TO:	Massachusetts Program Administrators (PAs), Massachusetts Energy Efficiency Advisory Council (EEAC) Consultants
FROM:	Betty Tolkin and Joanne O'Donnell, NMR Group
SUBJECT:	Analyses of Immediate Code Compliance Support Initiative Residential Training Surveys—September through December 2015
CC:	Pam Rathbun, Tetra Tech; Lynn Hoefgen, NMR Group; Allen Lee, Cadmus Group; Holly Farah, Cadmus Group, Althea Koburger, Cadmus Group
DATE:	December 23, 2015

This memo provides analyses of the immediate survey responses collected through paper surveys, registration data, and Audience Response Systems (ARS) from nine CCSI residential trainings held from September through December of 2015. CLEAResult, the CCSI contractor, held four trainings on Envelope and Building Science (EBS) on September 29, October 7, October 20, and December 10. CLEAResult held five trainings on HVAC and Indoor Air Quality (HVAC-IAQ) on September 18, September 29, October 29, November 12, and December 1. Out of an estimated 197 training attendees, 146 filled out paper survey forms.

Of the survey respondents, 70 were building code officials and the remaining 76 fell into the general category of builders, architects, contractors, equipment suppliers, and others. Not everyone who turned in a survey form answered all the questions; the number of respondents for each individual survey question is shown in the appropriate table.

The tables in this memo are similar to the ones provided on 10/31/14, 12/29/14, 3/13/15, and 7/10/15. Most of the statistics provided in this memo are from the September through December 2015 residential trainings. In addition, we provide some overall statistics based on cumulative responses from all 38 residential trainings held from September 2014 through December 2015; these are labeled as "2014 to 2015." This memo highlights how responses have evolved over the 38 residential trainings held through December of 2015.

It is important to note that the September through December 2015 attendees provided fairly positive feedback on the residential trainings, similar to the immediate survey responses for the earlier trainings. The most recent immediate survey respondents rated individual components of the trainings slightly higher in terms of usefulness than in past trainings, as shown in Table 1 and Table 3. The most recent attendees also rated the trainings' quality higher than earlier attendees, as shown in Table 5, most likely due to the enhancement of the handouts provided at these trainings. The most frequent suggestions for improvement, as shown in Table 13, are to provide more detail on code requirements and provide more trainings for contractors. The September through December 2015 trainees were more likely to say they would relay the information they received to builders, contractors, and homeowners and to suggest providing more trainings for contractors than earlier trainees. If these improved responses are maintained, it may indicate that CLEAResult may have successfully responded to earlier survey feedback and made the trainings more useful.

As outlined in the amended work plan dated May 5, 2015, NMR provided summaries of the findings from the immediate residential training surveys to the PAs and EEAC every other month in 2014 and is providing three such summaries in 2015. Cadmus has provided three summaries of findings from the immediate commercial training surveys to date. These interim deliverables are designed to provide early feedback to PAs, EEAC, and implementers on how well specific aspects of the trainings are being received.

Usefulness and Quality

The surveys asked respondents to rate the usefulness of eight to ten components of the trainings on a 1-to-6 scale in which 6 is extremely useful and 1 is not at all useful. As shown in Table 1, mean ratings for EBS training components ranged from 5.0 to 5.6, while mean ratings for HVAC-IAQ training components ranged from 4.7 to 5.4 (Table 3). The most recent September through December usefulness ratings for the EBS trainings are higher for every component than the ratings for all the trainings in 2014 and 2015. The most recent usefulness ratings for the HVAC-IAQ trainings are also higher for most components than the ratings for all the trainings in 2014 and 2015, but the differences are not as large as for the EBS components.

The survey respondents overwhelmingly rated all the training components listed as 4, 5, or 6 in terms of usefulness. The most highly rated components were air barrier and insulation installation (EBS), the enclosure and foundation (EBS), insulation (EBS), blower door testing (EBS), and ventilation (HVAC-IAQ). Builders and others gave slightly higher mean ratings than code officials to the various training components.

