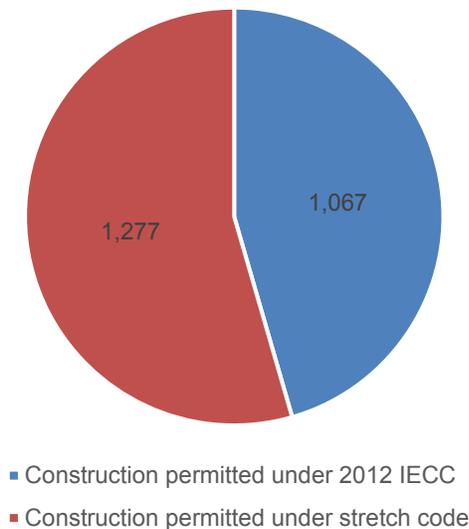
Interviewers found that this question was confusing for some respondents. For example, some respondents thought the question referred only to inspections specific to the training they had attended rather than to the total number of inspections across all systems. Respondents were also confused as to whether or not they should include retrofits, tenant build-outs, and various other inspections. Lastly, the question asked respondents to estimate the number of inspections *since the training,* but several respondents noted that the average number of inspections varied by month and was difficult to recollect or calculate offhand.

Interviewers also asked respondents to estimate how many of the completed inspections were final inspections. Twenty-one of the 24 respondents who estimated the total number of inspections also estimated the total number that were final inspections. These respondents estimated that of 1,914 total inspections, 330, or 17 percent, were final inspections.

Finally, interviewers asked respondents to estimate the total number of buildings inspected and these buildings' average square footage. Table 4-2 lists the answers provided by the respondents who conducted commercial inspections as part of their positions. It is important to note that the number of respondents varies by question because some respondents were unable to provide an estimate.

Table 4-2. Inspections Performed by Municipal Building Code Employees
(multiple responses; number of respondents)

	Total Respondents	Total Estimated
Total number of buildings inspected under all codes	20	1,617
Average square footage of each building	18	25,138 sq.ft.

Twenty of the 30 municipal building code employees estimated that they had inspected a total of 1,617 buildings under both the 2012 IECC and the stretch code.[9] Ten of the 30 respondents (34 percent) could not provide an estimate of the total number of buildings inspected. An inspector who works with both the 2012 IECC and the stretch code noted, *"I have conducted too many to really give you a count. It's been a very busy year for new construction and I also do inspections for other jurisdictions when needed."*

Eighteen of the 30 municipal building code employees estimated that the average square footage for each building inspected was 25,138 square feet. Three of the 12 other respondents did provide an estimate; however, they provided ranges that were too large to use to develop an average. These were their estimates:

- One inspector said the buildings he inspected ranged from 2,000 to 3,000 square feet. and that some buildings were 200,000 to 300,000 square feet or larger

- Another inspector estimated the buildings he inspected ranged from 6,000 to 100,000 square feet

- A building commissioner said the buildings he inspected ranged from 2,000 to 200,000 square feet.

4.1.2 Permit application or plan reviews by municipal building code employees

The follow-up IDIs 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. Of the 30 code officials interviewed, 25 were able to provide an estimate; collectively, they conducted 1,242 permit application or plan reviews. The remaining five respondents did not provide an estimate, because they either did not believe the question was applicable or did not have a good estimate for the number completed.

---

[9] As noted earlier, 1,000 of these buildings were inspected by one respondent, a state building commissioner.

4.2 BUILDING PROFESSIONALS' COMMERCIAL PROJECTS WORKED ON SINCE TRAINING

Cadmus asked building professionals to estimate the number of commercial projects permitted under the energy code that they had worked on since attending the training. Twenty of the 30 respondents stated they had worked on one or more projects permitted under the energy code, a total of 1,129 buildings. It is important to note, however, that respondents who had attended training more than one year previously gave the number of projects they had worked on during the last year. One of the ten other respondents, an architect, stated he had worked on "*hundreds of projects under the 2012 IECC*"; his estimate was not included in the total because it was not exact enough. The remaining nine respondents did not provide an estimate because they either did not believe the question was applicable or simply could not provide an accurate estimate.

As shown in Figure 4-2, of the 1,129 projects that building professionals estimated they had worked on since attending the training, 807 (71 percent) involved construction permitted under the 2012 IECC; 255 (23 percent) under the stretch code; 60 (5 percent) using ASHRAE 62; and seven (less than 1 percent) under 2015 IECC.

Figure 4-2. Number of Projects Worked on Since Training
(number of respondents; n=20)

- ■ Projects permitted under 2012 IECC   ■ Projects permitted under Stretch Code
- ■ Projects permitted under ASHRAE 62   ■ Projects permitted under 2015 IECC
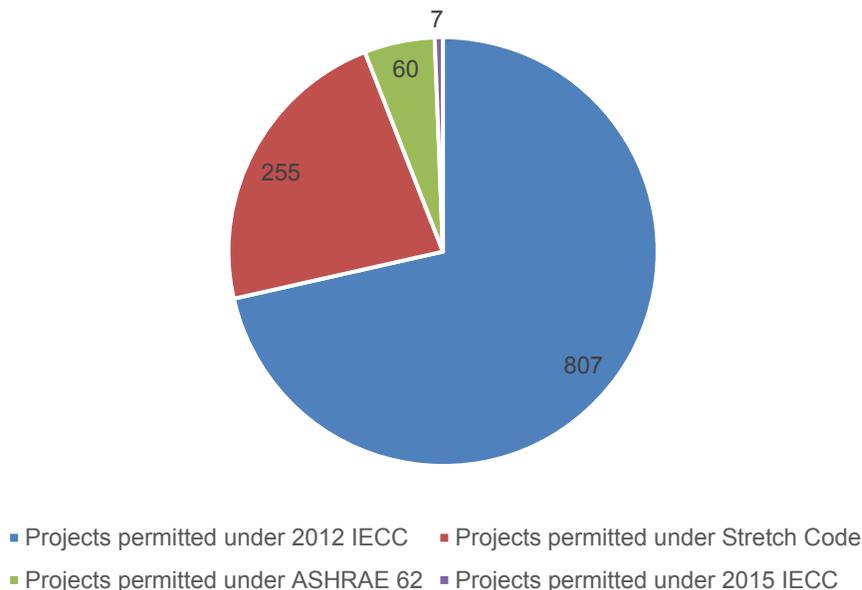
4.3 CHANGES MADE TO WORK AFTER ATTENDING TRAINING

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?*"

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

Building professionals 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 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 encouraged 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.

4.3.1   Municipal building code employees

A.   Changes made to work compared to immediate survey answers

As previously explained, respondents were asked to fill out immediate survey forms after their training session. Immediate surveys were used to gather information about the usefulness of the training, skills of the presenter, and quality of the information presented, as well as any additional comments from training attendees. The immediate survey also asked when respondents expected to first use what they had learned in the training session.

Table 4-3 compares the responses from the immediate surveys to the responses provided during the follow-up interviews when respondents were asked if they had changed how they conduct inspections or review building permit applications and plans as a result of the training. Because some of the immediate surveys did not include respondent names, respondent handwriting was illegible, or the respondent had not filled out the survey, only 17 responses were available.

Nine of the 17 municipal building code employees (53 percent) in the immediate survey indicated that they would be using something they learned at the training as soon as they walked out of the door. With respect to changes made to the inspection process, six respondents confirmed that they had, in fact, used what they had learned in the training during that time period; the other three said they still had not used what they learned to make changes to their inspection process.

With respect to changes made to the plan and permit review process, three of the nine respondents who indicated that they would be using the training as soon as they walked out of the door confirmed that they had used the training to modify their plan review process, four respondents had not used the training, and two did not feel the question was applicable.

The remaining eight municipal building code employees said they would use something they learned from the training in the next three to twelve months. With respect to changes made to the inspection process, three of the eight respondents confirmed that they had made changes to their inspection process in the follow-up interviews, four said they had not made changes, and one respondent did not feel the question was applicable. With respect to changes made to the plan review process, six of the eight respondents confirmed they had made changes to their plan review process and two had not made any changes.

Table 4-3. When Expected to First Use Training Information and Changes Made
(multiple responses; n=17)

Expected to first use training in immediate survey	Number of Respondents	Whether made changes to their work				
		Yes – Inspections	No – Inspections	Yes – Plan Review	No – Plan Review	Not Applicable
As soon as I walk out the door	9	6	3	3	4	2
Sometime in the next three months	4	2	1	3	1	1
In the next four to six months	2	1	1	2	0	0
In the next seven to twelve months	2	0	2	1	1	0
More than a year from now	0	0	0	0	0	0

The changes respondents made to the inspection process and plan and permit review process are detailed in the following sections.

B.   Changes made to inspections

Of the 30 municipal building code employees interviewed, four respondents either did not conduct inspections as part of their job position or did not believe that questions about a change in inspection process were applicable. Of the 26 respondents who did conduct inspections, 15 respondents (58 percent) said they had made some changes to their inspection process as a result of the training. The remaining 11 respondents did not make any changes to their work, as illustrated in Figure 4-3.

Figure 4-3. Changes Made to Inspection Process
(number of respondents; n=30)
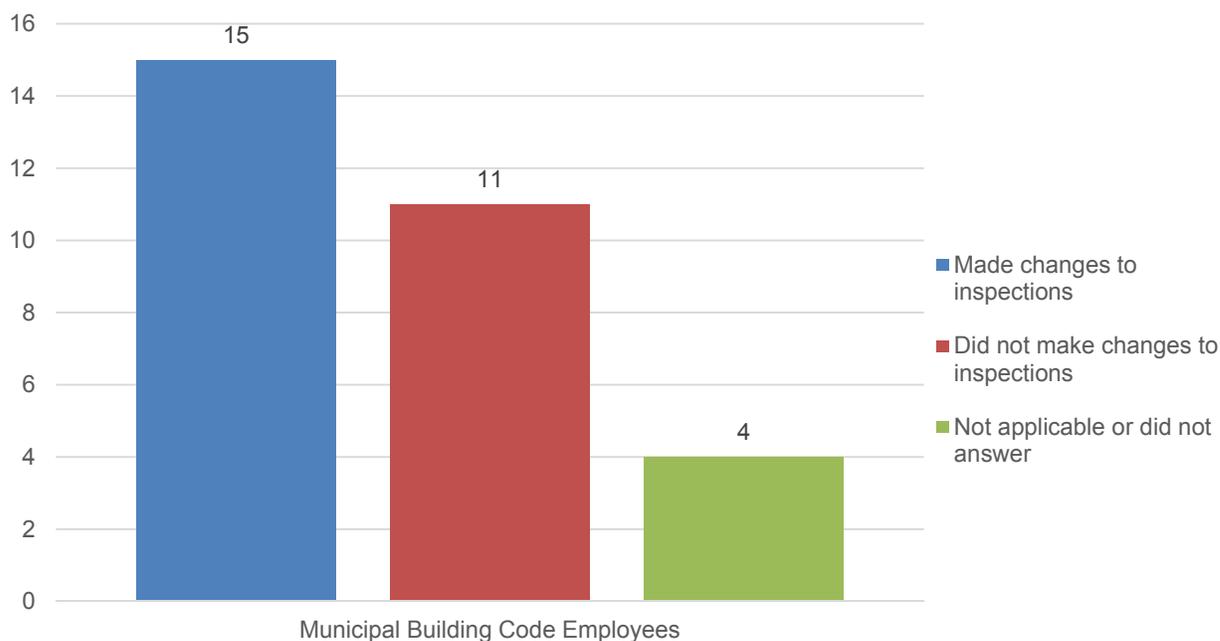
The 15 respondents who made changes to their inspection process were asked to describe how their inspection process had changed. (Table 4-4 lists the responses.) Over half of the respondents (9 out of 15, or 60 percent) said that they were more thorough in their inspection process or with enforcement of the energy code. One inspector described the impact the training had on his attention to detail:

> *"Truthfully, I used to take a lot for granted when it came to what an architect or engineer signed off on. I always assumed that if it was designed correctly, the building wouldn't have many issues. But the training made me more aware of some of the issues others were having so I starting conducting more in-depth inspections. Sure enough, I started noticing gaps when things should have been sealed and incorrect installation. Now I pay a lot more attention to details."*

Seven respondents of the 15 who said they made changes (47 percent) noted that they were paying closer attention to aspects of their projects that were overlooked in the past. One inspector noted that lessons learned from the training helped him create a resource for checking the parts of projects he missed before, stating, "*The training made me more aware of certain aspects of the building I should be paying closer attention to. I actually carry a cheat sheet now of common mistakes that I put together using the PowerPoint from the trainings. It has been added to our general onboard.*"

Respondents also noted that the training had increased their knowledge of what should be inspected, the importance of using a checklist, paying closer attention to verifying that construction matches approved plans, and code requirements, to name a few. An inspector noted that he had a better idea of the purpose of the code requirements and an increased general knowledge of the code because of the training. He added:

"I also have a better understanding of the scope of how systems work in terms of energy. The code itself presents everything two dimensionally and when you get into the field, everything is three dimensional and there is a little bit of a learning curve. I have been able to apply what I've learned in the training to bridge that gap between two dimensional illustrations and three dimensional systems."

Table 4-4. Changes Made to Inspection Process by Respondents Who Changed (multiple responses; n=15)

Areas	Number of Respondents
n	15
All more thorough during inspections/enforcement	9
General	6
Recessed lighting	1
Multifamily	1
Visual inspections	1
All more attention paid to certain aspects of the project	7
Insulation	3
Air sealing	2
Building envelope	1
System installation	1
More aware of what should be inspected	3
Incorporated use of checklist	2
Verifying that construction matches plans	1
Increased general knowledge of code	1
Better understanding of how systems work	1
Require engineer on record to be on site	1
Increased frequency of re-inspections	1

C.   *Changes made to permit application or plan review*

Municipal building code employees were also asked if they had changed how they review building permit applications or plans as a result of the training. As shown in

Figure 4-4, six of the 30 respondents did not answer or did not believe the questions were applicable to their current occupation. Eleven of the 30 (37 percent) did not make any changes to their review process as a result of the training. The remaining 13 respondents (43 percent) made a variety of changes to their review process.

Figure 4-4. Changes Made to Permit Application or Plan Review
(number of respondents; n=30)
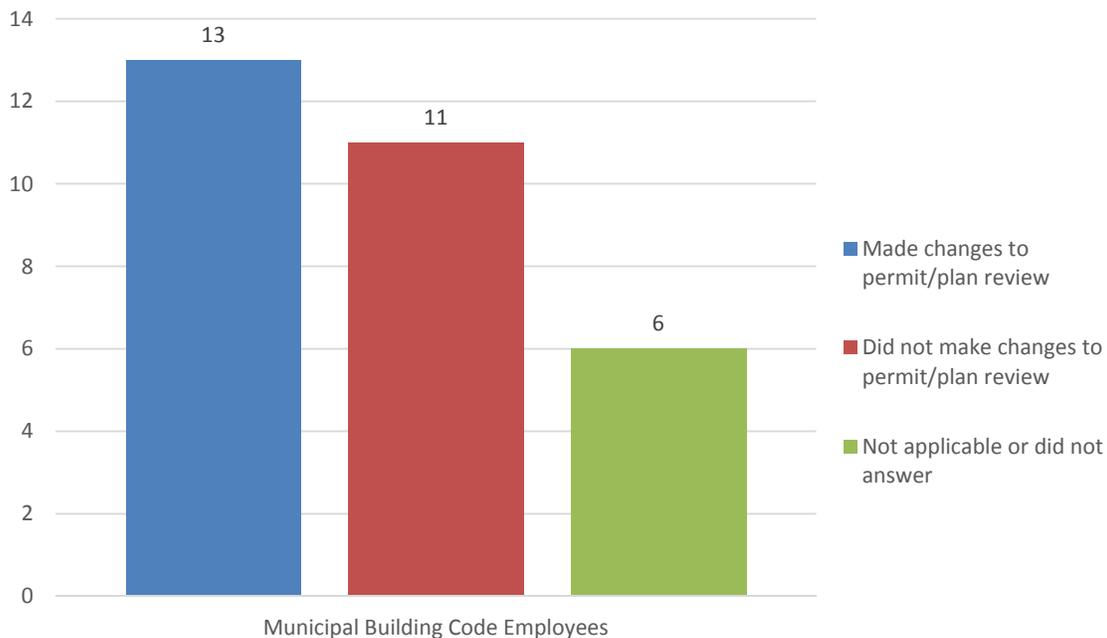
As shown in Table 4-5, of the respondents who made changes to the review process, nearly all (12 out of 13, or 92 percent) said that they were more thorough during plan review as a result of the training. Many respondents described the areas in which they spent more time reviewing—these areas included recessed lighting, efficiency ratings on HVAC equipment, and exterior walls. Six of the 13 respondents (46 percent) said that they asked for additional details on documentation as a result of the training.

Other changes made to the review process included modifying checklists and tables used by the department to reflect updated code requirements, a better understanding of HVAC drawings, more attention to the orientation of the sun and trade-offs, and closer attention to load calculations.

Compared to the previous IDI study, respondents in the current study were much more specific when explaining how their inspection and permit application and plan review process had changed. The sample size of municipal building code employees from the previous IDI study was very small so results were limited; in that study, respondents noted a general increase in knowledge that they were able to apply to their work, reducing the amount of time it took to verify certain measures during plan review and inspection.

Table 4-5. Changes Made to Permit Application/Plan Review Process by Respondents Who Changed
(multiple responses; n= 13)

Areas	Number of Respondents
n	13
All more thorough during plan review	12
General	5
Envelope detail	1
Recessed lighting	1
Lighting fixtures	1
Exterior walls	1
Weatherization	1
Insulated vs. non-insulated doors	1
High efficiency ratings on HVAC equipment	1
Requesting additional details and/or documentation	6
Updated checklists and/or tables	3
Better understanding of HVAC drawings	2
More attention to orientation of the sun	1
Look for calculations if performance based	1
More attention to trade-offs	1

D.   *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. As Table 4-6 shows, 10 of the 30 municipal building code employees said that the training had had an impact on other areas. The two areas most affected by the training were awareness of the energy code and participation in discussions on energy related topics. Four respondents noted that the training increased their knowledge of the energy code so significantly that it had a positive impact on all areas of their work. Another four respondents said that they were better able to converse with contractors, design professionals, and their peers and colleagues as a result of the training.

