

**ID-3: Codes and Standards Programs (Construction Firm Reps)**

**OMB Control No. 1910-5170**

**BACKGROUND INFORMATION (to be filled in prior to interview):**

Programmatic Activity Name:	
Year:	
BPAC Area	
2008 Budget:	
2008 Market Title Sampled	
2009-2010 ARRA budget	
2009-2010 ARRA Market Title Sampled	
Types of Services Provided through Programmatic Activity:	
Structure of SEP/ARRA funded activities from informal discussions with SEP representative (from database)	
Contact Name:	
Contact Company:	
Contact Phone:	
Contact Disposition:	

**A. Introduction**

My name is [INTERVIEWER NAME] from [Itron]. The US Department of Energy’s State Energy Program has hired us to gather information on the results of programs supported by the State Energy Program and the American Recovery and Reinvestment Act (ARRA) to upgrade energy efficiency building codes and improve the enforcement. The information you supply will be used to characterize the program in [PROGRAM YEAR]. This interview is being conducted as part of an

evaluation of the State Energy Program being conducted by Oak Ridge National Laboratory on behalf of the U. S. Department of Energy.

The U.S. Department of Energy (DOE) would like to inform each individual that the information requested here is being solicited under the statutory authority of Title III of the Energy Policy and Conservation Act of 1975, as amended, which authorizes DOE to administer the State Energy Program (SEP). This information is being sought as part of a national evaluation of SEP, the purpose of which is to reliably quantify Program accomplishments and help inform decisions on future operations. The sole use of the information collected will be for an analysis of national-level Program impacts. Disclosure of this information is voluntary and there will be no adverse effects associated with not providing all or any part of the requested information. The survey should take no more than 75 minutes for you to complete.

The information from all respondents will be combined for analysis purposes and data will not be released in a way that would reveal an individual respondent. If you prefer not to answer a question, just let me know and we'll go on to the next question. If you have any questions about this study, you can contact [MAIN STUDY CONTACT?].

## B. Characterization of Firm and Respondent

First, I'd like to get some information about your firm, your job and experience regarding energy efficiency elements of the building codes in force in [STATE IN WHICH PROGRAM IS LOCATED].

1. Which of the following services does your firm offer in [STATE]?
  - a. Architectural services
  - b. Electrical Engineering
  - c. Mechanical Engineering
  - d. Code compliance assessment for other designers and builders
  - e. Commercial construction management
  - f. Commercial construction
  - g. Residential construction
  
2. How many commercial new construction and major renovation projects did your firm work on in [STATE] during 2011? Your best estimate is fine.

NUMBER OF PROJECTS: \_\_\_\_\_

3. Roughly what percentage of your projects were accounted for by the following kinds of facilities:
  - a. Private Office \_\_\_\_\_
  - b. Retail \_\_\_\_\_
  - c. Schools \_\_\_\_\_
  - d. Other institutional \_\_\_\_\_

4. Is your firm involved in construction of single family homes or multifamily buildings?
  - a. Yes
  - b. No
  - c. DK/REF
  
5. IF 4 = YES: Roughly how many single family homes did your company build or design in 2011?

ENTER NUMBER \_\_\_\_\_

6. IF 4 = YES: Roughly how many multi-family building projects did your firm work on in 2011?

ENTER NUMBER \_\_\_\_\_

7. What are your specific job responsibilities?

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8. Are you familiar with the methods your company uses to ensure energy code compliance in [STATE]?
  - a. Yes
  - b. No
  - c. DK/REF

9. IF 8 = NO OR DK/REF, ASK: Can you refer me to someone in your firm who is familiar with energy code compliance procedures in [STATE]?
  - a. Name: \_\_\_\_\_
  - b. Title: \_\_\_\_\_
  - c. Telephone: \_\_\_\_\_
  - d. E mail address: \_\_\_\_\_

WHEN APPROPRIATE INDIVIDUAL IS IDENTIFIED, ASK:

10. What methods does your firm use to assess compliance with energy-related code elements for commercial building projects on which it works?