The immediate surveys also asked if the material in the various components was new to the respondents (Table 2 and Table 4). As was the case in the earlier trainings, fewer respondents answered this question than provided ratings of usefulness. The EBS components were generally more likely than the HVAC-IAQ components to be new for the respondents. The training components most likely to contain new information for the attendees were a case study of high-performance enclosures (EBS), the cost of change from 2009 to 2012 IECC (EBS), and Mass Save New Construction incentives (EBS and HVAC-IAQ). For most components in both types of trainings, builders and others were more likely than code officials to say the material was new to them.

Table 1. Usefulness Ratings for Envelope Building Science Training Components

		Rating of Usefulness for Sep. thru Dec. (percent)							Mean Ratings			
Training Component	n	6—Extr. Useful	5	4	3	2	1—Not at all Useful	NA/ Don't Know	Sep. thru Dec.	2014 through 2015		
										All	Code Officials	Builders /Others
Cost of change: 2009 to 2012 IECC	68	37%	25%	13%	4%	3%	1%	16%	5.0	4.6	4.4	4.8
Prescriptive, trade-off, performance compliance paths	70	44%	43%	7%	4%	0%	1%	0%	5.2	5.0	4.9	5.0
Insulation	70	56%	37%	4%	1%	0%	1%	0%	5.4	5.2	5.1	5.2
The enclosure: foundation, etc.	69	62%	32%	4%	0%	0%	1%	0%	5.5	5.1	5.1	5.2
Air barrier and insulation installation	70	63%	34%	1%	0%	0%	1%	0%	5.6	5.3	5.2	5.3
Blower door testing	69	57%	36%	4%	1%	0%	1%	0%	5.4	4.9	4.9	5.0
Case study - High performance enclosures	66	41%	35%	12%	3%	0%	2%	8%	5.2	4.9	4.9	4.9
Lighting requirements	67	42%	33%	15%	9%	0%	1%	0%	5.0	4.7	4.7	4.7
Stretch code	68	44%	32%	13%	4%	1%	1%	3%	5.1	4.7	4.6	4.8
Mass Save New Construction incentives	68	46%	32%	12%	4%	1%	1%	3%	5.2	4.7	4.6	4.9

Table 2. Whether the Envelope Building Science Training Components Were New

Component	Sep. thru Dec.		2014 through 2015					
			All		Code Officials		Builders and Others	
	n	Yes	n	Yes	n	Yes	n	Yes
Cost of change: 2009 to 2012 IECC	38	47%	262	41%	139	31%	123	52%
Prescriptive, trade-off, performance compliance paths	40	40%	268	28%	144	19%	124	39%
Insulation	41	24%	313	16%	180	17%	133	15%
The enclosure: foundation, etc.	40	30%	262	21%	139	21%	123	22%
Air barrier and insulation installation	41	37%	266	26%	143	25%	123	27%
Blower door testing	42	33%	263	22%	139	19%	124	25%
Case study - High performance enclosures	37	51%	240	41%	127	40%	113	42%
Lighting requirements	39	36%	299	32%	170	31%	129	33%
Stretch code	39	21%	243	22%	128	18%	115	27%
Mass Save New Construction incentives	40	48%	300	45%	171	43%	129	48%

Table 3. Usefulness Ratings for HVAC Indoor Air Quality Training Components

		Rating of Usefulness for Sep. thru Dec. (percent)							Mean Ratings			
Training Component	n	6—Extr. Useful	5	4	3	2	1—Not at all Useful	NA/ Don't Know	Sep. thru Dec.	2014 thru 2015		
										All	Code Officials	Builders/ Others
2012 IECC overview	72	51%	29%	13%	3%	1%	0%	3%	5.3	5.2	5.2	5.3
Indoor air quality	72	54%	32%	10%	3%	1%	0%	0%	5.3	5.2	5.2	5.2
Ventilation	72	57%	29%	8%	4%	1%	0%	0%	5.4	5.3	5.3	5.4
Ductwork	71	49%	31%	11%	7%	1%	0%	0%	5.2	5.3	5.2	5.3
Stretch code	70	29%	34%	7%	13%	4%	1%	11%	4.7	4.7	4.6	4.7
System sizing*	67	40%	30%	13%	12%	1%	1%	1%	4.9	4.8	4.8	4.9
Mechanical systems/equipment for super-efficient homes	70	44%	29%	14%	6%	1%	1%	4%	5.1	5.0	4.9	5.1
Lighting requirements	66	38%	23%	21%	8%	3%	2%	6%	4.9	4.8	4.7	4.7
Mass Save New Construction incentives	66	42%	21%	17%	8%	3%	3%	6%	4.9	4.9	4.8	5.1