One inspector noted that the training had improved his ability to speak directly with contractors: *"I would say I have more confidence when talking about the code to contractors. The training reinforces things you thought were correct or were telling people about the code. I can now say, 'this is how you do it,' and know I am right because I just trained on it."*

Table 4-6. Other Changes Made to Work as a Result of Training by Respondents Who Changed
(multiple responses; n= 10)

Areas	Number of Respondents
n	10
More general awareness of the code, knowledgeable	4
Better participant in discussion of energy features with peers and colleagues	4
Factored into other occupations/roles respondent has	1
More confident in code-related decisions	1
Ability to push harder for code compliance	1
Better knowledge of technology and innovation	1
Helpful in making public/consumers knowledgeable	1

Respondents also said that the training strengthened them in the other occupations or roles they held; for example, one inspector is also a contractor in his town. Additionally, as a result of the training, respondents said they were in a better position to push for code compliance, better able to educate consumers, had a greater knowledge of technology and innovation, and were more confident in code-related decisions. One building commissioner added, *"Most significantly, the training has given me what I need to push back on architects that aren't designing correctly."*

4.3.2   Building professionals

As with the code employees, all building professional respondents had been provided immediate survey forms after their training. Some of these surveys also did not include respondent names, respondent handwriting was illegible, or the respondent had not filled out the survey. Therefore, only 22 responses were available. Table 4-7 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.

Eleven of the 22 respondents who filled out the immediate survey indicated that they expected to use something they learned in the training as soon as they walked out of the door. Six of the 11 respondents confirmed that they had already used what they had learned in the training to change their work; five reported that they had not made any changes to their work.

The remaining 11 respondents expected to use something they learned in the training in the next three to twelve months. Of those, four indicated that they had already used information from the training to make changes to their work while the remaining seven said they had not made changes to 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 4-7. When Building Professionals Expected to First Use Training Information and
Changes Made**
(number of respondents; n=22)

Expected to first use training in immediate survey	Number of Respondents	Whether Made Changes to Work	
		Yes	No
As soon as I walk out the door	11	6	5
Sometime in the next three months	7	3	4
In the next four to six months	3	1	2
In the next seven to twelve months	1	0	1
More than a year from now	0	0	0

A.   Changes made to work by building professionals

Fifteen of the 30 building professional respondents (50 percent) indicated that they had
changed the work they did to better comply with the energy code as a result of the training;
Table 4-8 lists the changes. The most notable effect of the training was an improvement in
general knowledge, awareness, and familiarity with the code. Nine of the 15 respondents (60
percent) who had changed their work after the training said this improvement in general
knowledge was key to how they were doing business now.

One third (5 out of 15) of the building professionals also mentioned that having
attended the training affected both the resources they used and their current
practices, which they modified to reflect updated code requirements and training
information. Respondents noted that they paid greater attention to detail, modified
how they performed energy analysis and plan reviews for design firms, were more
aware of the expectations the state had for energy efficiency, and became known as a
resource for energy code information by peers and colleagues due to the training.
Additionally, one engineer said he was more aware of innovation in the industry, for
example of *"new technologies involved in projects such as laboratories, including how
to make a cryogenic freezer energy efficient."*

The remaining 15 respondents said the training either had no effect on their work or was not
directly related to their work, as explained in Section **Error! Reference source not found.**.

Table 4-8. Changes Made by Building Professionals Who Said Training Affected Their Work
(multiple responses; n= 15)

Areas	Number of Respondents
Familiarity with code requirements/general awareness	9
Modified current practices and/or resources to better reflect code requirements	5
Greater attention to detail - all	3
Piping insulation	1
Equipment sizing	1
Equipment efficiency	1
Greater awareness of new technologies	1
Plan review	1
Energy analysis	1
Better understanding of Massachusetts expectations	1
Seen as a resource by colleagues	1

Compared to the previous IDI study, the changes 2016 building professionals who participated in training made to the work were very similar. Like 2016 respondents, the respondents in the previous study noted that the greatest change to their work was a result of an increased familiarity or general awareness of the code. Those respondents, however, did not mention that they had modified current practices or resources to better reflect the requirements of the code.

B.   *Activities building professionals would be doing differently without training*

Interviewers asked the building professionals 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. As shown in Table 4-9, over half of the respondents who said their training had an effect (8 out of 15, or 53 percent) said they would not be doing anything differently. Three of 15 respondents said without the training they would be notably less aware of the requirements of the energy code. Five of 15 said that without the training they would be paying less attention to details, using incorrect or outdated reference materials, or providing incorrect recommendations for materials or equipment.

Table 4-9. Activities Building Professionals Would Be Doing Differently without Training
(multiple responses; n=15)

Activities	Number of Respondents
n	15
No activities would be different	8
Less aware of code requirements	3
Less attention to details	2
Using incorrect/outdated reference material	1
Providing recommendations for materials/equipment	1

C.   Projects most affected by the training

Building professionals were asked to identify the projects most affected by what they learned in the training. Eleven respondents elected to provide an answer. Of these, 10 respondents worked in jurisdictions that enforce both the 2012 IECC and the stretch code or worked across the state with all codes. Nine of the 10 said the training applied globally across projects, including stretch code projects. A lighting designer who works with all of the energy codes added, *"I do think the training applied to both stretch and non-stretch communities and, generally, across projects. It didn't prescriptively tell us how to meet the requirements, which is greatly needed, but the knowledge applies across the board."* The remaining respondent (of the nine who said the training applied globally across projects), an engineer who uses both codes, said the projects most affected by the training were energy audits.

One respondent worked exclusively with the 2012 IECC and, rather than answering in terms of the projects most affected by the training, said that the training did not apply to any of his industrial work.

D.   Other changes as a result of training

Lastly, interviewers asked building professionals if there were other areas not previously covered during the survey where the training had influenced their work (Table 4-10). Nine respondents provided examples of the impact of the training on different areas of their occupations. Most notably, five of the nine respondents said that the training gave them greater knowledge of the code and four said the training made them a better participant in discussions of energy features.

Two respondents incorporated the training material into energy code-related presentations. One of these respondents, an energy efficiency consultant, said, *"I have also incorporated some of what I learned into my own presentations when I present at conferences or seminars."*

Additionally, two respondents said they were now an energy code resource for their colleagues. An engineer elaborated, stating, *"The training has set me up to be someone my peers can turn to for questions and advice."*

Respondents also factored the training into their other roles or occupations, used the knowledge to help reach sustainability goals set by their companies, formed relationships with individuals from other occupations within the industry, and claimed utility incentives.

Table 4-10. Other Changes Made to Work as a Result of Training
(multiple responses; n= 9)

Areas	Number of Respondents
n	9
More general awareness of the code, knowledgeable	5
Better participant in discussion of energy features with peers and colleagues	4
Incorporated knowledge into own training material and presentations	2
Source of knowledge for colleagues	2
Learning about and claiming utility incentives	1
Factored into other occupations/roles respondent has	1
Knowledge used to help meet company or organization sustainability goals	1
Formed relationships with individuals from other occupations	1

4.4   WHY NO CHANGES WERE MADE AFTER ATTENDING TRAINING

Thirty-seven percent of the 30 municipal building code employees stated that they had not made any changes to their on-site inspections or plan review as a result of the CCSI courses they participated in; 50 percent of the 30 building professionals also made no changes to their work. In an effort to better understand the impact of the training, interviewers asked respondents to describe why the training did not affect their work and if respondents expected training to influence their work in the future. Results are described in the following subsections.

4.4.1   Municipal building code employees

A.   On-site inspection process

As shown previously in Figure 4-3, 11 of the 30 municipal building code employees indicated that they had not made any changes to their inspection process as a result of the training. Nevertheless, two of the 11 expected that the information learned at the training will influence future inspections. More than half (6 out of 11, or 55 percent) said that they had not made changes because they were already very thorough with inspections, as shown in Table 4-11. One inspector said, *"Really I just think that we have always been a little ahead of the curve in how we do inspections and what we look for. We don't seem to have any issues and we're very thorough here."* Three respondents (27 percent) also said that the training was too much of a review and did not provide enough new information to have an impact on the inspection process.

Table 4-11. Why Municipal Building Code Employees Made No Changes to Inspections
(multiple responses; n=11)

Reason	Number of Respondents
n	11
Already very thorough with inspections	6
Training was a review/no new information provided	3
Doesn't do enough inspections	2
Not relevant without hands-on portion	1
Training not relevant to stretch code	1
Information not geared toward inspections	1

Other reasons were that the respondents did not do enough inspections, the training was not relevant to the stretch code, and the information provided at the training was not geared enough toward inspections in general. One inspector also noted that, *"While the training was quite technically sound, it is hard for most of that to translate into inspections without an on-site or hands-on portion."*

B.   Permit application and plan review process

Although 13 of the municipal building code employees said they changed their permit application and plan review process as a result of the training (Table 4-8), 11 others indicated that they had not (Table 4-12). As was the case with inspections, respondents most commonly noted that they did not make any changes to their work because they were already thoroughly reviewing permit applications and plans. One building commissioner stated, *"I am already very thorough with plan review because I believe issues are easier to fix on paper and in design than in the field."* Cadmus notes that this perception differs from the findings from its recent study on the documentation provided to building departments to support commercial building energy code enforcement across Massachusetts.[10]

Other respondents said that the training did not provide enough new knowledge to impact their work. An inspector noted that he was *"already using a checklist provided by the ICC with code references and all of the basic information we require on the plans. Everything was already captured by that and I don't feel like the training added anything to it that we weren't already doing."* Cadmus' recent report on building code compliance documentation recommended that a simplified checklist be provided to building departments and we do not know if all departments are aware of the ICC checklist or if it is the best option.[11]

Two respondents indicated that the training did not change their review process because they continued to rely on the information provided to them by design professionals. One respondent, an inspector, said: *"I still rely on the architect or engineer to put together the information so that it complies with their software. I trust their calculations and I trust that they*

---

[10] Cadmus. October 17, 2016. *Commercial Code Compliance Documentation Assessment Draft.*
[11] *Ibid.* p. 1-1.

know and understand the requirements of the energy code." Other respondents said the training was not relevant to the stretch code or to plan review in general.

**Table 4-12. Why Municipal Building Code Employees Made No Changes
to Permit Application and Plan Review Process**
(multiple responses; n=11)

Reason	Number of Respondents
Already thorough review process	5
No added knowledge	4
Trust architect/engineer software analysis	2
Did not apply to stretch code	1
Focus of training was not relevant to plan review	1

When asked if the training would influence their permit application and plan review process in the future, two of 11 respondents (18 percent) said that the training would impact future work. A building commissioner elaborated, saying*, "I do foresee applying some of the knowledge. The training highlighted a lot of the nuances of the code and a few of the requirements that aren't always enforced. I will use those key points."*

Two other respondents said that the training may have an influence in the future. The remaining seven did not believe the training would impact future work.

4.4.2   Building professionals

Fifteen of the 30 building professional respondents (50 percent) indicated that they had changed the work they did to better comply with the energy code as a result of the training, but 12 (40 percent) indicated that they had not. As shown in Table 4-13, more than half of these respondents (7 out of 12, or 58 percent) said that they did not change their work because they were already meeting the requirements of the code or primarily work with above code projects.

Table 4-13. Why Building Professionals Made No Changes to Work
(multiple responses; n= 12)

Reason	Number of Respondents
Already meeting code minimums, works in above code	7
Not applicable to project work	3
No added knowledge	2

An energy efficiency consultant who works on above-code projects said, *"It's important for us to understand the code and what elements make our projects better than code. I haven't used the information when trying to exceed the code, but it's definitely crucial to understanding the code in general."* An engineering service provider also noted that the training did not change her work because she was already meeting code minimums before the training, "*We are generally hired to exceed code, so we already had that part down."*

Additionally, three respondents (a lighting designer, an engineer, and an architect) said that their work had not changed because the training was not directly applicable. The lighting designer said she was not concerned with meeting the energy code; the engineer worked with existing buildings and noted that his projects did not fall under the requirements of the stretch code; the architect said, *"We are consultants so we take designs that are already complete and build on them. The designs are usually always already to code, so most of the training just isn't applicable to what I am doing for my customers."*

Two respondents noted that the training did not provide them with enough new knowledge to impact their work.

Builder and other respondents were then asked whether they believed the training would impact their work in the future. Three of the 12 respondents (25 percent) thought their future work would be influenced by the training. Two of these three believed the training would be more relevant with the adoption of the 2015 IECC. An engineering services provider said: *"I do think that we will be doing more work with commercial buildings once the 2015 IECC is adopted and implemented since there are more applicable diagnostic tests."* The other respondent, an engineer, noted, *"I'm not sure when the codes will become more stringent with existing buildings, but at that point, I believe my involvement will be increased and the training will pay off."*

Half of the respondents (6 out of 12) did not believe the training would impact their future work, largely because they believed their work was already meeting or exceeding the energy code. An engineering project manager said: *"We will likely continue to be ahead of the curve as far as knowing, understanding, and using the code."* An architect also noted that the training would not influence his future work: *"not because the training isn't great, there's just limited application in my own work."*

The remaining three respondents were unsure if the training would influence any future work.

4-19

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

5.   USE OF TRAINING MATERIALS

In response to the suggestion provided by respondents from the previous IDI survey, training attendees received training handouts, including copies of the training slides, for all training courses after August 2015. To determine the extent to which attendees used training materials, interviewers asked all respondents who attended training after August 2015 to discuss if and how they had used the handouts provided at the trainings.

As indicated in Figure 5-1, 27 of the 39 respondents (69 percent) to which the question applied, and who provided an answer, indicated that they had used the training materials since attending the training session. The remaining 12 respondents had not used the training materials; however, three of these respondents thought that they would use the material in the future. Although the majority of these respondents did not offer a reason why they had not used the material, one inspector noted, *"I found the handouts too generic. Most people are looking for finer details. For the most part, I would say the handouts are promotions and technically worthless."*

Figure 5-1. Use of Training Materials
(number of respondents; n= 39)
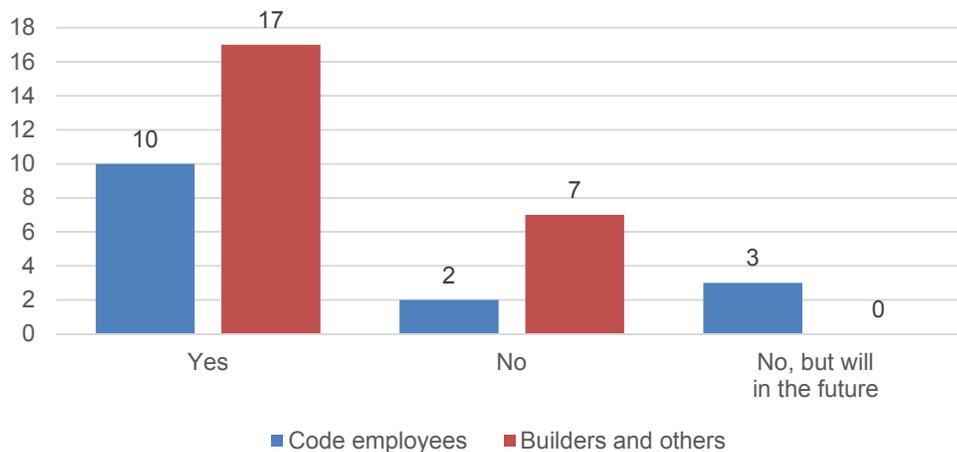
5.1   FREQUENCY OF USE OF TRAINING MATERIALS

Interviewers asked the respondents who used the training material how frequently they used it. Twelve of the 27 respondents (44 percent) who said they used the materials said that they used them frequently and another three respondents (11 percent) indicated that they sometimes used them. Seven respondents (26 percent) said that they had not used the training material often, and five respondents (19 percent) did not say how frequently the materials were used (Figure 5-2).

Figure 5-2. Frequency of Use of Training Materials
(number of respondents; n= 27)

- Frequently used material
- Sometimes used material
- Did not use the material often
- Did not say how often material was used
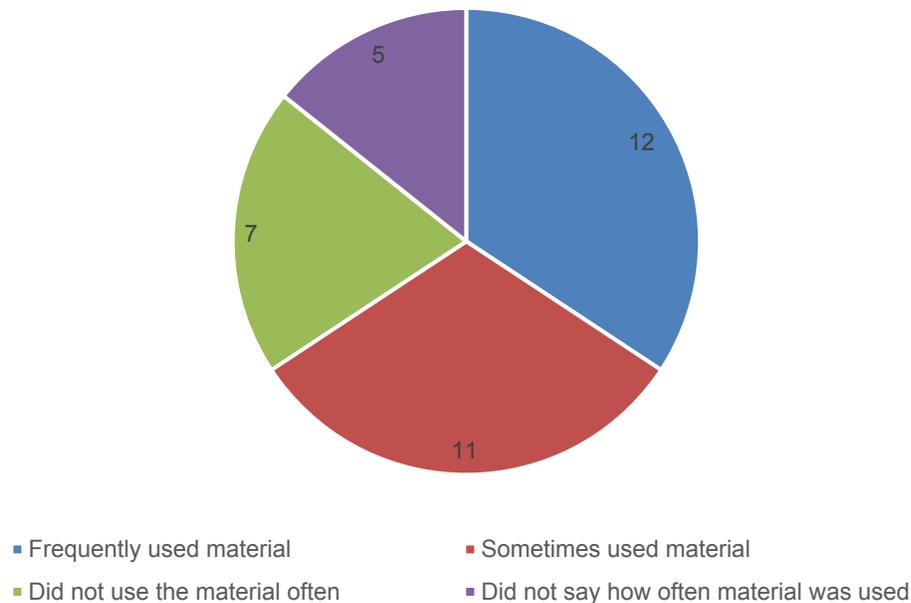
5.2   HOW TRAINING HANDOUTS ARE BEING USED

Respondents were asked how they had used the training materials since attending the training. Table 5-1 lists the various uses. More than half of the respondents who said they used the training materials (16 out of 27, or 59 percent) used them as a reference or for review purposes. An inspector noted, *"I've referenced them many times when I remember that a particular issue was well-covered by the training."*

Six of the 27 respondents (22 percent) handed out the material to others for educational purposes. One building commissioner described how he distributed the material to his office staff as well as to contractors:

> *"I actually made copies of the handout that had the changes to the code and put it on the front counter, on the bulletin board, and in a box near the entrance. They went really quickly and I replenished them often for a period of time. I think people like them because they reinforced what was in the code already, but showed what people were maybe not complying with."*

Fourteen percent (4 out of 27) of the respondents incorporated the training material into the resources available to their department staff or colleagues. A building inspector said: *"We incorporated the handouts into our building code book and we all use it as a reference guide here and there."*

Table 5-1. How Training Handouts Are Used
(multiple responses; n= 27)

Use	Number of Respondents
n	27
For review purposes and/or as a reference	16
Handed out to others as informational/educational material	6
Incorporated into office/department resources	4
Employee training	2
No use provided	2
Used to answer others' questions	1
Used to create inspection checklist for the department	1

6. SHARING OF INFORMATION AND RECOMMENDING TRAINING

The follow-up interviewers also asked with whom the attendees had shared information received 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 included in the survey were these:

> *"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 (building professionals). Have you shared information from the training(s) with others?"*

> *"Can you tell me what information you shared and the parties involved?"*

> *"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, most of whom were believed to be using the information shared with them. Furthermore, the majority of attendees responded that they would recommend the training to others.