11. IF MORE THAN ONE METHOD USED, ASK: What percentage of total projects are assessed using [METHOD]?

	<b>10. Method</b>	<b>11. Percent of Projects</b>
a	Checklist of prescriptive features	
b	Compliance software such as ComCheck	
c	Building simulation modeling of total building performance	
d	Other (Specify)	
e	Don't assess compliance for energy elements	
f	Don't Know/Refused	

12. What methods does your organization or the organizations you oversee use to assess compliance with energy-related code elements for residential buildings?
13. IF MORE THAN ONE METHOD USED, ASK: What percentage of total projects are assessed using [METHOD]?

	12. Method	13. Percent of Projects
a	Checklist of prescriptive features	
b	Compliance software such as ResCheck	
c	Building simulation modeling of total building performance	
d	Other (Specify)	
e	Don't assess compliance for energy elements	
f	Don't know/Refused	

### C. Characterization of Baseline Construction Practices

This next set of questions seeks information on common construction practices related to energy efficiency during the period immediately prior to [PROGRAM YEAR]. In particular we are interested in practices related to lighting, heating, cooling and related controls, shell insulation and air sealing. Are you able to provide information on standard practices in your jurisdiction, based on your experience in reviewing plans and inspecting projects or on your experience in overseeing such operations? Your general impressions and best approximations are fine for these purposes.

Yes: PROCEED TO BASELINE QUESTIONS

No: IS THERE SOMEONE ELSE IN THE ORGANIZATION WHO CAN PROVIDE THAT INFORMATION?

PROBE TO IDENTIFY STAFF WITH EXPERIENCE IN EITHER RESIDENTIAL, COMMERCIAL, OR BOTH.

14. IF FIRM DID  $\geq$  5 COMMERCIAL PROJECTS, ASK: In this question, I am going to read specifications for a series of commercial building elements that reflect the International Code Council's 2009 International Energy Conservation Code. I would like you to tell me what percent of the projects your firm worked on in the year prior to [PROGRAM YEAR] met these specifications. I would also like you to tell me what the most frequent value for the specification was. So, for example, the IECC 2009 requires that unitary cooling equipment from 65,000 to 135,000 BTU/hr have an EER of at least 11.0. We would like to know what percent of projects with cooling equipment of that type met the 11.0 EER standard, and what the typical alternative EER level was in the year prior to [PROGRAM YEAR]. Finally, since construction practices vary a great deal in the

commercial sector, we are seeking your best estimates for three different building types: offices, retail, and institutional, such as schools. REFER TO THE ANSWER GRID. IT MAY BE BEST TO EMAIL THE ANSWER GRID IN ADVANCE AND HAVE THE RESPONDENT FILL IT OUT PRIOR TO THE CALL.

- a. What percentage of [Office, Retail, Schools] projects completed in [YEAR PRIOR TO PROGRAM YEAR] met the following specifications?
  - b. What was the typical alternative specification at the time?
- 15. IF FIRM DID  $\geq$  5 RESIDENTIAL PROJECTS, ASK:** In this question, I am going to read specifications for a series of residential building elements that reflect the International Code Council's 2009 International Energy Conservation Code. I would like you to tell me what percent of the residential projects your firm worked on in the year prior to [PROGRAM YEAR] met this specification. I would also like you to tell me what the most frequent value for the specification was. So, for example, the IECC 2009 requires that roofs be insulated to R-38 in moderately cold climate zones. We would like to know what percent of projects with cooling equipment of that type met that specification, and what the typical alternative insulation level was in the year prior to [PROGRAM YEAR] in new construction. REFER TO THE ANSWER GRID. IT MAY BE BEST TO EMAIL THE ANSWER GRID IN ADVANCE AND HAVE THE RESPONDENT FILL IT OUT PRIOR TO THE CALL.
- a. What percentage of single and multifamily projects completed in [YEAR PRIOR TO PROGRAM YEAR] met the following specifications?
  - b. What was the typical alternative specification at the time?