Table 4. Whether the HVAC Indoor Air Quality Training Components Were New

Component	Sep. thru Dec.		2014 through 2015					
			All		Code Officials		Builders and Others	
	n	Yes	n	Yes	n	Yes	n	Yes
2012 IECC overview	42	29%	167	34%	119	26%	48	54%
Indoor air quality	41	20%	161	27%	115	26%	46	30%
Ventilation	40	18%	193	26%	137	24%	56	30%
Ductwork	41	12%	195	23%	139	19%	56	34%
Stretch code	40	23%	148	25%	108	19%	40	43%
System sizing	39	28%	151	32%	108	31%	43	33%
Mechanical systems/equipment for super-efficient homes	39	31%	185	39%	133	40%	52	38%
Lighting requirements	39	23%	185	28%	134	23%	51	39%
Mass Save New Construction incentives	37	35%	186	39%	136	40%	50	36%

Respondents also gave high ratings to the quality of the presentations (Table 5), with mean ratings ranging from 5.0 to 6.0 on a 6-to-1 scale in which 6 is excellent and 1 is poor. The highest ratings went to the presenter's skills. Almost all respondents (ranging from 88% to 100%) said they would recommend the training to others. The latest training quality ratings are similar to ratings for all residential trainings from 2014 through 2015, with the presenter's skills getting the highest rating and the quality of handout information getting the lowest rating. The handout information ratings from the most recent respondents are, however, higher than those from all 2014 and 2015 respondents. This is likely due to the availability of the slides for September and October trainees who requested them and an enhanced handout package starting on November 9, 2015. The new handouts include about two-thirds of the slides used in the trainings (picture slides are excluded) and other information. Moreover, recent trainees are also more likely than trainees from previous sessions to say they would recommend the trainings to others.

Table 5. Quality of Trainings
(Mean ratings on a 6 to 1 scale)

General Category	9/19 HVAC-IAQ	9/29 EBS	9/29 HVAC-IAQ	10/7 EBS	10/20 EBS	10/29 HVAC-IAQ
n	7	17	9	17	17	26
Presenter's skills	5.9	5.6	5.7	5.5	5.5	5.6
Quality of slide information	5.7	5.4	5.6	5.6	5.6	5.2
Quality of handout information	5.6	5.0	5.0*	5.5	5.4	5.0*
Handling of participant questions	5.7	5.5	5.6	5.6	5.7	5.5
n	7	16	8	17	17	23
Percent recommending training to others	100%	94%	88%	94%	100%	96%

General Category	11/12 HVAC-IAQ	12/1 HVAC-IAQ	12/10 EBS	All Trainings Sep. thru Dec.	All Trainings 2014 thru 2015	
n	11	20	21	145	962	
Presenter's skills	6.0	5.7	5.7	5.7	5.6	
Quality of slide information	5.5	5.4	5.5	5.4	5.2	
Quality of handout information	5.3	5.5	5.5	5.3	4.8	
Handling of participant questions	5.9	5.5	5.7	5.6	5.5	
n	11	20	21	140	966	
Percent recommending training to others	100%	100%	100%	97%	94%	

* One respondent did not provide ratings for this area.

The training attendees also provided feedback on the training quality through an Audience Response System (ARS) used during the presentations to indicate how much the respondents agreed with certain statements on a scale of 1 (strongly agree) to 6 (strongly disagree)[1]. As shown in Table 6, most trainees strongly agreed that the trainer was organized, prepared, knowledgeable, and informative. Most also felt that the trainer kept an appropriate pace and encouraged participation. Finally, close to nine out of ten respondents strongly agreed or agreed that they would recommend the training to others. While the ARS statements are not directly comparable to the paper survey questions in Table 5, the responses confirm that, in general, the respondents rate the quality of the trainings fairly highly. Moreover, the mean ratings for September through December are slightly better than the ratings for all the previous trainings that had used an ARS.