6.1 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 Figure 6-1, nearly all of the training participants surveyed (53 out of 57, or 93 percent) indicated that they shared some of the information from the training with other parties. The remaining 7 percent (4 out of 57), two municipal building code employees and two building professionals, had not shared information from the training at all. One of the municipal code employees who had not shared the information, an inspector, added that his department attended the training together and had been too busy since to share with anyone else. He intends to share the information in the future. Three respondents did not answer the question.

6-1

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

Figure 6-1. Training Information Shared with Other Parties
(number of respondents; n=57)
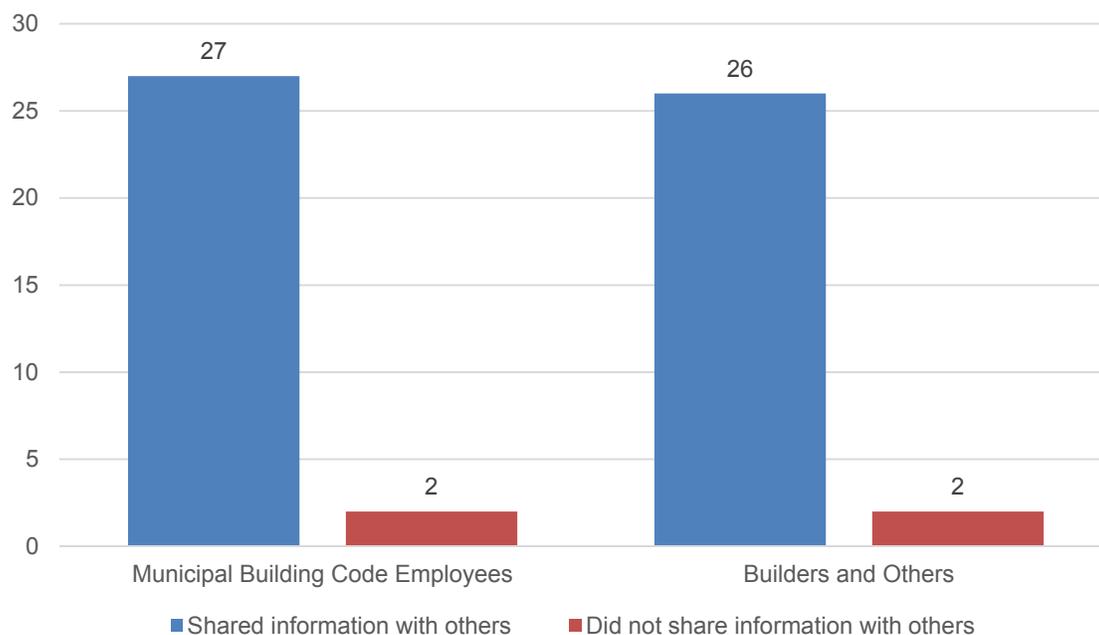
6.1.1 Parties with whom training information was shared

The interviewers then asked the respondents who said they had shared information (n=57) with whom they had shared it. Table 6-1 and Table 6-2 list the findings for both municipal building code employees and building professionals.

Over half of the municipal building code employees who shared information (16 out of 27, or 59 percent) indicated that they had shared with colleagues, both in their offices and from other jurisdictions (Table 6-1). One municipal building code employee noted that he shared the information with building officials from other communities for two reasons—to ensure that the energy code was being enforced uniformly throughout the area and to educate his colleagues:

> "I'm meeting today with the CBOs [community-based organizations] from [nearby] communities and I'll share it there. I really try to get communities together around us so that we are all doing the same thing. This information helps get the new CBOs up to speed, but also helps the senior guys out too. Sometimes they get a little set in their ways and need the push to follow the newer code requirements."

Another municipal building code employee said that he added information from the training to a jurisdiction-wide newsletter geared toward code changes and highlighting best practices. He believed the information had a positive impact on compliance rates in his area.

One-third of municipal employee respondents (9 out of 27) also shared information with builders and contractors, and 15 percent (4 out of 27) shared information with inspectors. Additional recipients of the shared information were design professionals (by 3 respondents),

Home Energy Rating System (HERS) raters (by 1 respondent), and clients or building owners (by 1 respondent).

Table 6-1. Parties with Whom Municipal Building Code Employees Shared Training Information

(multiple responses; n=27)

Party with Whom Information Was Shared	Number of Respondents
Colleagues	16
Builders/contractors	9
Inspectors	4
Did not identify specific party	4
Design professionals	3
HERS raters	1
Clients/building owners	1

As with municipal code building employees, the majority of building professionals respondents (21 out of 26, or 81 percent) shared training information with their colleagues, as shown in Table 6-2. Building professionals also primarily shared training information with design professionals (12 percent), builders and contractors (12 percent), and professional organizations (12 percent), including ASHRAE, the Association of Energy Engineers, and the International Facility Management Association. It is interesting to note that while municipal building code employees shared information with individuals who have occupations that fall into the building professionals group, no building professional respondents identified sharing information with municipal building code employees.

Table 6-2. Parties with Whom Building Professionals Shared Training Information

(multiple responses; n=26)

Party with Whom Information Was Shared	Number of Respondents
Colleagues	21
Design professionals	3
Professional organizations	3
Builders/contractors	3
Clients/building owners	2
Specifiers	1
Lighting distributers	1
Lighting designers	1

Municipal building code employee and builder and other respondents from the previous IDI study did not mention sharing the information with their colleagues, a significant difference from 2016 respondents.

6.1.2 Use of shared training information

Cadmus also asked respondents who shared information from the training if they believed the recipient parties were using the information; two respondents, a building commissioner and a university employee, did not respond. Of those who provided an answer, 41 (80 percent) believed that the various parties were using the information. Eight of the respondents said that only some of the parties were using the information or that they could only assume the information was being used. An additional 16 respondents indicated that they were not sure if the other parties were using the information, and six respondents did not believe the training information was being used (Table 6-3).

Table 6-3. Whether Information Shared with Others Is Being Used
(multiple responses; n= 51)

Parties Receiving Information from the Training	Yes	Some Are	Assume So	Not sure	No
Colleagues	26	0	4	7	0
Builders/contractors	6	1	0	2	2
Design professionals	3	0	2	1	0
HERS raters	1	0	0	0	0
Clients/building owners	0	0	0	2	1
Inspectors	2	0	0	1	1
Did not identify specific party	1	0	0	3	0
Specifiers	0	0	1	0	0
Lighting distributers	0	0	0	0	1
Lighting designers	0	0	0	0	1
Professional organizations	2	0	0	0	0

6.2 INFORMATION SHARED WITH OTHER PARTIES AND USE

To better understand the use of shared information, interviewers asked respondents to briefly describe the type of information shared with each party and how the information was being used. As shown in Table 6-1 and Table 6-2, the majority of both municipal building code officials and building professionals (37 out of 53, or 70 percent) shared training information with colleagues and another 23 percent (12 out of 53) shared information with builders or contractors. It is important to note that the building professionals respondent type did not consist of any builders or contractors in 2016; as a result, sharing information with builders and contractors does not overlap sharing information with colleagues.

The following sections further explore the information shared with these two parties and how they are using the information shared with them.

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

6.2.1 Information shared with colleagues

Cadmus asked respondents who shared information with colleagues (n=37) to describe the type of information they had shared. Table 6-4 shows that over half of the attendees (20 out of 37, or 54 percent) shared handouts they had received from the training with their colleagues. As described in Section 5, Cadmus asked attendees that attended training after August 2015 in a separate question if they had used the handouts provided at the training in their work. Respondents said they gave the material to others for educational purposes and integrated the training material into department resources, among other responses, and it is likely there is some overlap between the responses provided in Section 5 and this question.

Nearly half of the respondents (18 out of 37, or 49 percent) shared information about the code and changes between code versions with their colleagues. Another nine respondents (24 percent) mentioned that they shared highlights from the training or the key takeaways that pertained to them and their colleagues. Other items of information shared pertained to specific HVAC and envelope requirements, renovations, standards that also apply to code requirements, construction documents, and inspections.

Table 6-4. Information Shared with Colleagues
(multiple responses; n=37)

Information Shared	Total Number of Respondents
Handouts from training	20
Code information/changes	18
Highlights from training	9
Didn't specify/doesn't remember	7
All HVAC areas	6
Piping insulation	1
Equipment sizing	2
Duct leakage	1
Boilers	1
Economizers	1
All envelope areas	5
Building tightness/air sealing	3
Insulation requirements	2
Renovations	1
Applicable standards	1
Information related to construction documents	1
Information related to inspections	1

How colleagues are using the information shared by participants

An analysis of data, described in Sections 6.1.1and 6.1.2, revealed that 30 of 37 respondents (81 percent) indicated that they believed or assumed that their colleagues made use of the information shared with them. Cadmus then asked respondents to identify how the information was being used; 32 of the 37 respondents provided an answer, as shown in Table 6-5. Respondents thought that over one-third of their colleagues incorporated the training into their everyday work (12 out of 32, or 38 percent).

Another nine respondents stated that they believed their colleagues used the information to increase their own knowledge about the code. An energy efficiency consultant remarked, *"The conversations our office has had about the training has given the entire office a better understanding of the [code] requirements. We've used what we learned to modify and update any practices that seemed dated to better reflect what was taught at the training."*

Four respondents (13 percent) said they believed that the information was being used to facilitate discussions among colleagues. A local inspector shared the information to start discussions with other inspectors, stating, *"My colleagues and I discuss the material, mostly to make sure we are looking for the same things across our jurisdictions."* A building commissioner also noted the use of the information to start discussions and the impact that had on how work was completed, adding, *"We see a lot of great discussion in our office, but also with different CBOs and contractors after we share information about the training. I think they walk away from our discussions with a plan to change what they are doing to be in line with the code."*

Other ways respondents believed colleagues used the information shared with them included for personal use, plan review, to educate others, in energy audits, and to increase their knowledge of mechanical issues. Six respondents (19 percent) were not sure how information was used.

Table 6-5. How Information Is Being Used by Others: Colleagues
(multiple responses; n=32)

How Information is Being Used	Total Number of Respondents
Incorporated into every day practice	12
To increase general code knowledge	9
Don't know how information was used	6
Used in discussions on code-related issues	4
Using training material for own/personal use	3
Used during inspection	3
Used during plan review	2
Using to educate others	2
Used in energy audits and analysis	2
To increase knowledge of mechanical issues	1

6.2.2 Information shared with builders and contractors

Table 6-6 shows the information respondents (n=12) shared with builders and contractors. The majority of respondents (8 out of 12, or 67 percent) said they shared general information about the energy code and changes or updates made to code requirements. Five respondents also said they had shared training materials with builders and contractors.[12]

One inspector elaborated:

> "I have used the handouts with contactors when we are going over required information during plan review. […] The handouts have probably been most helpful when explaining the energy code and some of the requirements."

Three respondents (25 percent) did not remember the information shared and another respondent shared lighting controls information.

Table 6-6. Information Shared with Builders and Contractors
(multiple responses; n=12)

Information Shared	Total Number of Respondents
Code information/changes	8
Handouts	5
Didn't specify/doesn't remember	3
Lighting controls	1

A.   How builders and contractors are using information shared by participants

Twelve IDI respondents indicated that they shared information with builders and contractors. Seven of these 12 believed or assumed that builders and contractors used the information shared with them, as discussed in Sections 6.1.1 and 6.1.2. Cadmus then asked respondents to identify how they believed the information was being used; ten of the 12 respondents provided an answer, as shown in Table 6-7.

Four of the 10 respondents noted they believed that builders and contractors used information from the training to meet the requirements of the energy code. Additionally, three respondents (30 percent) believed builders and contractors used the information to increase their knowledge of inspections. An inspector stated: *"I know that the contractors have a better idea of what the building department is looking for during inspections and I've seen their understanding of the code improve, especially in terms of what issues to look for."*

---

[12] Cadmus asked attendees that attended training after August 2015 in a separate question if they had used the handouts provided at the training in their work. It is likely there is some overlap between the responses provided in Section 5 and this question.

Other ways builders and contractors used the information shared by participants included incorporating it into current practice, applying it to meet air barrier requirements, and using it to discuss code-related issues. Two respondents were unsure how the information was used.

Table 6-7. How Information Is Being Used by Others: Builders and Contractors
(multiple responses; n=10)

How Information is Being Used	Total Number of Respondents
To meet code - general	4
To increase knowledge about inspections	3
Incorporated into every day practice	3
Don't know how information was used	2
To meet air barrier requirements	1
Used in discussions on code-related issues	1

6.2.3 Information shared with all other parties

Table 6-8 shows the information from the training sessions that respondents shared with all parties other than colleagues and building professionals. Respondents most often shared information with design professionals about general code provisions and changes. The remaining groups received various information from the respondents.

Table 6-8. Information Shared with All Other Parties
(multiple responses; n=19)

Information Shared	Party Receiving Information				
	Design Professionals	Inspectors	Clients/ Building Owners	Professional Organizations	All Others
n	10	8	5	2	12
Code information/changes	4	1	1	2	2
All lighting	2	1	1	0	2
Lighting controls	1	0	1	0	2
General lighting	1	1	0	0	0
Handouts from training	2	1	1	0	1
Project specific information	1	0	0	0	1
New technology	0	1	0	0	0
Compliance issues	0	1	0	0	0
Don't remember/didn't say exactly what was shared	1	2	1	0	4

A.   How all other parties are using the information shared by participants

Cadmus asked respondents to identify how they thought the information they shared with all other parties was being used. Thirteen of the 19 respondents provided an answer, as shown in Table 6-9. Most often, they believed these other parties were using the information to increase their general knowledge of the energy code (design professionals, clients, and others), to discuss code-related issues, or in their everyday practice. An engineer who shared information with multiple parties, including professional organizations, said: *"I think the information we learned in the training is stuff that applies pretty universally to projects and across jurisdictions. It's not so much that they are or aren't using, it's mostly just that they've adapted their everyday work to reflect the requirements of the code."*

Table 6-9. How Information Is Being Used by Others: All Other Parties
(multiple responses; n=13)

How Information is Being Used	Design Professionals	Inspectors	Clients/ Building Owners	Professional Organizations	All Others
n	4	0	2	1	6
Incorporated into every day practice	1	0	0	0	1
Don't know how information was used	1	0	1	0	2
Used in energy audits	0	0	0	1	0
To increase general code knowledge	1	0	1	0	1
Designing to meet code	1	0	0	0	0
Used in discussions on code-related issues	0	0	0	0	2

6.3   RECOMMENDING TRAINING TO OTHER PARTIES

The interviewers asked the 60 respondents if they would recommend the CCSI trainings to others. Twelve respondents did not provide an answer. Of the 48 who did, 47 (98 percent) said they would recommend the training to other parties for various reasons, as shown in Table 6-10. The one respondent who would not recommend the training, a building commissioner that attended a lighting course, said that, *"for some parties, the information may be useful, but it's out of the scope of building commissioners and other code officials."*

Although the majority of respondents did not provide a reason, nearly one-quarter (11 out of 47, or 23 percent) recommended the training because it was informative and another 7 (15 percent) because it keeps the industry up to date with changes in the code. An engineer noted, *"It's really important to understanding code changes and how they apply to us."*

Others recommended the training because of its relevancy to certain occupations, its role as a review course, and its comprehensiveness. A university employee who attended an HVAC course noted the relevancy of the training and its importance as a review, stating he

6-9

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

recommended the training because, "*the material is always relevant and you can never see the code requirements too many times. We have many people here who don't get into the weeds of the code provisions very often so the review is much needed.*" In a similar response, an engineer who also attended HVAC training discussed how imperative the training was to his code knowledge, "*The trainings are really my primary avenue for information about the energy code so they are really critical in my own work.*"

Many respondents were also impressed with the knowledge and professionalism of the speakers. An inspector who attended envelope training said: "*I have always been pleased with the knowledge of the speakers; it seems like Mass Save puts a lot of effort into hiring good, knowledgeable speakers and that really makes a difference.*" Likewise, a building commissioner who attended lighting training noted, "*The presenters are always excellent. Very knowledgeable, very professional.*"

Table 6-10. Recommending Training to Other Parties

Reasons for Recommending Training	Total	Municipal Code Officials	Building Professionals
n	47	23	24
No reason provided	16	9	7
Training is informative	11	7	4
Training keeps knowledge current/up to date	7	2	5
Training relevant/useful in occupation	6	4	2
Speakers are excellent/knowledgeable	6	3	3
Training is good as a review	5	3	2
Training is comprehensive/thorough	4	1	3
Easy to understand for all levels	2	1	1
Different parties in one room is beneficial	2	1	1
Great for CEUs	1	0	1
Relatable for all audiences/industries	1	0	1

(multiple responses; n=47)

7. KEY SOURCES OF INFORMATION AND MASS SAVE TECHNICAL ASSISTANCE

The follow-up interviews allowed the evaluation team to identify the primary sources of information that municipal building code employees and other building professionals consult regarding building code requirements. The questions posed to them were these:

> *"When a question or an issue concerning the energy code comes up, where would you first go to look for information?"*

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

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.

7.1 SOURCES OF INFORMATION ON BUILDING CODES

To better understand where and how training participants received information about building energy codes, interviewers asked respondents where they would first look for information if they had a question about the energy code or a code-related issue. The most common source of information among all respondents was the code itself (43 out of 60, or 72 percent). Training participants also frequently consulted the internet (16 out of 60) and their peers and colleagues (13 out of 60) for information. Other sources mentioned by respondents included various industry and professional organizations, such as Mass Save, industry publications, and the Commonwealth of Massachusetts. Details of the sources used by respondent type are included in the following sections.

7.1.1 Municipal building code employees

All 30 municipal building code employees named at least one source for information they used when facing a question about the energy code. As shown in Table 7-1, the energy code itself was the most frequently mentioned source of information, with 70 percent (21 out of 30) of the respondents identifying the code book. Other common resources for code-related questions included the Internet; industry and professional associations; peers and colleagues; the Commonwealth of Massachusetts; Massachusetts energy code amendments; Massachusetts Board of Building Regulations and Standards (BBRS); industry publications; engineers; and HERS raters. The CCSI has worked with a number of the other sources mentioned in Table 7-1 including BBRS and organizations of code officials.