**16. Commercial Baseline Practices**

Component	IECC 2009 Specification*	a. % Meeting Spec.			b. Alternative Specification
		Office	Retail	Inst.	If Applicable
Roof Insulation	R-19 for standing seam roof /single fiberglass layer; R-19 + R13 for multiple layers				
Wall Insulation	R-19 for single faced fiberglass insulation layer between wall panels & steel frame. R-13 + 5.6 rigid insulation				
Maximum Window Area	40% of above-grade wall area				
Unitary AC/Air Cooled	< 65 kBtu/hr, ~ 5 tons SEER 13.0 65 – 135 kBtu/hr, ~ 10 tns EER 11.0 135 – 240 kBtu/hr ~ 20 tns EER 10.6 > 240 kBtu/hr EER 9.5				
Packaged Thermal AC & Heat Pumps	AC EER 12.5 HP EER 12.3				
Water cooled chillers	< 300 tons .634 kW/ton 300 – 600 tons .576 kW/ton				
Thermostatic Controls	Automatic setback and shut-off capability for 7 daily schedules/week				
Demand Control Ventilation	Required in all spaces > 500 sf with average occupancy > 40 persons/1000 sf				
Energy (Heat) Recovery Ventilation	All fans $\geq$ 5,000 CFM and $\geq$ 70% outside air supply				
Economizers	Required in all cooling systems $\geq$ 54 kBtu				
Interior Lighting Controls	Dual switching to reduce connected load by 50% or occupancy sensors				
Interior Lighting Controls	Automatic shut-off via time clock, EMS, or occupancy sensors				
Interior Lighting Power Density	Office 1.0 Watt/sf Retail 1.5 Watt/sf School/University 1.2 Watt/sf				
Exterior Lighting Control	Motion sensor or time clock				

\* Some specifications for shell elements change depending on climate zone. Consult IECC 2009 for correct values.

**17. Residential Baseline Practices**

Component	IECC 2009 Specification	a. % Meeting Spec.		b. Alternative Specification If Applicable
		1 – 4 units	≥ 5 units	
Ceiling Insulation	CZ 1-3 R-30 CZ 4-5 R-38 CZ 6-8 R-49			
Wall Insulation	CZ 1-4 except Marine R-13 CZ 4 Marine-6 R-20 CZ 7-8 R-21			
Floor Insulation	CZ 1-2 R-13 CZ 3-4 except Marine R-19 CZ 4 Marine - 6 R-30 CZ 7-8 R-38			
Basement Insulation	CZ 1-2 0 CZ 3 R-5 Sheathing or R-13 Cavity Fill CZ 4 Marine - 6 R-10/R-13 CZ 7-8 R-15/R-19			
Slab Insulation	CZ 1-3 0 CZ 4-5 R-10 to 2 ft depth CZ 6-8 R-10 to 4 ft depth			
Fenestration U Factor	CZ 1 1.20 CZ 2 0.65 CZ 3 0.50 CZ 4 – 8 0.35			
Air Leakage	Tested – maximum 7 air changes/hr at 33.5 psf (50 pascals) or detailed visual inspection by independent inspector			
Duct Insulation	R-8 for all supply ducts in attic; others R-6			
Duct leakage	Rough-in and post construction testing of all ducts in non-conditioned areas. Maximum 8 cfm leakage per 100 sf of conditioned space			
Mechanical Ventilation	Automatic or gravity dampers on all outdoor air intakes and exhausts			
Heating & Cooling System Sizing	Per Manual J or International Residential Code			
Interior Lighting	50% of lamps in permanent fixtures must be high efficacy (Fluorescent, CFL, LED)			

**D. Effect of Program on Acceleration of Statewide Code Adoption**

**IF ONE OF THE OBJECTIVES OF THE PROGRAM WAS TO ACCELERATE ADOPTION OF IECC 2009 AS THE STATEWIDE ENERGY EFFICIENCY CODE, ASK THIS SECTION. OTHERWISE SKIP TO NEXT SECTION.**

As you may know, the Governor of [STATE] agreed to adopt IECC 2009 as part of your state’s building code as a condition of receiving funding for energy projects through the American Recovery and Reinvestment Act. The date of adoption of the code is \_\_\_\_\_ and the effective date is \_\_\_\_\_. In this set of questions I would like to gather your thoughts on the likely timing of adoption for new statewide energy codes in the absence of the incentives and supports offered through ARRA.

- 18. First, do you think [STATE] would have adopted *any* statewide energy code by 2020 in the absence of the incentives and supports offered by ARRA?
  - a. Yes
  - b. No
  - c. Don’t know

19. IF 18 = NO, ASK: Why do you say that?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

20. IF 18 =YES, ASK: In the absence of the requirement that the state adopt IECC 2009 as its energy code, in what year do you think the it would have come into effect in this state?