Table 6. ARS Ratings of Training Quality

Statement		Agreement with Statement (Percent)						Mean	
	n*	1—Strongly Agree	2	3	4	5	6—Strongly Disagree	Sep. thru Dec.	2014 thru 2015
The trainer was organized and prepared	121	77%	14%	2%	1%	5%	2%	1.5	1.7
The trainer encouraged participation	56	70%	20%	7%	0%	3%	0%	1.5	1.5
The trainer was knowledgeable and informative	64	73%	20%	2%	2%	3%	0%	1.4	1.5
The trainer kept an appropriate pace	35	88%	9%	0%	0%	3%	0%	1.2	1.5
I would recommend this training	68	79%	9%	4%	2%	3%	3%	1.5	1.7

*Not all statements were assessed at each training.

Use of Training

The immediate surveys asked respondents to estimate when they would be conducting final inspections of housing units permitted under 2012 IECC (building code officials) or have the units they were working on undergo final inspections (builders and others). However, more than one-half (56%) of 2014 through 2015 respondents work in cities and towns that have adopted the stretch code and thus could not answer this question. Similarly, 59% of respondents during the September through December 2015 time period could not answer the question because they work in cities and towns that have adopted the stretch code.

Only 12 out of all 146 survey respondents indicated that they had at least some housing units currently permitted under 2012 IECC and 16 indicated that they had some final inspections of 2012 IECC units conducted. Table 7 shows the numbers of permitted units and inspections reported by the trainees who responded to this question for the September through December

[1] Due to a system malfunction, ARS data was not collected from the 10/29 HVAC-IAQ training.

2015 trainings; Table 8 shows the numbers of permitted units and inspections reported by all of the trainees who responded to this question from 2014 through 2015.

Table 7. Housing Units Permitted under 2012 IECC for September through December 2015 Trainees

Number of Housing Units	Currently permitted		Final inspections to date		Final inspections expected within one year	
	Code officials	Builders and others	Code officials	Builders and others	Code officials	Builders and others
n*	8	4	12	4	8	3
Less than five	1	0	3	0	2	0
Five to ten	1	2	3	2	1	1
Eleven to 100	2	2	3	2	2	2
More than 100	4	0	3	0	3	0

*The number of responses is shown where the sample size is less than 20.

Table 8. Housing Units Permitted under 2012 IECC for 2014 through 2015 Trainees

Number of Housing Units	Currently permitted		Final inspections to date		Final inspections expected within one year	
	Code officials	Builders and others	Code officials	Builders and others	Code officials	Builders and others
n	120	35	94	21	135	33
Less than five	23%	74%	40%	67%	13%	70%
Five to ten	29%	14%	23%	19%	19%	18%
Eleven to 100	41%	11%	32%	14%	61%	12%
More than 100	8%	0%	4%	0%	7%	0%

The surveys asked respondents who could not estimate the number of housing units under 2012 IECC and were not in stretch code communities to estimate when they would conduct a final inspection on such a unit or have a final inspection conducted on a unit they were working on. As shown in Table 9, more than one-third said they expect a final inspection in the next three months; more than one-fourth in roughly a year; and the remainder were unsure. The most recent trainees appear to be less likely than all of the trainees who responded to this question from 2014 through 2015 to be working with 2012 IECC units; however, this observation is based on a fairly small number of respondents.

Table 9. When Expect a Final Inspection on a 2012 IECC Unit

(Percent)

Expected Final Inspection	September through December			2014 through 2015		
	Code Officials	Builders and Others	Total	Code Officials	Builders and Others	Total
n	17	9	26	216	80	296
In the next three months	7	2	35%	49%	33%	44%
In the next four to six months	3	1	15%	19%	11%	17%
In the next seven to twelve months	2	1	12%	13%	19%	15%
More than a year from now	0	0	0%	1%	9%	3%
Unsure	5	5	38%	17%	29%	20%

*The number of responses is shown where the sample size is less than 20.