Table 7-1. Main Building Code Information Sources for Municipal Building Code Employees
(multiple responses; n=30)

Information Sources	Number of Respondents
n	30
The code itself/code book	21
All internet and web search	9
BBRS website	2
Building Science Corporation	1
Greenbuildingadvisor.com	1
Energycodes.gov	1
Energy.gov	2
ICC website	2
All industry/professional associations	8
Conservation Services Group technical assistance	1
Center of Environmental Technology	1
Department of Energy	2
Mass Save	4
Peers and colleagues	7
State of MA/MA amendments to code/MA Board of Building Regulations and Standards (BBRS)	4
All industry publications	3
Published code interpretations, code commentary	2
Academic journals (journal of light construction)	1
Engineer	3
HERS rater	1

7.1.2   Building professionals

All 30 building professional respondents also named at least one source of information on building code requirements that they used. Like municipal building code officials, building professionals were primarily using the code itself as their source for information about the energy code (22 out of 30, or 73 percent), as listed in Table 7-2. They also frequently mentioned Internet/web searches, Mass Save, and peers and colleagues, followed by ICC commentary and code consultants. One respondent, a lighting designer who attended envelope training, noted that he did not personally interact with the energy code and would not be looking for answers regarding anything code-related. As noted earlier, the CCSI has worked with a number of the other sources mentioned including BBRS and organizations of code officials.

Table 7-2. Main Building Code Information Sources for Building Professionals
(multiple responses; n=30)

| Information Sources	Number of Respondents
n	30
The code itself/code book	22
All Internet/web search	7
General	2
International Code Council online	3
Building science bloggers	2
Mass.gov	1
All Mass Save	7
Handouts or notes from course	5
Technical assistance	2
Peers and colleagues	6
State of MA, MA amendments, MA Board of Building Regulations and Standards (BBRS)	3
ICC commentary	1
Code consultants	1
Doesn't interact with energy code	1

7.1.3 Mass Save technical assistance as a resource

A new goal for the IDIs was to determine the importance of the Mass Save Energy Code Technical Support Initiative as a source for code information. The initiative provides technical support through telephone calls, e-mails, and a website. Respondents who identified the technical support provided by Mass Save as a resource were asked questions about their use of the service and its importance. Respondents who did not mention the technical support service were asked about their awareness and whether they had used it or not. The following sections describe the respondents' impressions of the technical support offered by Mass Save.

A.   Participants that identified Mass Save as a source of information

Four municipal building code officials and two building professionals (6 out of 60) identified the technical support services provided by the Mass Save Energy Code Technical Support Initiative when asked where they would first look for information about the energy code if a question or a concern came up. Interviewers asked the respondents to indicate how important this technical support was as a source of code information compared to other sources they may use. Three out of six respondents who used the services said that the technical support is a vital or very important resource; two respondents thought the technical support was of medium importance; and one code official believed it was not that important, as shown in Figure 7-1.

7-3

Figure 7-1. Importance of Mass Save Energy Code Technical Support
(number of respondents; n=6)
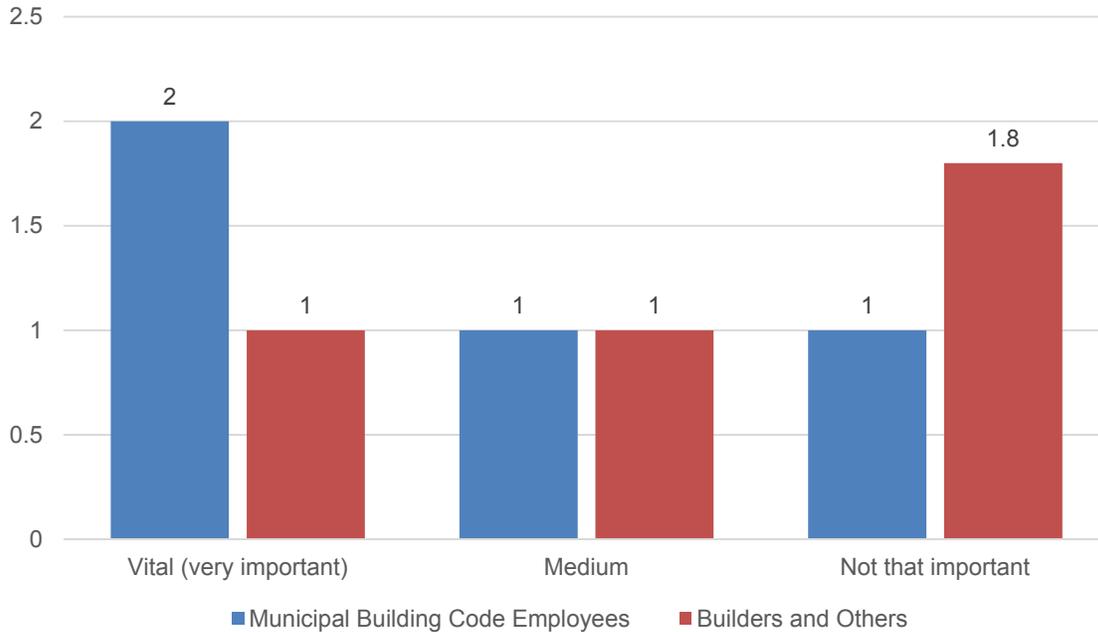
Cadmus then asked respondents about their use of the Mass Save website as well as the technical support available through e-mail and telephone and their satisfaction with each, as shown in Table 7-3.

Table 7-3. Satisfaction with Mass Save Energy Code Technical Support
(multiple responses, n=6)

Type of technical support	Municipal Building Code Officials	Building Professionals
n	4	2
Total using website	3	2
Satisfied	2	2
Not satisfied	1	0
Total using e-mail and/or telephone	4	1
Satisfied	3	1
Not satisfied	1	0

Three of the four municipal building code officials had visited the Mass Save website. Of these, two were satisfied with the website. When asked if he was satisfied with the website, a building commissioner noted, *"I was very satisfied. It's my primary resource."* The third code official, however, was not satisfied with the website, citing that it was hard to navigate.

Both building professionals who listed Mass Save as a main source of information had visited the website and both were satisfied with their experiences. Unlike the code official that was not satisfied, an engineer said that the website was, "*easy to navigate and understand.*"

All four municipal building code officials said they had submitted a question by e-mail or telephone to the Mass Save technical support services. Three of these were satisfied with the responses they received or their experience in general. One building commissioner stated that he was very satisfied despite not finding a resolution for his problem, "*I might not have gotten the answer I was looking for, but they got back to me and we had a great conversation about the issue.*" Likewise, an inspector said he, "*received a pretty good code interpretation through e-mail and felt as though my question was thoroughly answered.*" One code official was not satisfied with the service, however, as he never received a return phone call. He added, "*I will call them again and try to get a response. I realize some things get looked over, but it would be nice to know if someone was working on my question.*"

The one building professional respondent who had used the technical support offered through phone and e-mail was satisfied with the experience.

B. *Participants who did not identify Mass Save as a main source of information*

Cadmus asked the remaining municipal building code officials (n=26) and building professionals (n=28) who did not identify the Mass Save technical support services as a main source of code information if they were aware of the support it offered (Table 7-4). Nearly two-thirds of all respondents (34 out of 54, or 63 percent) indicated that they were aware of the technical support offerings. Of these 34 respondents, eight had used the website and five had used the technical service available through e-mail or telephone; no respondents had used both services. However, the majority of those aware of the service (21 out of 34, or 62 percent) had not used the service at all.

Although not asked to elaborate, several respondents currently not using the service added that this was because they were able to answer code-related questions using the code books or peers and colleagues first and did not otherwise have a need for the technical support. One inspector added, "*I have recently become aware of it, but haven't used it yet. I assume I will in the future. Any free resource for us is important and much appreciated.*"

Table 7-4. Awareness of Mass Save Energy Code Technical Support
(number of respondents; n=54)

Awareness	Municipal Building Code Officials	Building Professionals
Aware	18	16
Have used website	3	5
Have used e-mail or phone	4	1
Have used both	0	0
Have not used it	11	10
Not aware	8	12

As shown in Figure 7-2 respondents who were aware of the Mass Save technical support service but did not identify it as a main source of information (n=34) were asked to determine its importance as a source of code information compared to other sources they might use. Nine respondents (17 percent) said that the service was not that important, with one inspector adding that it was not that important because it's *"not that responsive."* A lighting designer said that the although the service was *"not very vital"* to her work, she had used it for personal reasons at home and found it to be very useful. An additional nine respondents said the service was of medium importance, and one municipal building code official said the technical support service was vital or very important.

Figure 7-2. Importance of Mass Save Energy Code Technical Support to Those Aware of it
(number of respondents, n=34)

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017
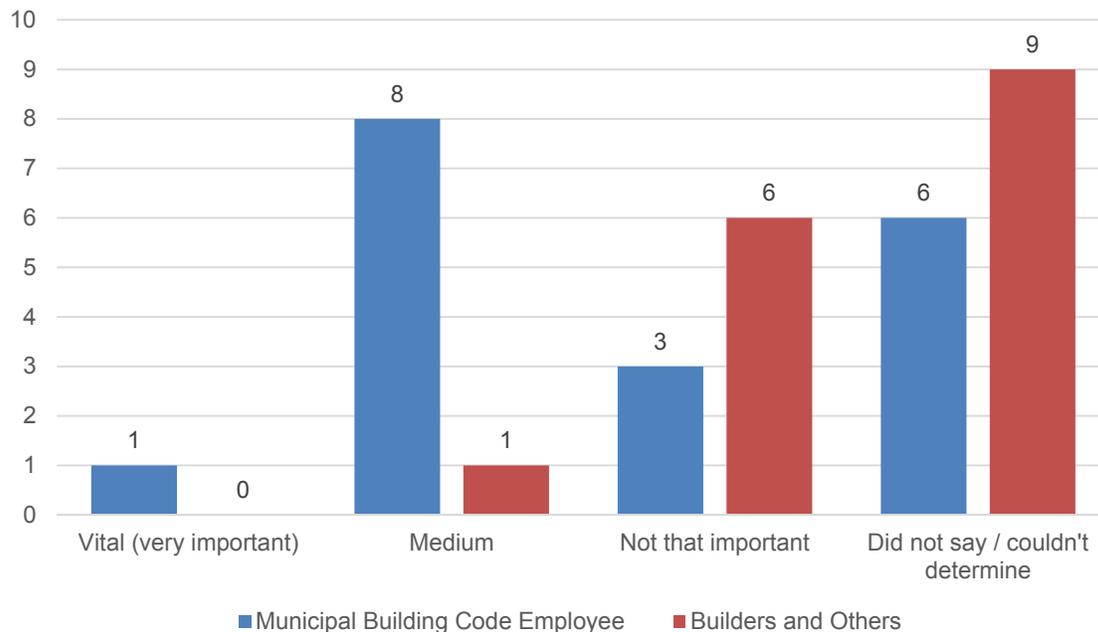
Respondents who did not say or could not determine the importance of the Mass Save technical support were most often those who were aware of the resource but had not used it.

Cadmus asked respondents who indicated that they had used the Mass Save website or technical support available through e-mail and telephone to describe their satisfaction with each, as shown in Table 7-5. The three municipal building code official respondents and five building professionals who had used the website were satisfied with it. A building commissioner said: *"I refer to the website often—it's a helpful way to get more information. I give people the information that I can and anything that is beyond me, I refer them to the Mass Save website."*

Three-quarters (3 out of 4) of the four municipal building code officials using the technical support provided through telephone or e-mail also indicated that they were satisfied with the service. A building commissioner added, *"I was satisfied, yes. I generally relay what I find out to the contractors too and they are always happy with the information I provide them."*

The remaining municipal building code official respondent and the only building professionals respondent to use the technical support through telephone or e-mail were not satisfied with the support they received and/or their experience with the service, primarily because of the length of time for the technical support representatives to provide an answer. An engineer said: *"I have used the hotline a few times—sometimes they are helpful. No one answered for a few weeks at a time though and there have been instances where I never got a call back. Overall, [I'm] not very satisfied with it."*

The one building commissioner who was dissatisfied with the service recounted a similar situation:

> *"I do reach out using the technical assistance line and I get calls back. I am going to say it's not a quick response though and for a building official or contractor, that's an issue. I would give them a D- on that. The lead time is too long to be practical. I'm often calling because I have an issue that needs addressed in the next few minutes - not in a few days, not even in a few hours."*

Table 7-5. Satisfaction with Mass Save Energy Code Technical Support
(multiple responses; n=13)

Type of Technical Support	Municipal Building Code Official	Building Professionals
Total using website	3	5
Satisfied	3	5
Not satisfied	0	0
Total using e-mail and/or telephone	4	1
Satisfied	3	0
Not satisfied	1	1

7.2 TRAINING ATTENDED SINCE CCSI TRAINING

To learn of any other resources participants used for information about the energy code, Cadmus asked respondents to identify commercial energy code-related training, webinars, or gatherings they had attended since attending CCSI training. Slightly more than one-half of the respondents who answered the question (29 respondents, n=56) said they had attended one or more training sessions since attending the CCSI training. These sessions took a variety of forms, including training presented through webinars, presentations, conferences, and industry and association meetings, as shown in Figure 7-3.

Figure 7-3. Additional Training Attended
(number of respondents; n=56)
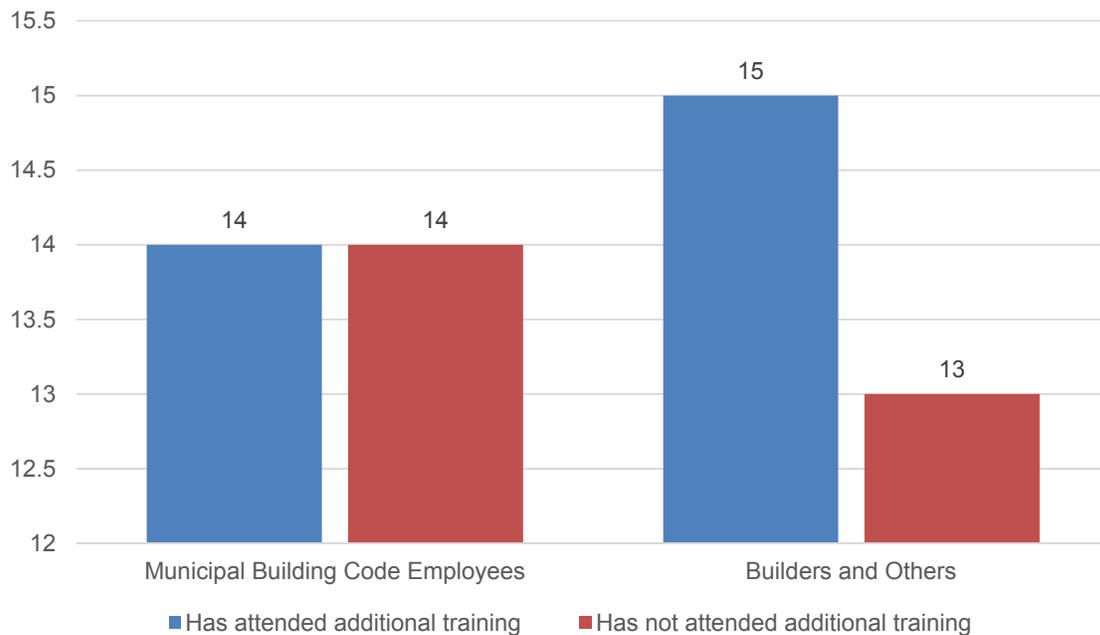
When asked to describe the type of training or gathering they attended, respondents generally recalled the sponsor, the topic, or both. Since attending the CCSI training covered by the interview, just under half (13) of the respondents who attended additional training said they had attended other CCSI training courses with topics such as mechanical provisions, lighting requirements, and building envelope. Municipal building code officials also attended training provided by the Western Massachusetts Builders Association, State Building Code Commission, ICC, Center for EcoTechnology, and local building official organizations. In addition, code official respondents listed smaller, less formal gatherings with other jurisdictions and town meetings.

Building professionals attended training provided by a number of local and national professional organizations, including the Illuminating Engineering Society of Massachusetts, Boston Society of Architects, National Grid, USGBC, ASHRAE, and The Education Cooperative. Respondents also attended trade shows and training provided by manufacturers. Building professionals respondents also noted that they received training from fellow staff members who were practicing presentations for conferences or were presenters at many commercial building energy code conferences themselves.

In addition to the topics covered by the CCSI trainings, respondents indicated that the other training they attended focused on a variety of energy code-related topics, including the future of the energy code, sustainability, innovation in design, and green buildings.

All 29 respondents who attended additional training sessions found the non-CCSI trainings to be useful and for a number of reasons. A building commissioner said that meetings with other jurisdictions were *"helpful to get an idea of where other jurisdictions are with the energy code and where they see it going."* Another building commissioner said the training he attended was helpful because he was shown specific equipment and products that meets the code requirements.

An engineer noted that the non-CCSI training he attended had *"some specific applications to industrial building"* that the CCSI training lacked. Other respondents noted that the most useful portion of the training they attended were topics not usually covered in a code-specific class, such as sustainability, resiliency, innovation in technology, and above-code building.

8. 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 chapter examines the perceptions of building professionals of their interactions with code officials and their customers' interest in energy efficiency. The interviewers also asked municipal building code employees and building professionals about their perceptions of the priority given to checking energy efficiency during inspections.

This chapter also discusses the energy efficiency issues municipal building code employees encountered in the field and any factors influencing the amount of time municipal building code employees spent checking for the energy efficiency aspects of code compliance. It also discusses information filed at local building departments to document energy code compliance for commercial construction and the length of time buildings of various sizes and types take from permitting to receiving a certificate of occupancy.

8.1 BUILDING PROFESSIONALS' INTERACTION WITH CODE OFFICIALS

Interviewers asked building professionals if their interactions with code officials and code enforcement concerning energy efficiency had changed in the last year or so. As shown in Table 8-1, nearly one-third of the building professionals (9 out of 30, or 30 percent) said they did not interact directly with code officials. Respondents who noted they do not interact with code officials also varied by occupation—four engineers, a heating and cooling distributor, an architect, an energy efficiency consultant, a lighting designer, and an engineering services provider. Many added that the nature of their projects was what drove their interactions with code officials; that is, they provided services, such as lighting designs, to individuals who interacted directly with code officials or that their interactions were limited to asking and answering questions.

The remaining respondents (21 out of 30, or 70 percent) said their interactions with code officials regarding energy efficiency had not changed over the last year. For example, an equipment supplier noted his interactions had not changed because his interactions were limited: *"I only interact with [building officials] when I need to provide documentation or safety data sheets. I would say my interactions have not changed."* An energy efficiency consultant further elaborated by saying: *"No. None of the local building departments understand the code. If an engineer says a project is compliant, local building departments just go with it."*

These results are similar to the results achieved during the 2015 IDI in which only one respondent noted a change in interactions with code officials; the remaining respondents noted that they either had no interaction with code officials or their interactions had not changed.