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

21. What are your main reasons for this assessment?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Additional follow-up questions**

22. During the 5 years prior to [PROGRAM YEAR], had there been efforts to adopt or update a statewide energy efficiency building code?

- a. Yes
- b. No
- c. Don't know

23. IF 22 = YES, ASK: Which organizations advocated for adoption of a new statewide energy efficiency code?

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24. What organizations or constituencies opposed adoption of new codes?

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25. What were their principal objections to the adoption of new codes?

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26. How effective were the advocates and opponents of the code in enlisting political support for their views? What evidence do you have for this assessment?

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27. Were there other business, economic, or political factors in the state that were supporting or working against the adoption of energy codes immediately prior to [PROGRAM YEAR]? IF YES: What were they?

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28. What were the outcomes of these efforts? Was a new or updated code adopted?

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29. To your knowledge, was your state’s energy office, also known as [NAME OF OFFICE], involved in developing or supporting the development and adoption of this code?
- a. Yes
  - b. No
  - c. Don’t know

30. IF 29 = YES, ASK: What specific activities did the [NAME OF OFFICE] undertake to support the development and adoption of the new energy code?

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31. On a scale of 1 to 10, where 1 means “not at all important” and 10 means “very important”, how important was your state energy office’s involvement in the development and adoption of the energy efficiency building code?

ENTER 1 – 10, 99 FOR DK/REF: \_\_\_\_\_

32. Why do you say that?

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## E. Effect of the Program on Local Code Adoption

**IF ONE OF THE OBJECTIVES OF THE PROGRAM WAS TO SUPPORT AND ACCELERATE ADOPTION OF LOCAL ENERGY EFFICIENCY CODES, ASK THIS SECTION. OTHERWISE SKIP TO NEXT SECTION. YOU SHOULD NOT ASK THIS SECTION IF YOU HAVE ASKED SECTION D.**

According to descriptions of the state activities provided to us, one of their objectives was to promote the development and adoption of energy efficiency codes in selected local jurisdictions, including the following: INSERT LOCAL JURISDICTIONS THAT RECEIVED STATE ENERGY OFFICE SUPPORT FOR CODE DEVELOPMENT AND ADOPTION.

33. Were you aware of the efforts of the state energy office to support the adoption of energy efficiency building codes in these jurisdictions?
- a. Yes
  - b. No
  - c. DK/REF

34. Do you think these jurisdictions would have adopted *any* building energy code by 2020 in the absence of the programs and support offered by the state energy office?
- a. Yes
  - b. No
  - c. Don't know

35. IF 34 = NO, ASK: Why do you think that?

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36. IF 34 =YES, ASK: In the absence of the programs and support you received from the state energy office, in what year do you think that these jurisdiction would hav adopted any energy efficiency codes?

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

37. What are your main reasons for this assessment?

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38. Are you aware of business, economic, or political conditions in the jurisdictions that received support from the state energy office for code adoption that supported the adoption of energy codes immediately prior to [PROGRAM YEAR]? That worked against code adoption? IF YES: What were they?

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39. On a scale of 1 to 10, where 1 means "not at all important" and 10 means "very important", how important was your state energy office's involvement in the development and adoption of the energy efficiency building codes?

ENTER 1 – 10, 99 FOR DK/REF: \_\_\_\_\_



40. Why do you say that?

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## F. Non-compliance Rates

**ASK THIS SECTION ONLY IF PA HAS TARGETED ACCELERATION OF ADOPTION OF STATEWIDE OR LOCAL CODES; THAT IS, ONLY IF YOU HAVE ASKED SECTIONS D OR E.**

In this set of questions we seek your views on the extent to which various provisions of the energy efficiency codes in force in your state are being complied with. Here we are referring not only to projects your firm has completed but to other projects of which you are aware.