The surveys also included a simpler timing question—namely, when the respondents first expected to use something learned at the training. As shown in Table 10, more than one-half of respondents (55%) said they expect to use the training immediately with an additional 33% saying they expected to use it within the next three months. The overall percentage of those expecting to use what they had learned in the training within three months is very similar to that provided from all the trainings from 2014 through 2015. These consistent responses indicate that the trainings are providing useful information with immediate applications even for attendees in areas that have not adopted 2012 IECC.

Table 10. When Expect to First Use Training Information
(Percent)

Expected Use of Training	September through December			2014 through 2015		
	Code Officials	Builders and Others	Total	Code Officials	Builders and Others	Total
n	69	74	143	552	393	945
As soon as I walk out the door	57%	54%	55%	67%	55%	62%
Sometime in the next three months	29%	37%	33%	20%	29%	24%
In the next four to six months	13%	9%	11%	9%	11%	10%
In the next seven to twelve months	0%	0%	0%	2%	4%	2%
More than a year from now	1%	0%	1%	2%	1%	2%
Not likely to ever use it	0%	0%	0%	0%	0%	0%

Most Important Information and Other Qualitative Data

Respondents who attended the EBS trainings found the 2012 IECC code changes, insulation requirements, and air barrier information to be the most important new information provided by the trainings, while those attending the HVAC-IAQ trainings considered ventilation options and requirements, duct sealing, and 2012 IECC code changes the most important new information provided (Table 11). Other areas mentioned moderately included duct placement sizing and testing (HVAC-IAQ), which are likely code changes if 2015 IECC is adopted (EBS), and HERS rating information (EBS).

Table 11. Most Important New Information Provided by the Trainings (September through December 2015)

(Percent; multiple response)

General Category	EBS	HVAC-IAQ	All Trainings
n	46	44	90
Ventilation options and requirements	0%	39%	19%
2012 IECC code changes	22%	11%	17%
Insulation requirements	17%	5%	11%
Air barrier information	20%	0%	10%
Duct sealing	7%	14%	10%
Everything—general overview	13%	7%	10%
Duct work, including duct placement, sizing, and testing	2%	9%	5%
Level of detail provided	4%	5%	4%
2012 to 2015 IECC code changes	7%	0%	3%
HERS rating information	7%	0%	3%
Air sealing information	4%	2%	3%
Air infiltration or leakage	4%	2%	3%
Reaffirmation of current knowledge	2%	5%	3%
HVAC requirements	0%	7%	3%
Building envelope and foundation options/requirements	4%	0%	2%
Blower door testing	4%	0%	2%
Vapor barriers	4%	0%	2%
Technical support, web resources, and manuals available	2%	2%	2%
Mass Save incentives	2%	2%	2%
Stretch code information	2%	0%	1%
Areas to review in-field	0%	2%	1%
ASHRAE standards	0%	2%	1%
Window requirements	0%	2%	1%
Opportunity for discussion	0%	2%	1%
No new information	2%	2%	2%
Other	2%	2%	2%

Building code officials mostly said they would use this information during their inspections and relay it to builders and contractors. Builders and others mostly said they would use this information during the construction process, during the design phase, and during audits and HERS ratings (Table 12). The responses from the September through December 2015 trainings are fairly similar to those from the earlier trainings, except that both types of respondents in the latest trainings were more likely to say they would relay the information provided to builders, contractors, and homeowners. The HVAC-IAQ trainings also had a number of HERS raters who said they would use the information during audits.

Table 12. How Information Provided by the Trainings Will Be Used

(Percent; multiple response)

General Category	September through December			2014 through 2015		
	Code Officials	Builders and Others	Total	Code Officials	Builders and Others	Total
n	39	42	81	338	256	594
During inspections	33%	2%	17%	45%	2%	26%
During construction process/apply to building practices	13%	31%	22%	3%	36%	17%
Relay to builders or contractors	23%	10%	16%	15%	7%	12%
During initial planning	15%	7%	11%	14%	7%	11%
Code enforcement	18%	0%	9%	18%	0%	10%
Integrate into design	3%	17%	10%	1%	15%	7%
As a reference	0%	7%	4%	3%	9%	6%
Educate homeowners	8%	7%	7%	5%	6%	5%
Permit approval	5%	0%	2%	6%	2%	4%
New construction applications	0%	7%	4%	1%	4%	2%
Current projects	0%	5%	2%	1%	4%	2%
Making projects code compliant	0%	2%	1%	0%	4%	2%
During audits/HERS ratings	0%	10%	5%	0%	4%	2%
During construction process applied to HVAC work	5%	7%	6%	1%	1%	1%
Other	13%	12%	12%	11%	20%	14%