Table 8-1. Changes in Interactions with Code Officials
(number of respondents; n=30)

Have your interactions with code officials regarding energy efficiency changed?	Number of Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
Yes	0	0	0	0	0	0	0
No	21	1	0	16	1	0	3
No interaction with code officials	9	0	0	7	0	0	2

8.2   CUSTOMER INTEREST IN ENERGY EFFICIENCY

Building professionals respondents were evenly split on whether or not customers had become more interested in energy efficiency in the last year or so (Table 8-2). Slightly more than half of the respondents (16 out of 30) said that their customers had become more interested (or somewhat more interested) in energy efficiency in the last year. The reasons varied and included rebates, increased funding for energy efficiency programs, desire to obtain a green building certification, shorter payback periods, utility programs, and incentives. An engineer noted that the availability of more incentives made his clients *"more inclined to be cognizant of the code and exceeding its minimums."*

Table 8-2. Changes in Customer Interest in Energy Efficiency
(number of respondents; n=30)

Have your customers become more interested in energy efficiency?	Number of Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All codes
Yes	15	1	0	10	1	0	3
Somewhat	1	0	0	1	0	0	0
No	14	0	0	11	0	0	3
Are customers willing to pay more for energy efficiency?	**Number of Respondents**	**Building Code in Municipalities Covered**					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All codes
Yes	15	1	0	11	0	0	3
Some are/it depends	2	0	0	2	0	0	
No	11	0	0	9	1	0	1
Does not apply	2	0	0	0	0	0	2

A lighting designer remarked that many mixed-use retail/residential and classic office space customers are more interested in efficiency and sustainability because they *"see the opportunity to be considered energy efficient as a brand or a mechanism to get higher rent."* She noted that many of her customers are appealing to the *"millennials"* who *"value the environment and other aspects of efficiency more so than other demographics."* For her

8-2

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

customers, she said it is *"one thing to be energy efficient and to consume as few watts as possible, but it's another thing to make it a marketable attribute that brings people in."*

An energy efficiency consultant said that his customers were more interested in energy efficiency *"mostly because they have to be."* He added, "*However, and probably more importantly, efficiency is a topic of conversation everyone is having and that's encouraging.*"

The remaining 14 (of 30) respondents said that their customers had not become more interested in energy efficiency in the last year or so. One engineer stated, *"It's really hard to get facility managers and owners to save energy and water. They are most interested in the assessment of conditions that I give them, the areas where they can improve efficiency. And then they hire someone if it makes sense financially."* Six of the 14 respondents (43 percent) of those who said *"no"* added that it was because their customers were already highly interested. An engineer remarked, *"Our customers have always made energy efficiency a main focus—especially when that leads to money-saving opportunities and a reduction in annual expenses. I would say it's usually their primary focus."* Similarly, an architect said, *"energy efficiency has always been a high priority to our customers."* He added, *"I have found that during concurrency periods, when a new code comes into effect but projects can choose to follow the previous code, more projects will choose to follow the new code."*

When asked if customers were willing to pay more for energy efficiency in the last year, over half (17 out of 30, or 57 percent) said that some or all of their customers were willing to pay more. Reasons for an increase in the willingness to pay for energy efficiency included incentives, a better understanding of lifetime savings, short payback periods, and return on investments.

An engineer said that a lot of it depends on *"good incentive programs from the major utilities. If the incentives are there or if they can readily see a payback, they don't mind paying for [efficiency]."* Another engineer said his customers are *"not necessarily willing to pay more, but most are willing to pay for audits for the same reason."*

A lighting designer noted that her customers were willing to pay more for energy efficiency up to a point and that it often depended on the structure of the business:

> *"There seems to be a clear threshold of a 20% premium for efficiency measures; that is a number that is fairly easy to recoup with lower operating costs. The challenge is dealing with a retail client or a similar project where the operation and maintenance budget comes from one department and another department handles renovations. In those instances, it becomes more difficult for the company as a whole to see the value. If you have one entity that does purchasing as well as paying to maintain the property, the customer is far more receptive to paying for efficiency."*

The remaining two-thirds of respondents (11 out of 30, or 37 percent) said that their customers were not willing to pay more in the last year. Two of those respondents noted that their customers did pay for energy efficiency, but because they had to rather than wanted to. An architect said: *"I'm not sure they have a choice. The ability to make that decision is limited by code advancements; they must pay for what the code calls for."*

Two respondents, a lighting designer and a heating and cooling distributor, said the question was not applicable to their occupations.

Compared to the respondents in the previous IDI survey, the 2016 respondents were less likely to say that customers had become more interested in energy efficiency and that customers were willing to pay more for energy efficiency.

The interviewers asked respondents how they prioritized checking for energy efficiency during inspections compared 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 (building professionals). 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 building professionals 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 have to comply with? Why? Has this priority changed since you attended the training? Do you anticipate the priority given to checking energy efficiency will increase in the future? Why?"*

8.3.1   Municipal building code employees

Table 8-3 lists how municipal building code employees (n=29) prioritized checking for energy efficiency relative to other areas and their reasoning behind those prioritizations. Over one-third of the municipal building code employees (11 out of 29, or 38 percent) reported that checking for efficiency was a high priority. Four of those respondents (36 percent) noted that they personally prioritized energy efficiency, although that may not be the case for the community or company for which they work. For example, one inspector said, *"This really depends on the jurisdiction. Personally, I see it as a very high priority and so does everyone else in my department. However, my commissioner doesn't see it as a high priority, so the community I am in is just barely keeping up with the code."*

A building commissioner shared a similar sentiment:

> *"For me, [energy efficiency] is a high priority because I've always had the feeling you can build a very, very tight building but that that doesn't always mean it is energy efficient and can actually be unhealthy if it's done wrong. For others, low. I've brought up issues to insulating companies, one filed a grievance against me in fact, and was told that we don't need to be concerned with energy and should focus just on the building code."*

8-4

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

Table 8-3. Energy Efficiency Prioritization—Municipal Building Code Employees
(number of respondents; n=29)

Reasons for Energy Efficiency Prioritization	Priority of Energy Efficiency			
	High	Med High	Medium	Low
n	11	4	11	3
Personal belief in importance	4	0	0	0
Occupation requires high prioritization	3	0	0	0
Code increases have led to higher prioritization	2	0	0	0
Health/safety/structural come first	0	4	8	2
Driven by city/community sustainability plan	1	0	0	0
Priority based on owner/customer	1	0	1	0
Time, budget, staffing is an issue for prioritization	0	0	1	1
No reason provided	0	0	1	0

Another three respondents noted that energy efficiency was a high priority because their occupations required it to be and that it was not any less important than health, safety, or structural codes. A building commissioner noted that energy inspections are *"a part of the job that can't go untouched."* He added, *"I don't prioritize structural inspections over energy, I think of them the same and both are high priorities in my work."* An inspector also noted that each inspection was the most important at the time it was completed: *"Everything is in proportion,"* he said, *"[the priority is] high when I'm doing an HVAC inspection because I'm concentrated on that. At that point, it's the highest priority. Same goes for any other inspection."*

Other reasons given for prioritizing energy efficiency include an increase in stringency of the energy code, city or community sustainability goals and plans, and customer interest. A state building inspector shared his perspective on prioritizing energy efficiency:

> *"The priority depends on the certification the building is going for - we have a lot of LEED buildings and energy inspections are now a part of that. A part, I will add, that was overlooked for years. Over the years, I've seen a lot of bad buildings with problems caused because no one was looking at how things are sealed, how things are performing, or balanced; the indoor environment was overlooked for so long and now people are realizing it. Now there seems to be a higher priority placed on energy efficiency to avoid some of those issues in the future."*

Energy efficiency was also a medium-high priority for four respondents (14 percent). These respondents all listed health, safety, and structural codes as having a slightly higher prioritization.

Eleven of the 29 respondents (38 percent) said that energy efficiency was a medium priority; the majority (8 out of 11, or 73 percent) of whom also said health, safety, and structural codes came first. One inspector said: *"It doesn't have the same importance as structural, but it isn't*

insignificant either. It is definitely a secondary focus, but we put a lot of effort into energy efficiency and it is something we take seriously." Respondents also noted that the priority was driven by department resources, such as time, and the customer. A building commissioner explained the role commercial building owners play in energy prioritization:

> *"I will say medium and I have some thoughts on this. In residential construction, our role in energy efficiency is more important because the people buying the product don't understand the concepts well enough to make good judgement. Owners on the commercial side do and many of them are on-site all of the time, so really we just focus on it less because our customer focuses on it more."*

The remaining three respondents (10 percent) said that energy efficiency was a low priority, and cited the importance of health, safety, and structural codes, as well as limited department resources, as the primary reasons. A building inspector highlighted the importance of the structural code and joked: *"There's no use in putting in insulation if the building is just going to fall down."*

Compared to the 2015 IDI, the 2016 respondents were more likely to say that energy efficiency was a high priority relative to the other things they have to comply with.

A.   Change in priority since training

The interviewers then asked the municipal building code employees if their prioritization of energy efficiency had changed since they attended the training. As shown in Figure 8-1, most respondents (25 out of 29 or 86 percent) said their prioritization had not changed since they attended the training. The other four respondents said the priority of energy efficiency had increased, even if it was simply because of a greater awareness. One building commissioner noted that there was *"certainly a better awareness for it"* and a state building commissioner said that since the training, he had *"been able to pinpoint certain features that have a higher impact on the efficiency of the building."* Another building commissioner noted that documentation had become more of a priority since the training.

Figure 8-1. How Code Official Prioritization of Energy Efficiency Changed Since Training
(number of respondents; n=29)
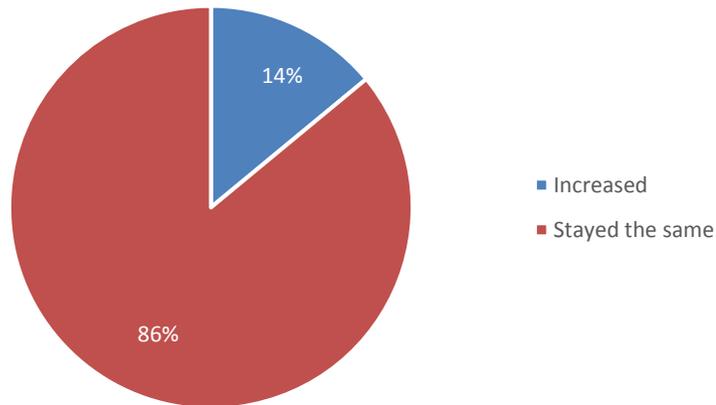
B.   Priority of energy efficiency in the future

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 (Table 8-4). Of those who responded (n=28), the majority (17 out of 28, or 61 percent) reported that the priority of energy efficiency would increase in the future. Their main reason was an increase in awareness by customer, company, or jurisdiction. Respondents also said the priority would rise with the greater focus on reducing operating costs, with more interest in local or company green building practices and higher sustainability goals, with lower energy efficiency costs, and greater code stringency.

8-7

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

Table 8-4. Whether Priority for Checking Energy Efficiency Will Increase in Future
(multiple responses; n=28)

Why Priority Will or Will Not Change	Will Priority Change in Future?		
	Yes	Maybe	No
n	17	9	4
Priority will increase as awareness increases	8	0	0
Priority will increase as code stringency increases	2	0	0
Priority will increase due to local or company sustainability practices, green building requirements	2	0	0
No reason provided	2	5	3
Health/safety/structural will continue to be higher priorities	1	2	1
Priority will increase as cost associated with energy efficiency decreases	1	0	0
Priority will increase due to a focus on reducing operating costs	1	0	0
Priority will depend on importance placed by state and/or jurisdiction	0	1	0
Priority dependent on occupant behavior	0	1	0

One respondent, an inspector, noted that a greater prioritization of energy efficiency because of more stringent energy codes may have a negative impact on customers and the general public, however. He explained:

> "Energy efficiency is the trend but how we are getting there is an issue. I am worried that codes in general will get more and more picky and not address the general problem though. In the 2009 IECC, and to some extent the 2012 IECC, was a pretty straight forward book. Someone who doesn't deal with codes all of the time can look something up pretty effectively. Now the level of detail is increasing and with it, the priority given to energy efficiency; if that trend continues, you will lose the ability of the general public to know what is going on. The tendency is to become increasingly tedious about things that marginally impact energy efficiency."

Additionally, although 9 of the 28 respondents said that the priority given to energy efficiency might increase in the future, most noted they were not sure how. An inspector was unsure of the impact an increase of interest would have on prioritizing energy efficiency in his department, "*I do think people will become more interested in energy efficiency but I don't yet know how that will impact building departments.*" One building commissioner said an increase in the prioritization of energy efficiency will depend on changes in occupant behavior. He noted, "*I think we are going to reach a plateau at some point until we really start changing behavior. Buildings are tight and efficient these days; the next step is changing occupant behavior. That's our next task.*"

The remaining four respondents (4 out of 28, or 14 percent) said that the priority would not increase in the future and that health, safety, and structural codes would continue to be higher priorities.

Compared to the 2016 municipal building code employee respondents, none of the respondents in the 2015 IDI thought the priority giving to checking energy efficiency would increase in the future.

8.3.2 Building professionals

The interviewers asked the building professionals if they gave priority to ensuring a project's energy efficiency over other codes with which they had to comply. Cadmus also asked the respondents to describe their reasons, as listed in Table 8-5.

Table 8-5. Reasons for Energy Efficiency Prioritization by Building Professionals
(multiple responses; n=29)

Reasons for Energy Efficiency Prioritizations	Priority of Energy Efficiency		
	High	Medium	Low
Energy efficiency is central to their business practices	23	0	0
Clients/customers are interested	10	0	0
Local commitment to efficiency	1	0	0
High utility rates	0	0	0
Increases as awareness increases	0	0	0
Required by code	2	0	0

All of the building professional respondents who provided an answer (n=29) said that ensuring energy efficiency was a high priority. More than three-fourths (23 out of 29, or 79 percent) stated that it was central to their business practices and was often why customers selected their firms or services. Over one-third (10 out of 29, or 34 percent) added that clients were the driving force in their prioritization of energy. Many noted that the interest from clients came from wanting to obtain LEED or other above-code certifications, eligibility for rebates, and an increase in the companies that required leasing space that was deemed green. An engineer added, *"Our purpose is to provide products that are code compliant, at a minimum. Most of my clients want the most efficient material for their money, so our priority is on efficiency."*

Additional reasons for making energy efficiency a high priority included a local commitment to efficiency and because it is required by code.

The respondent who did not provide an answer was a lighting designer who stated, *"I just need to meet the lighting design expectations. I don't really think about projects in terms of energy."*

These findings are consistent with the findings from the previous IDI study; all building professionals respondents in both 2015 and 2016 said that checking for energy efficiency was a high priority.

A.   Change in priority since training

The interviewers then asked the building professionals if the prioritization of energy efficiency had changed since they attended training. As shown in Figure 8-2, all but one respondent

(29 out of 30, or 97 percent) said that the priority had not changed since they attended the training. Cadmus did not ask respondents to elaborate on why the priority had or had not changed. However, an engineer said, *"It is not so much a matter of the priority changing as it is the code is raising the bar higher and mandating the efficiency."* An architect added that the priority had not changed but that training made him more focused on it.

Figure 8-2. How Building Professionals' Prioritization of Energy Efficiency Has Changed Since Training (number of respondents; n=30)
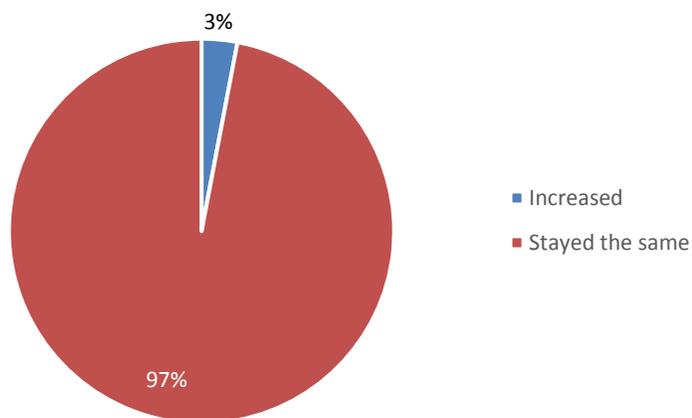
One of the 30 respondents, a university employee said that the priority had changed and had increased in the last year. The change was because the university had set a goal to reduce campus greenhouse gas emissions by at least 32 percent by 2030.

B.   Priority of energy efficiency in the future

Cadmus also asked building professionals if they anticipated a future increase in the priority given to checking energy efficiency. Two respondents did not answer the question. Of those who did (n=28), 26 respondents (93 percent) said that the priority would increase. Table 8-6 lists the reasons respondents believed the priority would or would not increase in the future.

Table 8-6. Whether Priority for Checking Energy Efficiency Will Increase in the Future
(multiple answers; n=28)

Reasons for Why Priority Will/Will Not Increase in Future	Number of responses
Priority will increase as awareness/knowledge increases	11
Priority will increase to keep up with code requirements, policy changes, and/or technology	8
Priority will increase - no reason given	5
Priority will increase to meet sustainability goals of business or town	3
Priority will increase for continued sustainability	3
Priority change will depend on project	1
Priority will not increase as it is already high	1
Priority will not increase – no reason given	1

Like municipal building code officials, building professionals believed the primary factor driving increased prioritization of energy efficiency was greater awareness by customers and consumers (11 out of 28, or 39 percent). As one engineer stated, *"[The priority is] already high, but I see a trend in efficiency becoming more and more important all of the time as people become more aware of paybacks and the benefits of reducing energy use."* A second engineer said: *"The importance of the code in preventing structural deterioration, mold, etc., will continue to make customers more interested, they just need education."* He added, *"This education will empower the consumer to build better homes and better buildings."*

Another engineer attributed the increased prioritization of energy efficiency to the effort put in by the Commonwealth of Massachusetts. He noted, *"There seems to be a greater importance put on energy efficiency in Massachusetts than in other states and with that comes a lot of effort to make people aware of efficiency. The more awareness, the greater the importance."*

Eight of the 28 respondents (29 percent) said that energy efficiency would be given higher priority to keep up with code requirements, policy changes, or technology. A lighting designer explained:

> *"I think [the priority] has to increase. There are some limitations to the prescriptive approach to energy conservation, partly as it relates to lighting, with LEDs being so much more efficient than the other sources we have traditionally designed with. At some point, we get to a point of diminishing return. From there we need to go to lighting controls, overall usage, and electric rates that correspond to usage, for example, to incentivize better technology and innovation."*

An engineer agreed that the priority would change, *"especially in the area of lighting."* Additionally, an energy efficiency consultant said that the priority would be placed on enforcement and compliance, adding, *"I think codes seem to be getting more stringent and there is more of an emphasis placed on energy codes. More policy changes mean more emphasis will be placed on measurement and verification."*

Of the two respondents who said the priority would not change, an architect added that this is because of the high priority already placed on energy efficiency, *"A lot of thought goes into*

the energy code, so much so that if we give it any more thought, we will drive ourselves crazy."

Like the municipal building code employee respondents, 2016 building professional respondents were more likely to say energy efficiency would increase in the future than did those who took the IDI follow-up survey in 2015.

C.   Building professionals' concern for energy code compliance

Interviewers also asked building professional respondents who were neither builders nor code officials (n=18) if they thought builders had become more concerned about complying with code in the last year (as shown in Table 8-7). Half of those able to answer (9 out of 18) believed builders had not become more concerned with code compliance. One respondent, an architect, stated that builders are relying on architects to make sure projects are compliant and that they otherwise have little interest.

Table 8-7. Perceptions of Builders' Concern Regarding Code Compliance
(number of respondents; n=18)

Are builders more concerned about complying with code?	Number of Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All codes
Yes	7	0	0	6	0	0	1
Some are/it depends	2	0	0	1	0	0	1
No	9	1	0	7	1	0	0

Of the remaining nine respondents, seven believed that all builders and two believed that some builders were more concerned about complying with the code. They gave these reasons: builders were making sure subcontractors were doing tight duct work; builders were not cutting corners on applications; builders were ensuring work was completed correctly the first time; and builders were better able to apply the correct enforced codes.

Two engineers said the relationship between builders and the code enforcement industry influenced builders' concern for compliance. One engineer said that low compliance and perceived disinterest in compliance could be attributed to *"miscommunication between the builders and code officials."* He added, *"Code officials often aren't straightforward enough with the builders about what is necessary."* The second engineer said that builders' greater interest in compliance was because of more effective enforcement. "*Inspectors are becoming more stringent so builders are doing a better job of making sure everything is compliant before the inspectors get there."*

The two respondents who said some builders (rather than all) were more concerned thought that the jurisdiction in which the builder worked had an influence.

Compared to the respondents in the 2015 IDI study, the 2016 respondents were less likely to say that builders had become more concerned with complying with the energy code.

8.4   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. Nearly half of the respondents who provided an answer (14 out of 29, or 48 percent) said they had not encountered any issues in the field they would consider serious. An inspector added, *"commercial is pretty heavily regulated and requires more verification throughout the process so we easily spot 'issues' before they are issues."* A building commissioner also noted that he had not seen any serious issues because *"most buildings are what is called 'controlled construction,' so the architect and engineer have already made sure everything complies."*

The remaining respondents gave examples of one or more serious issues they had encountered—the two most common concerned air sealing and missing insulation where it was required. Other issues concerned lighting and HVAC controls, system installation, skylights, and unskilled operators. Table 8-8 lists the issues the respondents reported.

Table 8-8. Serious Issues in the Field
(multiple responses; n=29)

Serious Issue	Number of Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
No serious issues	14	5	4	1	0	4	0
Air sealing	4	1	2	1	0	0	0
Missing insulation	3	3	0	0	0	0	0
Lighting and HVAC controls	2	2	0	0	0	0	0
System installation	2	1	0	1	0	0	0
Air blocking in multifamily	1	1	0	0	0	0	0
Understanding applicability of requirements	1	0	1	0	0	0	0
Issues related to building being "too tight"	1	0	1	0	0	0	0
Use of building	1	0	0	1	0	0	0
Skylights	1	0	1	0	0	0	0
Untrained contractors	1	1	0	0	0	0	0
Solar issues	1	1	0	0	0	0	0
Operator knowledge	1	1	0	0	0	0	0
Commissioning	1	1	0	0	0	0	0
Make up air	1	0	1	0	0	0	0

One building official explained that his issues were a result of his city being *"post-industrial."* He explained:

> *"We have the infrastructure for industrial use (meaning that the buildings are not efficient at all), but the buildings are now being used for other applications. What we run into is people buying the industrial buildings with no interest in bringing them up to code. Or, if they do, they do the absolute bare minimum. We struggle with that a lot and end up granting variances or exemptions for the energy code."*

Another inspector said that the issues he encountered were the result of issues within certain trades, *"From a simple job, such as residential project where we'll see insulation stuffed in and crushed, to commercial where we're missing rigid insulation or damp roofing, we see issues because people are untrained."* He attributed the lack of skills and training to *"the crunch we've had in the economy."*

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

To better understand the nuances of energy code enforcement and compliance, interviewers asked respondents to describe the time spent checking for and complying with the code. In the following sections, municipal building code employees described issues concerning enough time to enforce the code and building professionals described issues concerning energy code compliance that required more time than previously.

8.5.1   Municipal building code officials and time spent enforcing the energy code

Interviewers asked municipal building code officials to describe the factors that determined the amount of time they spent checking for the energy efficiency aspects of code compliance. Thirteen of the 29 code officials (45 percent) who answered the question said they had not experienced any issues or that enforcing the energy code simply takes as long as it takes. One inspector elaborated:

> *"We really take the amount of time it takes. It's not like we have 6 inspections in an afternoon and can only devote 15 minutes to each. Instead, we give people a block of time that they can expect us in, like the cable company, and that gives us plenty of time to address issues at every project. We aren't afraid to reschedule either. Sometimes projects are larger or more complex than you think they will be. We still spend as much times as it takes."*

A building commissioner shared this conclusion and added, *"It's really just a part of the job so we are as thorough as possible. We treat it like anything else; we don't cut corners just because it isn't structural."* An inspector also said inspections were just a part of the job and that he was doing everything he could to check code, adding, *"I think that if we had more time or more staff, we would use them for other things."*

The other sixteen respondents (55 percent) provided one or more factors that influenced the amount of time they spent enforcing the energy code. As shown in Table 8-9, the most commonly mentioned factor was department workload or how busy their department was.

Table 8-9. Factors Impacting Time Spent Enforcing Energy Code
(multiple responses; n=29)

| Factors | Number of Respondents | Building Code in Municipalities Covered | | | | | |
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All codes
Department workload	14	5	6	1	0	2	0
No issues/it takes as long as it takes	13	7	4	1	0	1	0
Complexity of project	5	2	3	0	0	0	0
Availability of staff/personnel	5	1	3	1	0	0	0
Budget	5	3	2	0	0	0	0
Size of the building	4	2	2	0	0	0	0
Knowledge/expertise of inspector	2	1	0	1	0	0	0
Issues with other codes	1	0	0	1	0	0	0

Respondents most often believed they or their departments were so busy, they did not have an adequate amount of time to dedicate to each inspection. One building commissioner said the time available for each project often depended on the time of year the inspection occurred, "*During the middle of our busy season (early spring into fall), we really just do the bare minimum to make sure the building is built to code. Outside of our busy season, we can spend more time on each project.*"

Other factors that impacted the time spent enforcing the energy code included the complexity of a project, availability of staff, department budget, size of the building, knowledge of the inspector, and issues with other codes. In most cases, respondents named a general lack of necessary resources. For example, a state building inspector said, "*We really just don't have the time or staff. As usual, we just added 5 or 6 more inspections but no additional resources. And we don't have a lot of the expertise needed for the inspections.*" A state building commissioner added, "*There's a lack of man power and money to facilitate the kind of evaluations we need.*"

Contrary to the current findings, 2015 municipal building code employee respondents did not identify the workload of the department as a factor in the amount of time available to enforce the energy code. Instead, the majority of respondents said the size and use of the building had the greatest effect on the time spent enforcing the code.

8.5.2 Building professionals and time spent complying with the energy code

Interviewers asked building professionals 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 (20 out of 29, or 69 percent) answered "*no.*"

We then asked the nine respondents who answered "*yes*" to explain where they put in more time and/or effort. The majority (6 out of 9, or 67 percent) said they spent more time and effort

meeting the code requirements, mostly because of the complexity of the code (Table 8-10). Other explanations included time spent on compliance options, effort spent meeting sustainability goals, complexity of projects, and effort added to lighting design.

Table 8-10. Where Additional Time/Effort Was Spent in Past Year
(multiple responses; n=9)

Activities	Number of Respondents	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
Meeting code requirements/complexity of code	6	1	0	5	0	0	0
Compliance options	1	0	0	1	0	0	0
Meeting sustainability goals of company	1	0	0	1	0	0	0
Complexity of projects	1	0	0	1	0	0	0
Designing lighting controls	1	0	0	0	0	0	1
Did not say	1	0	0	1	0	0	

These results are consistent with the results from the previous IDI study in which the majority of 2015 respondents who put in more effort and/or spent more time in the last year complying with the energy code noted that additional time and effort was spent meeting code requirements.

8.6   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 and to estimate the percentage of projects they reviewed that submitted COMcheck files with supplemental checklists for mandatory requirements, COMcheck files with no supplemental information, or prescriptive checklists.[13] Cadmus also asked code officials if any information had changed since attending training.

Interviewers asked building professionals 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 had changed since attending the training. Additionally, interviewers asked building professionals what percentage of the projects they worked on required them to submit COMcheck files with

---

[13] As explained on the U.S. Department of Energy's Building Energy Codes Program website, "The COMcheck software product group makes it easy for architects, builders, designers, and contractors to determine whether new commercial or high-rise residential buildings, additions, and alterations meet the requirements of the IECC and ASHRAE Standard 90.1, as well as several state-specific codes. COMcheck also simplifies compliance for building officials, plan checkers, and inspectors by allowing them to quickly determine if a building project meets the code."

supplemental checklists for mandatory requirements, COMcheck files with no supplemental information, and prescriptive checklists.

8.6.1 Municipal building code employees

Municipal building code employees gave various descriptions of the type of information filed at their building departments to document energy code compliance. Many gave very detailed descriptions and others provided more general answers. Respondents said the information varied by project type, compliance option, and variances issued. Responses from participants (n=25) are included in Table 8-11; five respondents did not believe they were qualified to answer.

COMcheck reports were the type of information most commonly identified by code officials (14 out of 25, or 56 percent). Code officials said construction documents, energy modeling or performance data, code analysis from architecture firms, and prescriptive checklists, among others, were also filed at their building departments.[14]

Table 8-11. Information Filed at Code Officials' Building Departments
(multiple responses; n=25)

Type of Information Filed	Number of Responses	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
COMcheck reports	14	6	4	0	0	4	0
Construction documents/plans	5	3	1	1	0	0	0
Performance data/Energy modeling	3	0	2	1	0	0	0
Code analysis	3	1	1	1	0	0	0
Prescriptive checklists	3	2	1	0	0	0	0
Inspection reports	2	0	0	2	0	0	0
Building envelope specifications	2	0	1	1	0	0	0
Registered design professional seal/engineer affidavit	2	1	1	0	0	0	0
Lighting documentation	2	0	1	1	0	0	0
Manual J, D	2	2	0	0	0	0	0
Permit applications	2	1	0	1	0	0	0
Details for complying	1	0	1	0	0	0	0

---

[14] We note that this is twice the percentage of buildings for which Cadmus found COMcheck reports submitted across 12 jurisdictions in Massachusetts: *Commercial Code Compliance Documentation Assessment Final Report.* November 29, 2016. p. 4-8.

| Type of Information Filed | Number of Responses | Building Code in Municipalities Covered | | | | | |
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
with code							
HVAC balancing reports	1	0	0	0	0	1	0
Calculations	1	0	1	0	0	0	0
Jurisdiction-specific information	1	0	1	0	0	0	0
Performance testing	1	0	1	0	0	0	0
Equipment testing and commissioning schedule	1	0	0	1	0	0	0
Narrative	1	1	0	0	0	0	0
Final construction control documents	1	0	0	1	0	0	0
Existing building review	1	1	0	0	0	0	0
Energy specifications	1	1	0	0	0	0	0
Full design drawings	1	0	1	0	0	0	0

Cadmus then asked the same respondents if anything had changed since training. Most respondents (24 out of 25) noted that the type of information was the same, one of which said that the forms were updated with 2015 requirements, but that nothing had changed. The remaining respondent said that since the training, the stretch code compliance form was added.

A.   COMcheck files and prescriptive checklists

All municipal building code employees, whether or not they listed COMcheck as information filed at their building departments, were 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. Table 8-12 lists their responses.

Only half (15) of the municipal building code official respondents provided an estimate, which is close to the number of respondents (14) who identified COMcheck files as information filed at their building departments (Table 8-11). Of the 15 that did not provide an estimate, six answered that *"some," "most,"* or *"very few"* projects included COMcheck or a prescriptive checklist; these answers were not included in the analysis. Respondents often found it difficult to estimate a percentage or were unaware of the specific type of COMcheck files received. Other respondents were unaware of COMcheck entirely. One building commissioner stated, *"I wasn't aware that there was a COMcheck. Honestly, it may be printed on the plans and I've just never noticed it."*

Of the 15 respondents who did provide an estimate, nine (60 percent) reviewed projects with COMcheck files that included supplemental checklists. The percentage of projects reviewed with supplemental checklists ranged from 60 percent to 100 percent, with an average of 91 percent across all nine respondents.

The remaining six respondents said they received COMcheck files but were unsure if these files included a supplemental checklist or not. These projects ranged from 25 percent to 100 percent, with the average of 76 percent across all six respondents.

No respondents provided a percentage for COMcheck files without supplemental checklists or prescriptive checklists. It is interesting to note that three respondents said that COMcheck did not apply to stretch code towns, yet four stretch code respondents listed COMcheck as required documentation (Table 8-11).

Table 8-12. Percentage of Information Filed at Code Official's Building Departments
(multiple responses; n=15)

Type of Information Filed	Number of Responses	Number of Respondents			
		1%–25%	26%–50%	51%–75%	76%–100%
COMcheck files with supplemental checklists	9	0	0	2	7
COMcheck files with no supplemental information	0	0	0	0	0
COMcheck but unsure if supplemental or not	6	1	0	1	4
Prescriptive checklists	0	0	0	0	0

8.6.2   Building professionals

Twenty building professionals said that 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—the most common were COMcheck files and load calculations. Four of the 20 respondents (20 percent) said they filed COMcheck files and three said they filed load calculations. Other types of information included design drawings and specifications, energy models, duct leakage and building tightness testing reports, compliance affidavits, project and contractor submittals, and photo documentation (Table 8-13).

Table 8-13. Information Building Professionals File at Building Departments
(multiple responses; n=20)

Type of Information Filed	Number of Responses	Building Code in Municipalities Covered					
		2012 IECC	Stretch Code	Both Codes	2015 IECC	Con. Period	All Codes
COMcheck file	4	0	0	3	1	0	0
Load calculations	3	0	0	3	0	0	0
Design drawings and specifications	2	0	0	2	0	0	0
Energy model	2	0	0	2	0	0	0
Duct leakage testing	2	0	0	2	0	0	0
Building tightness reports	1	0	0	1	0	0	0
Code compliance affidavit	1	0	0	1	0	0	0
Contractor submittals	1	0	0	0	0	0	1
Project submittals	1	0	0	0	0	0	1
Photo documentation	1	0	0	0	0	0	1

It is interesting to note that although only four of the 20 building professionals respondents (20 percent) said they filed COMcheck files, over half (14 out of 25, or 56 percent) of the municipal building code employees qualified to answer reported that COMcheck reports were filed at their building department (as presented previously in Table 8-11).

A.   COMcheck files and prescriptive checklists

Cadmus asked the four respondents who said they were responsible for filing information to document energy code compliance for commercial construction with the local building department to estimate what percentage of the projects that required the submittal of COMcheck files with supplemental checklists for mandatory requirements, COMcheck files with no supplemental information, or prescriptive checklists. Respondents' estimates varied and are summarized in Table 8-14. As with municipal building code officials, building professionals respondents often found it difficult to estimate a percentage or were unaware of the specific type of COMcheck files required. According to respondents who were able to answer, on average, 41 percent of the projects required submittal of COMcheck files with supplemental checklists for mandatory requirements, 20 percent required COMcheck files with no supplemental information, and, as with municipal building code employees, 0 percent required prescriptive checklists. It is important to note that the resulting percentages were based on a limited number of respondents.

Table 8-14. Percent of Information Filed at Building Professionals' Building Departments
(multiple responses; n=4)

Type of information Filed	Number of Responses	Number of Respondents				
		0%	1%–25%	26%–50%	51%–75%	76%–100%
COMcheck files with supplemental	4	1	1	0	1	1

8-20

Type of information Filed	Number of Responses	Number of Respondents				
		0%	1%–25%	26%–50%	51%–75%	76%–100%
checklists						
COMcheck files with no supplemental information	3	1	1	1	0	0
Prescriptive checklists	0	0	0	0	0	0

Additionally, two respondents who said they were responsible for filing information to document energy code compliance worked with the 2015 IECC at the time of the interview. Cadmus asked them if the information filed at the building department changed after the adoption of the 2015 IECC. One respondent said it was too early to tell, and the other respondent said it had not changed and he did not expect it to.

9. SUGGESTIONS FOR IMPROVING THE CCSI TRAINING AND ADDITIONAL COMMENTS

Another key goal of the in-depth interviews with training participants was to gather their suggestions for improvements to the CCSI training. Most respondents offered specific suggestions for improving the CCSI training as well as more general comments for promoting code enforcement and energy efficiency. The interviewers also asked three additional questions before concluding each interview:

> *"Can you think of additional topics you wish the [TRAINING(S)] had included?"*

> *"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 (building professionals) the energy code?"*

> *"Is there anything we have not covered that you would like to add?"*

Recommendations from the three questions have been organized as either ways to improve CCSI training or ways to improve the energy code technical support initiative. These recommendations are described in the following sections.

9.1 IMPROVING CCSI TRAINING

Interviewers encouraged all training attendees to recommend ways the training could be improved, including additional topics they wished the sessions had covered. Over half of the respondents (31 out of 60, or 52 percent) provided one or more recommendations for training topics and improvements, as listed in Table 9-1. The 31 respondents consisted of 18 building professionals and 13 code officials. Respondents offered general ideas to improve the courses, such as getting more people to attend, designing training for specific audiences, and suggesting additional course topics, including industrial applications.