The training attendants provided a number of unique responses which form the “other” category. These include better communication with construction officials, integration into training curricula, updating company materials, providing training for staff, meeting client needs, doing heat load calculations, more accurately estimating project costs, differentiating one’s company from competitors, and planning or promoting equipment sales. These diverse responses reflect the diversity of the training attendees and the numerous ways the trainings can be used, in addition to enhancing code compliance.

Asked to provide additional comments and suggestions for improving the trainings, the few attendees who replied most often said they appreciated the fact that the training was provided. The most frequent suggestions for improvement in the September through December trainings were to provide more details on code requirements and provide more trainings for contractors. As noted earlier, the suggestion to provide handouts of the slides used was addressed in early November (Table 13). Examples of areas where the respondents wanted more details include air barriers, different ventilation products, and using Manuals J and S. The suggestion to provide more trainings for contractors is particularly popular for the most recent training attendees; one respondent noted that contractor trainings should be offered free of charge and at times and locations convenient to contractors. Similar suggestions for offering more trainings for contractors were reported in the follow-up interviews of residential trainees completed in November of 2015.[2]

[2] NMR Group Inc., *Follow-up Interviews with CCSI Residential Training Attendees Draft Report*, November 24, 2015.

Table 13. Additional Comments and Suggestions to Improve Trainings

(Percent; multiple response)

General Category	September thru December Trainings			All Trainings 2014 thru 2015
	EBS	HVAC-IAQ	All Trainings	
n*	14	21	35	266
Appreciated the training	6	33%	62%	36%
Provide more detail on code requirements	4	24%	26%	6%
Provide handouts of the slides used	1	5%	10%	14%
Provide more trainings for contractors	2	5%	9%	1%
Improve slide image quality	1	5%	6%	3%
Provide additional trainings in the future	0	10%	6%	2%
Training room uncomfortable	0	10%	6%	1%
Change focus to 2015 IECC code	1	0%	3%	0%
Provide examples of how to apply code	0	5%	3%	15%
Provide more up to date information	0	5%	3%	5%
Extend the training session time	0	5%	3%	3%
Further focus on the stretch code and related changes	0	0%	0%	3%
Provide checklists	0	0%	0%	3%
Give examples of products to use to meet requirements	0	0%	0%	2%
Limit distracting side conversations	0	0%	0%	2%
Shorten training session time	0	0%	0%	1%
Other	1	14%	11%	18%

*The number of responses is shown where the sample size is less than 20.

The “Other” category includes providing more information on energy savings and CO_2 reduction, providing trainings sooner after code adoption, creating a glossary of the terms used in the trainings, lengthening the trainings and having hands-on exercises, having more trainings available in western Massachusetts, educating homeowners, having larger training rooms,

having training rooms with tables to make taking notes easier, focusing on costs and benefits, having more trainings on trainings on Manuals J, S, and D, providing more information about incentives, and better organizing presentations.

Training Attendee Data

Nearly one-half of the September through December training attendees who completed surveys work as building code officials. Code officials and building contractors were more likely to attend HVAC-IAQ trainings, while builders and architects were more likely to attend EBS trainings. Table 14 presents more detailed self-descriptions of the trainees' positions.

Table 14. Training Attendees
(Percent)

Position	September thru December Trainings			All Trainings 2014 thru 2015
	EBS	HVAC-IAQ	All Trainings	
n*	73	73	146	949
Building code official	38%	59%	49%	54%
Builder (oversees the entire construction of a home or building)	22%	3%	12%	17%
Architect or design engineer	16%	4%	10%	10%
HERS rater or energy efficiency consultant	7%	5%	6%	5%
Building contractor	3%	18%	10%	6%
Other	14%	11%	12%	8%

*Does not include training attendees who filed out paper surveys but either did not register for the trainings or did not indicate their occupation when registering.