Table 9-1. Suggestions for Additional Course Topics and Improving CCSI Training
(multiple response; n=31)

How to Improve CCSI Training	Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended HVAC Training
All expressing the need to have greater attendance by other audiences	15	6	3	6
More diverse audience needed	2	1	0	1
Get more builders and contractors to attend	8	4	0	4
Get more design professionals to attend	4	0	3	1
Get more code officials to attend	1	1	0	0
All specific topic areas	9	1	0	8
Boilers	2	0	0	2
Controls	1	0	0	1

How to Improve CCSI Training	Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended HVAC Training
Equipment installation	1	0	0	1
Equipment efficiency/sizing	1	0	0	1
Building science	1	0	0	1
Commissioning	2	0	0	2
Roof insulation	1	1	0	0
All courses designed for specific audiences	7	4	1	2
Courses designed for building owners	1	0	0	1
Courses designed for employees, building users	2	1	0	1
Courses designed for electrical engineers	1	0	1	0
Courses designed for wiring inspectors	1	1	0	0
Courses designed for consumers/general public	2	2	0	0
All suggestions for adjusting types and duration of trainings	6	4	0	2
Training too high level, need more detail	3	2	0	1
Do different trainings for different market actors	1	0	0	1
Do different training for beginners	1	1	0	0
Offer refresher or follow-up courses yearly	1	0	0	1
Include more case studies/real-life examples	5	1	2	2
Hands-on activities/on-site portion	5	0	2	3
Identify main differences between codes (IECC, stretch, ASHRAE 90.1, LEED, etc.) and when to use each	3	1	0	2
Whole building/holistic approach	2	0	1	1
Focus on HERS ratings	2	0	0	2
More emphasis on prescriptive means to compliance	2	0	1	1
Innovation in commercial projects: products, design	2	0	0	2

How to Improve CCSI Training	Number of Respondents	Attended Envelope Training	Attended Lighting Training	Attended HVAC Training
More emphasis on stretch code	1	0	1	0
Training focused on code enforcement	1	0	1	0
Inclusion of industrial applications	1	0	0	1
Emphasis on specific products for code compliance	1	1	0	0
Building operation and maintenance/ ongoing maintenance needed for compliance	1	0	0	3
Massachusetts-specific focus	1	0	1	0
Marketing energy efficiency and compliance	1	0	1	0

Nearly half of the respondents (15 out of 31, or 48 percent) said the training would be improved by increasing the participation of more groups of industry professionals. This suggestion came from respondents who believed the training was not geared toward their own occupations and from respondents who believed other industry professionals would benefit most from the training. Eight of the 15 respondents noted that more builders and contractors needed to attend the training. An energy efficiency consultant who attended HVAC training said:

> "I find it to be interesting that a lot of the builders and subs have never attended these types of things. […] I feel like with all of the changes happening so rapidly, there should be more of an effort to market to builders. Most of the attendees are code officials, but there is a need to clarify the process for everyone else involved. It would be useful to have builders and contractors on board."

Four respondents also noted that more design professionals should attend the training. A building inspector who attended lighting training said: *"The trainings really need to focus more on the design team. [Mass Save] needs to get the architects and the designers who sell the products to buy into it and also put the responsibility on them to sell it to their customers."*

Two respondents, a building inspector and an engineering services provider, said the training could be more diverse in general. The engineering services provider attended envelope training and said that although she did not feel comfortable critiquing the training because it was *"several inches over [her] head",* the number of male inspectors in attendance made it difficult to relate to the attendees. She said, *"Most of the audience was building inspectors and most were also men, so it's harder to relate to many of the other attendees."*

One respondent, a building commissioner who attended lighting training, said the training *"needs [to be] restructured to better include the people enforcing the code."*

In addition to suggesting greater attendance of the training by industry professionals, seven respondents (23 percent) also suggested that training courses be designed to include a broader range of attendees, such as building owners, building users (employees), electrical and wiring engineers, and the general public. For example, an engineer who attended HVAC

training noted that Mass Save should advocate for and provide better training about commissioning, controls, and knowledge of systems so that more building owners understand the importance of the energy code:

> *"People need a better idea of how buildings work in relation to the code—especially building owners. I think they are really the people Mass Save needs to target now. Owners often think that equipment runs on its own, but that isn't true if it is not set up properly. The code only gets you so far, you still have to know how to run it."*

He added that building users, or employees, are another important target audience for future training efforts:

> *"The employees should know how to work the buildings too—closing windows, turning off lights—it's really conservation. Office workers should have a better attitude about saving energy. That would be the ideal focus for Mass Save."*

A building commissioner who attended envelope training also recommended providing training to building owners by presenting information on the benefits of the code:

> *"We need to present energy efficiency in a way that takes the focus off of [building owners'] pocket books and focuses more on a deeper, but applicable, understanding of the benefits of the energy code. We spend so much time focusing on carbon footprint and greenhouse gases and quite frankly, that doesn't mean much to most people. It's hard to understand so it's not important. Mass Save could really jump in here and help refocus marketing efforts on things that really matter to people."*

Likewise, two other respondents, both building commissioners who attended envelope training, spoke of the importance of providing education to the general public. One said that *"education of the general public will help us do our job better."* He gave a personal anecdote of how utilities and consumers could be better educated to understand energy:

> *"I just received an energy statement from our local utility. Where I live in particular, we have neighbors who live in second homes and they aren't here very often. So these statements from the utility companies come and they say we are using 'x amount more energy' than the neighbors. This isn't accurate—there is no consideration of the lifestyles of people in our town. It isn't practical to compare the energy usage of a home where someone lives year round with someone here only a few months a year. We need to make energy a real-life example. We need to do a greater job of understanding personal situations. In this scenario, people that live here full time are really confused by the utility statements that are saying we use way too much energy. And instead of that being an incentive, it's actually really damaging to how people understand energy and their role in efficiency."*

Of the 31 respondents, nine (29 percent) also suggested including topics, or providing greater details about specific topics, such as boilers and equipment sizing, and seven (23 percent) suggested adjusting the type or duration of training, for example, to conduct separate courses for different market actors. An architect who attended lighting training said that having municipal building code officials and building professionals in the same room was often distracting because of the type of information each occupation needs most:

"The programs and seminars are a good format, but they are largely dominated by building officials. More outreach to building community is needed or maybe separate courses. The issue is that building officials want specific answers and that often derails the class. Inspectors are constantly trying to apply the code to a specific application that isn't applicable to those in the building community."

Five respondents said the training could be improved by providing more case studies or real-life examples. One inspector who attended envelope training said, *"I would have liked to see a greater amount of real world failures."* Five respondents also noted that the training would be more successful if it included an on-site or hands-on portion for both code officials and building professionals. A lighting designer who attended lighting training elaborated:

"The training is not, in its present form, a hands-on active workshop where you are put in a situation where you are required to properly execute the requirements. Mass Save should consider adding a situational component as a complimentary segment to the training."

Other suggestions for course improvements (listed in Table 9-1 above) include:

- Identifying the main differences between various codes and when to use each
- Covering innovation in design
- Emphasizing the stretch code, code compliant products, and the prescriptive means to compliance
- Focusing on building operation and maintenance
- Including a section on marketing energy efficiency and compliance, among others

Twenty-nine respondents did not provide any recommendations for improving the courses or any additional topics. Although not prompted to explain, seven of 29 respondents (24 percent) said they could not offer a suggestion because the training was too long ago to remember and another seven because they believed the training was sufficient as is and did not need any improvements. The remaining 10 respondents (34 percent) did not provide an explanation as to why they did not have a recommendation.

9.2   SUGGESTIONS FOR IMPROVING ENERGY CODE TECHNICAL SUPPORT INITIATIVE

Interviewers also asked training attendees to offer suggestions for improving the Energy Code Technical Support Initiative to help them better enforce or comply with the energy code in the future. Thirty respondents—17 code officials and 13 building professionals—provided suggestions. Although the other 30 respondents did not provide any recommendations, many remarked they had not yet used the available technical support so did not feel qualified to make suggestions for improvements.

Table 9-2 presents respondents' recommendations for improving the technical support initiative. Two-thirds (20 out of 30, or 67 percent) said that developing and distributing resources aimed at implementing the energy code would be most useful. Specifically, respondents suggested a standardized checklist or cheat sheet for inspections, plan review, and field use by contractors would be most beneficial. Other suggestions were better

marketing of Mass Save as a resource, distribution of a newsletter or blog discussion industry topics, and increasing the frequency of training, among others.

Table 9-2. Suggestions for How the Energy Code Technical Support Initiative Can Help Respondents Comply or Enforce the Energy Code
(multiple response; n=30)

How to Improve Energy Code Technical Support Initiative	Total Respondents	Attended Envelope Training	Attended Lighting Training	Attended HVAC Training
Implementation resources	20	10	4	6
General	2	2	0	0
Standardized checklist/ cheat sheet for inspection	9	4	2	3
Standardized checklist/ cheat sheet for plan review	8	3	2	3
Standardized checklist/ cheat sheet for contractors	1	1	0	0
Technical support/Mass Save as a resource marketed better	4	1	1	2
Newsletter/blog/ e-mail on industry topics	4	2	0	2
Improvements to technical support	3	2	0	1
FAQs added to website	1	0	0	1
Better response time	1	1	0	0
Local person for technical assistance	1	1	0	0
Increase frequency of training	2	1	0	1
Offer incentives for retrofits and retrocommissioning	1	0	0	1
Make training required	1	0	0	1
Interactive online community	1	0	0	1
Increase number of locations for training/distance too great	1	1	0	0
Offer energy audits for existing buildings	1	1	0	0
Specialized inspectors available	1	0	0	1

The following quotes from training attendees elaborate on the suggestions and ideas listed in Table 9-2. Although not all are practical, the respondents were thoughtful in providing suggestions for the most useful information in their respective occupations.

An engineer who attended envelope training believed that Mass Save should provide implementation resources to code officials to help alleviate builders' confusion:

> *"What I have heard from builders is that there is general confusion about the code and some builders just don't know how to implement it. More importantly, the code officials aren't on the ball. Mass Save could do more work on implementation with the code*

officials. The builders are telling me that they are checking with the code official ahead of time and not getting a straightforward response. Resources would improve the situation greatly."

Likewise, an engineering service provider who attended envelope training believed that more support for implementing the code consistently would be most beneficial, especially as energy codes become more complicated. *"We don't see the energy code consistently implemented from town to town, so a way to ensure consistency would be helpful. Codes are only going to get worse so we need a way for [them] to be implemented."*

An inspector who attended HVAC training suggested that Mass Save develop a cheat sheet for both plan review and inspection:

> *"We could use more hands on training and more direction on the code in the field. The training slides focus on efficiency and that's great, but it's not really useful in the field. We need to cut to the chase and get a cheat sheet for plan review on what to focus on and a cheat sheet for field inspection on what to focus on in the field."*

An inspector who attended lighting training also discussed the importance of a handout for inspectors, especially new hires who do not yet have solid knowledge of what the requirements look like in the field:

> *"I've been a building inspector for 11 years and new inspectors are coming in every day. On day one, they don't have the same level of knowledge as the inspectors that have been doing this for years. If Mass Save really wanted to do something, they could team up with building regulation in [my area] and put together training in harmony with what the State is trying to do with the code. We need a single point of reference that says, 'This is the code requirement and this is what you should be looking for.' When you go to a Mass Save seminar, you are introduced to the code and to the idea of what could be as opposed to what must be. The focus should be on the 'must' from the start. Ideally, we could group the seminar with the state building inspectors and make a 2-page handout that says, 'You should be looking for this, this, and this." Some inspectors miss things for the first two years and a handy little sheet for inspection purposes only would alleviate a lot of that."*

An engineering service provider who attended HVAC training suggested that Mass Save distribute *"a newsletter, blog, or periodic e-mail that touches on a hot topic or innovative idea in the industry."* Another engineer who also attended HVAC training suggested providing *"Reminders or e-mails about new codes, new technologies, the way towns are using the code, that sort of thing, would be really helpful."*

An architect who attended HVAC training recommended creation of an interactive online community through which individuals in the industry could ask and answer questions:

> *"The only thing I can think that would be helpful would be a website where you could type a question and other people in the community could respond with their personal opinions or examples of projects in MA that pertain to your question; almost like an online code commentary that is open to the public. It would be nice to have that support structure statewide and it would be helpful if the website kept a list of common questions and their answers that you could search through. I know there is a phone number for technical assistance, but an interactive website would be more useful.*

There would be more people looking and more people asking questions and providing their opinion to yours."

An energy efficiency consultant who attended mechanical training proposed that Mass Save training be mandatory:

"I think that engineers, contractors, and builders should have a certain amount of training before they can submit an application for a building permit. And building officials should have to prove they have had training within some time frame to show competency; to show that they at least know more than one set of codes. I'm not sure how practical it is to do that, but it would improve compliance tenfold."

An inspector who attended envelope training recommended dividing technical support by specific jurisdiction with one person assigned to respond to questions. His idea came from other training at which the presenter offered to be a point of contact for training-related information. He remarked:

"I have the presenter's personal card from yesterday's training. He offered to help if we needed an immediate answer to a code question. I like this set up because it feels personal. If in a local region you weren't calling a general mailbox, and there was a person associated with your region, technical assistance would be much easier. I am sure that's probably not the most desirable solution to the person on the other end, but I could see if having a greater impact."

A state building inspector described the need for specialized inspectors:

"There needs to be a mechanism where more inspectors are hired, or more specialty inspectors are hired to help out with the inspection requirements. Building officials, in my opinion, are just not experienced enough. There's only so much you can do; you can do a thorough inspection, but at the end of the day, when it comes to the balancing of the systems and stuff like that, the building inspectors don't have the expertise. We end up relying on architects, which isn't bad, but we could just be better and part of that is getting the right people doing the inspections. Just one man's opinion, but I think the sentiment is felt everywhere."

9-8

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 OVERALL CONCLUSIONS

The commercial classroom training provided by CCSI has been a valuable resource for both municipal building code employees and building professionals. Cadmus found that, in general, respondents believed the training was useful and that participants would recommend it to others. Municipal building code employees changed aspects of their inspection and plan and permit review processes as a result of the training and building professionals used the training to improve their general knowledge of the code, a key to the success of their businesses. Both respondent types believed the training was crucial to their participation in discussions of code-related topics with peers and colleagues and many felt as though that was an important takeaway from the training.

Cadmus found that nearly all of the training attendees shared the information they learned from the training with at least one other party. These parties are generally believed to be using the information, even if simply to increase their general knowledge of the code. Cadmus also found that training attendees used the training materials provided by CCSI to improve their own work as well as the work of others.

However, the majority of respondents rely on the code book itself as the primary resource for code-related questions and issues. Cadmus found that very few people have utilized the technical support services provided by Mass Save and that, while attendees were generally satisfied with the support they received, improvements could be made to increase awareness and usability of the services.

In addition to relying on the code book, professional organizations, and peers and colleagues for code-related information, respondents attended training, webinars, and gatherings outside of CCSI trainings and found them to be useful because they addressed topics not usually covered in CCSI courses, such as sustainability, resiliency, innovation in technology, and above-code building.

Cadmus found that ensuring the energy efficiency of a project is generally of greater importance for building professionals respondents than municipal building code employees, mainly due to the prioritization of life, health, and safety codes by code officials. However, 2016 municipal building code employee IDI respondents were more likely to say that energy efficiency was a high priority relative to the other requirements they have to enforce than 2015 IDI respondents, implying that the prioritization has increased over the last year. Municipal building code employees expect that the priority will continue to increase in the future.

Cadmus found that factors impacting energy code enforcement by municipal building code employees include department workload, complexity of the project, availability of staff or personnel, and budget. Cadmus determined there is a growing demand for implementation resources, such as a checklist for inspection and plan review, to better enforce the energy code.

The high prioritization of ensuring energy efficiency by building professionals is due, in large part, to current business practices and customer demand. Cadmus found the interest of industry customers to be increasing because of rebates, incentives, and other funding

available to commercial building projects, as well as the environmental responsibility felt by customers. Like municipal building code employees, building professionals anticipate the priority given to energy efficiency will increase in the future.

Respondents reported that COMcheck was the type of information most frequently filed with building departments to document energy code compliance, but the information submitted varied widely by jurisdiction. In many cases, respondents seemed to be confused by questions concerning the types of information filed as well as specific COMcheck details. Several municipal building code employees noted throughout the interviews that they relied on architects and engineers to design code-compliant buildings as a key component of energy code enforcement.

Finally, while attendees generally believed the training was informative, Cadmus found that respondents had recommendations for improving the training that extended beyond improving current training topics. Respondents hoped to see the training marketed better to industry professionals they perceived as having low training attendance, encouraged expanding the training to include a broader audience, and suggested the addition of an on-site or hands-on training module. Cadmus also learned that both types of respondents often found it distracting to have the other respondents in the same training. Municipal building code employees were frustrated with how rudimentary the information in the training needed to be in order to be relatable for building professionals; building professionals were frustrated with the specific nature of the questions posed by code officials as they were often not applicable to building professionals' occupations or projects.

Overall, Cadmus found that interview respondents were enthusiastic about gaining greater familiarity with code requirements, increasing their knowledge of code-related topics, and finding new and innovative ways of complying with and enforcing the energy code. Mass Save trainings are considered a reputable source of code information throughout Massachusetts and participants often look forward to and rely on the trainings for the latest energy code developments.

10.2   RECOMMENDATIONS

Cadmus categorized recommendations for improving the CCSI into the following key categories: improving training, improving technical support services, and improving energy code enforcement.

10.2.1 Improving training

To ensure respondents are getting the most out of the commercial CCSI training courses, Cadmus recommends the following:

- **Improve the quality of the handouts provided at the training so that they can serve as an educational resource.** Respondents often felt they were more for marketing purposes than educational and, since Cadmus has determined that respondents are sharing the information, improved handouts would help disperse general code-related knowledge. Cadmus also recommends that presenters encourage training attendees to share the handouts by providing examples of individuals or jurisdictions that are including the handouts on bulletin boards,

incorporating them into newsletters, providing them to builders and contractors, and handing them out at meetings and other gatherings.

- **Add modules to the training that explore topics beyond basic energy code knowledge**, such as innovative technology and design and above-code building, as well as modules that cover different project types, such as industrial buildings. Respondents are looking elsewhere for resources that better suit the needs of their jurisdictions or customers.

- **Include an on-site and hands-on module for specific audiences.** Respondents believed the training would be more useful to municipal building code employees if there was an on-site portion of the training that showed what code requirements look like in the field and clarified the aspects of the building that need to be inspected. Likewise, respondents believed design professionals, including lighting designers, as well as other occupations would benefit from a laboratory environment in which they were asked to apply the code to specific projects. As noted in the conclusions, several respondents said it was distracting to have those with different roles, either code officials or building professionals, in the same training. However, the exchange of information between code officials and industry professionals is important for the growth for all parties. Including on-site and hands on training modules in addition to the courses already offered would eliminate the need to provide separate training for code officials and building professionals while also ensuring all attendees received the type of information needed to maximize the impact of the training.

- **Increase marketing of the training to industry groups that are currently underrepresented, such as building contractors and equipment suppliers, in training attendance.** Respondents noted that various segments of the building industry were not attending the training in significant numbers and the training would be more effective if they attended and took the information learned back to their practice.

- **Use the training to encourage greater communication between municipal building code employees and building professionals.** Industry professionals are often relying on code officials to educate them and provide guidance on code-related issues. At the same time, code officials are relying on design professionals to design code-compliant buildings. There is a disconnect between the respondent types that has often led to a dismissal of the other respondent type and a lack of understanding of their unique roles in code compliance.