Trainees in the "other" category include building design consultants, sales representatives, remodelers, and program managers.

As in the earlier trainings, the majority of builders and architects trained from September through December 2015 have been in their present positions for at least ten years (Table 15). However, more than one-third of the code officials at the most recent trainings have been at their present positions for five years or less.

Table 15. Years in Present Position for September through December 2015 Trainees

(Percent)

Position	n	Less than 1 year	1 to 5 years	6 to 10 years	11 to 15 years	16 to 20 years	More than 20 years
Building code official	60	8%	27%	18%	10%	14%	23%
Builder (oversees the entire construction of a home or building)	17*	0	1	0	1	2	13
Building contractor	15*	1	1	2	1	1	9
Architect or design engineer	15*	0	0	0	2	1	12
HERS rater or energy efficiency consultant	10*	2	2	1	3	0	2
Equipment supplier	2*	0	0	1	0	0	1
Other	12*	0	1	3	3	0	5

*The number of responses is shown where sample size is less than 20

Residential trainings held from December 2014 through December 2015 used ARS to develop estimates of the proportion of all building permits that are drawn for retrofit projects and, for the retrofit projects, the proportion of building permits that are energy-related. As shown in Table 16, the respondents indicated that an average of just over three-fifths of the permits they drew or were drawn in their jurisdictions were for retrofit projects and three out of five retrofits are energy-related. Building code officials provided similar responses to all trainees.

Table 16. Proportion of Retrofit Building Permits

(Percent)

Percentage of all building permits issued	All trainees		Building code officials only	
	Retrofit portion	Portion of energy-related retrofit permits	Retrofit portion	Portion of energy-related retrofit permits
n	469	442	184	172
None	2%	3%	2%	1%
20%	11%	17%	14%	22%
40%	14%	18%	12%	21%
60%	28%	17%	29%	23%
80%	37%	27%	40%	24%
100%	7%	18%	2%	9%
Mean	62%	60%	60%	55%

The survey respondents work in cities and towns across Massachusetts (they could list up to three municipalities on the survey forms). The September through December trainees work across Massachusetts; Boston, Newton, and Wellesley are listed most frequently due to large numbers of builders and others attending. Pittsfield had the largest number of code officials attending (Table 17).

Table 17. Cities and Towns Represented in the September through December Trainings

(Number of responses; multiple response)

City or Town	Code Officials	Builders and Others	Total	City or Town	Code Officials	Builders and Others	Total
Acton	0	3	3	Cambridge	0	6	6
Adams	2	0	2	Canton	2	1	3
Amesbury	0	1	1	Cheshire	1	0	1
Amherst	0	2	2	Chicopee	4	0	4
Arlington	0	1	1	Clarksburg	2	0	2
Ashburnham	0	1	1	Concord	1	6	7
Attleboro	0	1	1	Dalton	1	0	1
Auburn	0	1	1	Dartmouth	0	1	1
Belmont	1	1	2	Deerfield	2	0	2
Berlin	0	1	1	Dennis	0	1	1
Beverly	0	1	1	East Longmeadow	1	0	1
Bolton	0	1	1	Eastham	0	1	1
Boston	1	9	10	Easthampton	4	1	5
Brewster	0	3	3	Egremont	0	2	2
Brookline	0	8	8	Fairhaven	0	1	1
Byfield	0	1	1	Falmouth	0	1	1

City or Town	Code Officials	Builders and Others	Total	City or Town	Code Officials	Builders and Others	Total
Florida	1	0	1	Hudson	0	1	1
Framingham	0	3	3	Hyannis	0	1	1
Franklin	0	3	3	Lancaster	0	1	1
Gardner	2	0	2	Lanesborough	1	0	1
Georgetown	0	1	1	Lawrence	1	0	1
Gill	0	1	1	Leicester	0	1	1
Gloucester	0	3	3	Lee	1	0	1
Granville	2	0	2	Lenox	1	1	2
Great Barrington	1	2	3	Lexington	0	4	4
Greenfield	0	1	1	Lincoln	1	0	1
Hadley	4	1	5	Littleton	0	2	2
Hamilton	0	2	2	Longmeadow	0	1	1
Harwich	0	3	3	Lowell	0	1	1
Hatfield	0	2	2	Marlboro	0	2	2
Haverhill	0	1	1	Marshfield	0	1	1
Hinsdale	1	0	1	Medfield	1	0	1
Holliston	0	3	3	Medford	2	1	3
Holyoke	0	2	2	Medway	0	3	3
Hopkinton	0	1	1	Melrose	0	2	2

City or Town	Code Officials	Builders and Others	Total	City or Town	Code Officials	Builders and Others	Total
Mendon	0	1	1	Plainfield	2	0	2
Milford	1	1	2	Plainville	0	1	1
Millville	0	1	1	Peabody	0	1	1
Monson	1	0	1	Pittsfield	7	0	7
Monterey	1	0	1	Plymouth	1	1	2
Natick	0	2	2	Quincy	3	0	3
Needham	0	4	4	Revere	1	0	1
New Ashford	2	0	2	Richmond	0	1	1
New Bedford	0	1	1	Royalston	1	0	1
New Salem	1	0	1	Sandwich	1	0	1
Newbury	0	1	1	Sandisfield	1	0	1
Newburyport	0	1	1	Saugus	1	0	1
Newton	0	12	12	Seekonk	0	1	1
North Attleboro	0	1	1	Sharon	1	0	1
Northampton	3	4	7	Shrewsbury	0	2	2
Northbridge	1	0	1	Somerville	1	1	2
Norwood	0	1	1	Southampton	2	0	2
Orange	1	0	1	Southbridge	2	0	2
Orleans	0	3	3	Southwick	2	0	2

City or Town	Code Officials	Builders and Others	Total	City or Town	Code Officials	Builders and Others	Total
Sterling	1	0	1	Wendell	1	0	1
Stockbridge	0	2	2	Wellfleet	0	1	1
Stoneham	0	1	1	Wellesley	0	10	10
Stoughton	0	1	1	West Boylston	0	1	1
Sudbury	0	8	8	West Springfield	0	1	1
Templeton	1	1	2	Westboro	1	0	1
Tewksbury	0	1	1	Westford	0	2	2
Tolland	3	0	3	Westhampton	1	0	1
Townsend	2	4	6	Westminster	1	0	1
Truro	0	1	1	Weston	0	7	7
Upton	1	0	1	Westwood	2	1	3
Uxbridge	1	0	1	Williamstown	1	0	1
Walpole	2	0	2	Winchester	2	1	3
Waltham	1	0	1	Worcester	0	2	2
Ware	1	0	1				

Unique Attendees—All Trainings

The team calculated the number of unique trainees for all trainings from September 23, 2014, through December 10, 2015, by using trainee enrollment data and completed immediate surveys. As shown in Table 18, residential trainings had 1,002 unique attendees and the commercial trainings had 505 unique attendees; 183 individuals have attended both residential and commercial trainings. More than four out of ten unique attendees have been code officials; the trainings have also had sizable numbers of architects in attendance. Builders, described as those overseeing the entire construction of a home or building, and building contractors responsible for specific aspects of construction, as would be expected, have been much more likely to attend residential trainings. Trainees listed as "other" most often described themselves as engineers, facilities managers, or consultants to the PAs. This table will be updated for each memo, residential and commercial, provided on the immediate training surveys.

Table 18. Numbers of Unique Training Attendees

(Number of attendees)

Position	All Residential Trainings	All Commercial Trainings	All Trainings—Both Res and Com
Building code official	486	206	544
Builder (oversees the entire construction of a home or building)	135	8	142
Architect or design engineer	103	93	181
Building contractor	78	15	91
HERS rater or energy efficiency consultant	46	32	77
Equipment supplier	19	23	37
Other	78	72	143
Position not known*	57	56	109
Total unique training attendees	1002	505	1324

*Includes individuals who did not indicate their position on the registration form and a small number of individuals who attended the trainings (and filled out the immediate paper surveys), but did not register.