10.2.2 Improving technical support services

To ensure the industry is aware of and using the technical support services provided by Mass Save, and to increase user satisfaction, Cadmus recommends the following:

- **Implement an effort specifically for marketing the technical support offered by Mass Save** so that more people are aware of the services and resources available to them.

- **Improve the response time of the technical support.** While respondents were generally satisfied with the answers provided by the service, the time it took to receive an answer was too long to be practical or useful, particularly for the enforcement community.

- **Develop energy code implementation resources, specifically checklists for inspections and plan review,** that could be used throughout the state. Many respondents identified the need for consistent implementation as a growing issue facing the industry. Furthermore, a consistent and standardized checklist has the potential to save time during plan review and inspection, which may help streamline the workflow of departments and increase the amount of time available to devote to ensuring energy efficiency.

- **Create a medium for distributing code-related information and topics of interest to industry professionals.** Respondents identified periodic emails, newsletters, and blogs as potential methods for informing the industry of new codes, innovative technologies, new construction techniques, upcoming trainings, and other topics that may be of interest to code officials and buildings and others alike.

10.2.3 Improving energy code enforcement

To improve energy code enforcement throughout Massachusetts, Cadmus recommends the following:

- **Increase the emphasis in training and communication to both respondent types on the information necessary to submit to building departments to document energy code compliance.**

- **Review the importance of and best practices behind energy code enforcement with code officials.** Municipal building code employees are often relying on design professionals and building owners for code enforcement. Cadmus learned that code officials are forgoing thorough plan reviews if construction documents are stamped by a design professional. Cadmus also learned that code officials are spending less time on energy code inspections when building owners and design professionals are overseeing construction activities. While this was only mentioned by two of the 30 respondents, Cadmus believed this was important to highlight as it may be indicative of inspection practices throughout Massachusetts.

Follow-up In-depth Interview Guide for Commercial Training Attendees—2016—Builders and Others

Name: _____ Occupation: _____
Title: _____
Company or City/Town: _____ Telephone: _____
Email: _____
Name for Incentive Check: _____ No Incentive Accepted: _____
Address for Incentive Check: _____

_____
Interview date: _____ Time: _____
Interviewer: _____

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 one of the following charities: *Audubon Society, MercyCorps, or Natural Resources Defense Council*; 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 Massachusetts commercial building energy code based on the 2012 IECC-ASHRAE 90.1-2010/ enforce(s) the energy stretch code/enforce(s) both the 2012 IECC-ASHRAE 90.1-2010 and the stretch code/ [FOR INTERVIEWS DONE AFTER THE 2015 IECC IS ADOPTED] enforce(s) the new code based on the 2015 IECC.

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

A-1

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017

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

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

_____.

Training Feedback
1. To the best of your recollection, can you tell me which part or parts of the[TRAINING(S)] you found most useful and why?

Use of Training
2. Can you provide me an estimate of how many commercial projects permitted under the [2012 IECC energy code and/or the stretch code] you have worked on since attending the training? [RECORD]
   a. How many buildings were involved?
   b. Approximately what was average size of these projects in square feet?
   c. How many of these projects involved construction permitted under the 2012 IECC? How many were permitted under the stretch code?
   d. [ASK IF CONDUCTING INTERVIEW AFTER 2015 IECC IS ADOPTED] Have you done any commercial projects permitted under the 2015 IECC?
      i. [IF YES] Please estimate how many buildings were involved?

	All construction	Construction permitted under 2012 IECC, if applicable	Construction permitted under stretch code, if applicable	Construction permitted under 2015 IECC, if applicable
Number of buildings				
Average square feet		--	--	--

3. [FOR ALL CODES THAT RESPONSE=0 IN QUESTION 2] When do you expect to work on a commercial project permitted under
   a. the 2012 IECC
   b. the stretch code
   c. the 2015 IECC

4. [IF RESPONDENT HAS WORKED ON ANY PROJECTS SINCE COMPLETING TRAINING(S)] Have you changed the work that you do to better comply with the [2012 IECC energy code/stretch code] as a result of the training(s) you attended? [IF RESPONDENT HAS WORKED ON PROJECTS PERMITTED UNDER 2015 IECC, PROBE ABOUT WHICH CHANGES APPLY TO THESE 2015 IECC SITES AND WHICH APPLY TO EARLIER SITES]

a. [IF YES] Can you please tell me how your work has changed? [PROBE, IF NECESSARY]
  i. Do you pay more attention to certain areas and, if so, which ones?
  ii. What, if anything, would you have done differently if you had not attended the [TRAINING(S)?]
  iii. [IF YES AND MORE THAN ONE PROJECT LISTED IN QUESTION 2] Do these changes apply to any particular projects or all the work you have done since the training(s)?
    1. Which projects in particular have been affected by you attending the [TRAINING(S)]?
    2. [IF RESPONDENT DOES WORK IN STRETCH CODE AREAS] Do you feel the training affected your work in areas using the stretch code? If so, how?
b. [IF NO] Why would you say the training has not affected your work? [PROBE, IF NECESSARY:]
  i. Was the training relevant to your work?
  ii. Do you feel you already did everything properly to code?
  iii. Has there not been enough time to incorporate what you learned?
  iv. [IF WORK IN STRETCH CODE AREAS] Do you feel the training did not apply to the stretch code?

5. [IF RESPONDENT HAS NOT CHANGED ANYTHING DUE TO TRAINING(S) *OR* HAS NOT WORKED ON ANY BUILDINGS SINCE TAKING TRAINING] 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?

6. [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 ____%
c. [ASK IF CONDUCTING INTERVIEW AFTER 2015 IECC IS ADOPTED] Has this information changed after the adoption of the code based on 2015 IECC?
  i. [IF YES] How has it changed?
  ii. [IF NO] Do you expect it to change? If so, How?

7. [IF ATTENDED TRAININGS AFTER AUGUST 2015] Have you used the handouts provided at the trainings and the copies of the training slides you may have received as a reference or in any other way in your work? [IF YES: Probe on how the handouts/slides have been used and how often they are used]

8. Are there areas we have not covered where the training(s) has/have influenced your work?
   a. [IF YES] Can you describe these areas and how the training(s) has/have influenced your work?

Sharing Information
9. Please think of different parties you interact with, such as people working on your projects, 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 NOT MENTIONED ABOVE] Did you share any of the handouts or other materials you received at the trainings?
   c. [IF SHARED ANYTHING] Do you believe [PARTY] is making use of the information you have shared?
   d. How are they using this information?
   e. Did you recommend the [PARTY] attend any of the trainings? Why or why not?

Key Sources of Information
10. When a question or an issue concerning the energy code comes up, where would you first go to look for information? [Probe: may have different sources depending on the issue or measure affected; also, may simply Google question rather than go to a particular source]
   a. [IF MENTION USING GOOGLE TO SEARCH] Can you tell me what sources ultimately provide you with the information you are seeking?

11. [IF THE RESPONDENT HAS MENTIONED MASS SAVE OR THE ENERGY CODE TECHNICAL SUPPORT INITIATIVE IN RESPONSE TO QUESTION 10]
   a. How important is the Mass Save Energy Code Technical Support Initiative as a source of code information compared to other sources you might use? [Probe: not that important, medium, vital]
   b. Have you ever gone to the Mass Save website looking for information? [IF YES] Were you satisfied with the website? Why or why not?
   c. Have you ever asked the Mass Save Energy Code Technical Support any questions through email or the telephone? [IF YES] Please tell me briefly how satisfied you were with the response(s) and why.

12. [IF THE RESPONDENT HAS *NOT* MENTIONED MASS SAVE OR THE ENERGY CODE TECHNICAL SUPPORT INITIATIVE IN RESPONSE TO QUESTION 10] Are you aware of the support provided by the Mass Save Energy Support Technical Initiative on line and by telephone? [IF YES, ASK a through c below]

a. How important is this source of code information compared to other sources you might use? [Probe: not that important, medium, vital]

b. Have you ever gone to the Mass Save website looking for information? [IF YES] Were you satisfied with the website? Why or why not?

c. Have you ever asked the Mass Save Energy Code Technical Support any questions through email or the telephone? [IF YES] Please tell me briefly how satisfied you were with the response(s) and why.

13. Since [DATE], have you attended any other trainings, webinars, or gatherings discussing commercial building energy codes?

   a. Please tell me the names, sponsors, and approximate dates of these events. We're also interested in the speakers at these events, if you can remember their names. [Probe if the training or discussion was in conjunction with another event such as a general association meeting]

   b. What was the focus of this (these) event(s)? [Probe if covered a particular area of the energy code, the 2015 IECC code, or other]

   c. Did you find this/these event(s) useful? Why or why not?

General

14. 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?

   b. Has this priority changed since you attended [TRAINING(S)]?

   c. Do you anticipate the priority given to checking energy efficiency will increase in the future?

      i. [IF YES] Why is that?

15. [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?

16. 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.

17. Have your customers become more interested in energy efficiency in the last year or so?

   a. Why or why not?

18. Would you say customers have been more willing to pay more for energy efficiency in the last year?

   a. Yes [Probe: which customers? How much more are they willing to pay in a percentage?]

   b. No

19. [EQUIPMENT SUPPLIERS/CONTRACTORS/ARCHITECTS ONLY] Would you say builders have been more concerned about complying with code in the last year?
   a. Yes [PROBE: in what way? What prompted this increased interest in energy code compliance?]
   b. No

Closing

20. Is there anything that you would want added to the training or additional topics you wish the [TRAINING(S)] had included?
   a. [IF YES, PROBE] What additional topics would you have liked the training to cover?

21. Do you have any suggestions for how the Energy Code Technical Support Initiative can help you comply with the energy code?

22. Is there anything we have not covered that you would like to add?

Thank you for your time.

Follow-up In-depth Interview Guide for Commercial Training Attendees—2016—Code Officials

Name: _____ Title: _____

Company or City/Town: _____ Telephone: _____

Email: _____

Name for Incentive Check: _____ No Incentive Accepted: _____

Address for Incentive Check: _____

_____

Interview date: _____ Time: _____

Interviewer: _____

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 one of the following charities: *Audubon Society, MercyCorps, or Natural Resources Defense Council*; 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?

    c. Yes
    d. 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 currently enforcing the Massachusetts commercial building energy code based on the 2012 IECC-ASHRAE 90.1-2010/is enforcing the stretch code/is enforcing both the commercial energy code based on the 2012 IECC-ASHRAE 90.1-2010 and the stretch code/ [FOR INTERVIEWS DONE AFTER THE 2015 IECC IS ADOPTED] is enforcing the new code based on the 2015 IECC.

    c. Yes
    d. No; [ASK] Please explain which code you are using _____
    Thank you. For the rest of the interview, I will refer to the [CODE FROM ABOVE] simply as the [energy code/stretch code].

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

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?

Use of Training

Commercial Building Inspections

2. [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?
   a. How many buildings have you inspected?
   b. [ASK IF USING 2012 IECC] How many involved construction permitted under the 2012 IECC?
   c. [ASK IF USING THE STRETCH CODE] How many involved construction permitted under the stretch code?
   d. [ASK IF CONDUCTING INTERVIEW AFTER 2015 IECC IS ADOPTED] Have you done any inspections of buildings permitted under the 2015 IECC? [IF YES] Please estimate how many units were involved.
   e. Can you estimate how many of these were final inspections?
   f. And what was the average square footage of the buildings you inspected?
   g. What percent of the buildings inspected would you estimate was for final inspections?

	Construction permitted under 2012 IECC energy code, if applicable		Construction permitted under stretch code, if applicable		Construction permitted under 2015 IECC code, if applicable	
	# Buildings	Avg. Sq. Ft.	# Buildings	Avg. Sq. Ft.	# Buildings	Avg. Sq. Ft.
Total inspections						
Final inspections (%)		--		--		--

3. [IF QUESTION 2 = 0] Do you normally conduct commercial inspections in your position?

    a. [IF YES] When would you expect to next conduct an inspection?

4. [IF QUESTION 2 > 0] Have you changed how you conduct energy code inspections as a result of the training(s) you attended? [IF HAVE DONE INSPECTIONS ON UNITS PERMITTED UNDER 2015 IECC IN QUESTION 2 ABOVE, PROBE ABOUT WHICH CHANGES APPLY TO THESE 2015 IECC SITES AND WHICH APPLY TO EARLIER SITES]

    a. [IF YES] Can you please tell me how your inspection 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 inspections 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?
        iv. Since the training(s), are you now finding, and correcting, code compliance issues that might have been missed prior to the training(s)? If yes, please describe these areas.
        v. [IF RESPONDENT WORKS IN STRETCH CODE AREAS] Do you feel the training affected your work given that your jurisdiction uses (used) the stretch code? If so, how?

    b. [IF NO] Why would you say the training has not affected how you conduct inspections? [PROBE, IF NECESSARY:]
        i. 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
        iv. [IF RESPONDENT WORKS IN STRETCH CODE AREAS] Do you feel the training did not apply to the stretch code?

5. [IF RESPONDENT HAS NOT CHANGED ANYTHING DUE TO TRAINING(S) OR IF HAD NOT DONE ANY INSPECTIONS BUT EXPECT TO DO SO IN THE FUTURE] 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?

Commercial Building Plan/Permit Review

6. [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?

    a. [IF RESPONDENT HAS NOT REVIEWED ANY PERMIT APPLICATIONS] Do you normally review building permit applications in your position?
       i. [IF YES] When would you expect to next review an application?

    b. [ASK IF CONDUCTING INTERVIEW AFTER 2015 IECC IS ADOPTED] Have you done any reviews of building permit applications for buildings permitted under the 2015 IECC and, if so, how many permits and buildings are involved?

7. [IF RESPONDENT HAS REVIEWED ANY BUILDING PERMIT APPLICATIONS SINCE COMPLETED TRAINING] Have you changed how you review building permit applications/plans as a result of the training(s) you attended? [IF RESPONDENT HAS REVIEWED APPLICATIONS PERMITTED UNDER 2015 IECC IN QUESTION 6, PROBE ABOUT WHICH CHANGES APPLY TO THESE 2015 IECC PERMITS AND WHICH APPLY TO EARLIER PERMITS]

    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?
       iv. Since the training(s), are you now finding, and correcting, code compliance issues that might have been missed prior to the training(s)? If yes, please describe these areas.
       v. [IF RESPONDENT WORKS IN STRETCH CODE AREAS] Do you feel the training affected your work given that your jurisdiction uses (used) the stretch code? If so, how?

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?
    iv. [IF WORK IN STRETCH CODE AREAS] Do you feel the training did not apply to the stretch code?

8. [IF RESPONDENT HAS NOT CHANGED ANYTHING DUE TO TRAINING(S) OR HAS NOT REVIEWED ANY BUILDING PERMIT APPLICATIONS BUT EXPECTS TO DO SO IN THE FUTURE] 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?

9. 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 ____%
    c. [ASK IF CONDUCTING INTERVIEW AFTER 2015 IECC IS ADOPTED] Has this information changed after the adoption of the code based on 2015 IECC?
        i. [IF YES] How has it changed?
        ii. [IF NO] Do you expect it to change? If so, How?

10. 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?

11. [IF ATTENDED TRAININGS AFTER AUGUST 2015] Have you used the handouts provided at the trainings and the copies of the training slides you may have received as a reference or in any other way in your work? [IF YES; Probe on how the handouts/slides have been used and how often they are used]

Sharing Information
12. 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 NOT MENTIONED ABOVE] Did you share any of the handouts or other materials you received at the trainings?
c. [IF SHARED ANYTHING] Do you believe [PARTY] is making use of the information you have shared?
    i. How are they using this information?
d. Did you recommend the [PARTY] attend any of the trainings? Why or why not?

Key Sources of Information

13. When a question or an issue concerning the energy code comes up, where would you first go to look for information? [Probe: may have different sources depending on the issue or measure affected; also, may simply Google question rather than go to a particular source]
a. [IF MENTION USING GOOGLE TO SEARCH] Can you tell me what sources ultimately provide you with the information you are seeking?

14. [IF THE RESPONDENT HAS MENTIONED MASS SAVE OR THE ENERGY CODE TECHNICAL SUPPORT INITIATIVE IN RESPONSE TO QUESTION 13]
d. How important is the Mass Save Energy Code Technical Support Initiative as a source of code information compared to other sources you might use? [Probe: not that important, medium, vital]
e. Have you ever gone to the Mass Save website looking for information? [IF YES] Were you satisfied with the website? Why or why not?
f. Have you ever asked the Mass Save Energy Code Technical Support any questions through email or the telephone? [IF YES] Please tell me briefly how satisfied you were with the response(s) and why.

15. [IF THE RESPONDENT HAS *NOT* MENTIONED MASS SAVE OR THE ENERGY CODE TECHNICAL SUPPORT INITIATIVE IN RESPONSE TO QUESTION 13] Are you aware of the support provided by the Mass Save Energy Support Technical Initiative on line and by telephone? [IF YES, ASK a through c below]
d. How important is this source of code information compared to other sources you might use? [Probe: not that important, medium, vital]
e. Have you ever gone to the Mass Save website looking for information? [IF YES] Were you satisfied with the website? Why or why not?
f. Have you ever asked the Mass Save Energy Code Technical Support any questions through email or the telephone? [IF YES] Please tell me briefly how satisfied you were with the response(s) and why.

16. Since [DATE], have you attended any other trainings, webinars, or gatherings discussing building energy codes? [IF YES, ASK A-C BELOW]
a. Please tell me the names, sponsors, and approximate dates of these events. We're also interested in the speakers at these events, if you can remember their names. [Probe if the training or discussion was in conjunction with another event such as a general association meeting]

b. What was the focus of this (these) event(s)? [Probe if covered a particular area of the energy code, the 2015 IECC code, or other]

c. Did you find this/these event(s) useful? Why or why not?

General

17. 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?
    b. Has this priority changed since you attended [TRAINING(S)]?
    c. Do you anticipate the priority given to checking energy efficiency will increase in the future?
        i. [IF YES] Why is that?

18. What, if any, serious issues related to energy efficiency code requirements have you encountered during inspections over the past year or so, that needed to be fixed?
    a. [IF ANY MENTIONED] Please describe what happened and how it was addressed?
    b. [IF ANY MENTIONED] How often do these issues occur?
    c. [IF ANY MENTIONED] Are these issues more prevalent in certain building types, geographies, or for certain builders? How so?

19. 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

20. Is there anything that you would want added to the training or additional topics you wish the [TRAINING(S)] had included?
    a. [PROBE] What additional topics would you have liked the training to cover?

21. Do you have any suggestions for how the Energy Code Technical Support Initiative can help you to enforce the energy code?

22. Is there anything we have not covered that you would like to add?

Thank you for your time.

A-13

Follow-Up Interviews with CCSI Commercial Training Attendees. February 16, 2017