41. What percent of permitted projects in your jurisdiction meet each of the following code requirements, taking into account the resources available for enforcement and current practices of builders and construction professionals active in the jurisdiction. A response of 100 percent means that all projects permitted in your jurisdiction meet the code specifications. A response of 90 percent means that 10 percent of the permitted projects do not meet specifications, due to lack of understanding or motivation on the part of the builder or lack of enforcement resources.
42. FOR FEATURES WITH ESTIMATED COMPLIANCE RATE BELOW 90 PERCENT, ASK: What are the principal reasons for lack of compliance for this component?

**Commercial Code Compliance**

Component	IECC 2009 Specification*	46. Compliance Rate	47. Principal Reasons for Non-compliance
Roof Insulation	R-19 for standing seam roof /single fiberglass layer; R-19 + R13 for multiple layers		
Wall Insulation	R-19 for single faced fiberglass insulation layer between wall panels & steel frame. R-13 + 5.6 rigid insulation		
Maximum Window Area	40% of above-grade wall area		
Unitary AC/Air Cooled	< 65 kBtu/hr, ~ 5 tons SEER 13.0 65 – 135 kBtu/hr, ~ 10 tns EER 11.0 135 – 240 kBtu/hr ~ 20 tns EER 10.6 > 240 kBtu/hr EER 9.5		
Packaged Thermal AC & Heat Pumps	AC EER 12.5 HP EER 12.3		
Water cooled chillers	< 300 tons .634 kW/ton 300 – 600 tons .576 kW/ton		
Thermostatic Controls	Automatic setback and shut-off capability for 7 daily schedules/week		
Demand Control Ventilation	Required in all spaces > 500 sf with average occupancy > 40 persons/1000 sf		
Energy (Heat) Recovery Ventilation	All fans $\geq$ 5,000 CFM and $\geq$ 70% outside air supply		
Economizers	Required in all cooling systems $\geq$ 54 kBtu		
Interior Lighting Controls	Dual switching to reduce connected load by 50% or occupancy sensors		
Interior Lighting Controls	Automatic shut-off via time clock, EMS, or occupancy sensors		
Interior Lighting Power Density	Office 1.0 Watt/sf Retail 1.5 Watt/sf School/University 1.2 Watt/sf		
Exterior Lighting Control	Motion sensor or time clock		

\* Some specifications for shell elements change depending on climate zone. Consult IECC 2009 for correct values.

**Residential Code Compliance**

Component	IECC 2009 Specification	46. Compliance Rate	47. Principal Reasons for Non-compliance
Ceiling Insulation	CZ 1-3 R-30 CZ 4-5 R-38 CZ 6-8 R-49		
Wall Insulation	CZ 1-4 except Marine R-13 CZ 4 Marine-6 R-20 CZ 7-8 R-21		
Floor Insulation	CZ 1-2 R-13 CZ 3-4 except Marine R-19 CZ 4 Marine - 6 R-30 CZ 7-8 R-38		
Basement Insulation	CZ 1-2 0 CZ 3 R-5 Sheathing or R-13 Cavity Fill CZ 4 Marine - 6 R-10/R-13 CZ 7-8 R-15/R-19		
Slab Insulation	CZ 1-3 0 CZ 4-5 R-10 to 2 ft depth CZ 6-8 R-10 to 4 ft depth		
Fenestration U Factor	CZ 1 1.20 CZ 2 0.65 CZ 3 0.50 CZ 4 – 8 0.35		
Air Leakage	Tested – maximum 7 air changes/hr at 33.5 psf (50 pascals) or detailed visual inspection by independent inspector		
Duct Insulation	R-8 for all supply ducts in attic; others R-6		
Duct leakage	Rough-in and post construction testing of all ducts in non-conditioned areas. Maximum 8 cfm leakage per 100 sf of conditioned space		
Mechanical Ventilation	Automatic or gravity dampers on all outdoor air intakes and exhausts		
Heating & Cooling System Sizing	Per Manual J or International Residential Code		
Interior Lighting	50% of lamps in permanent fixtures must be high efficacy (Fluorescent, CFL, LED)		

## G. Effects of Programs to Strengthen Code Enforcement

**ASK THIS SECTION ONLY IF PA INCLUDES ELEMENTS TO IMPROVE CODE ENFORCEMENT AT THE LOCAL OR STATE LEVELS. SUCH ELEMENTS INCLUDE TRAINING OF CODE OFFICIALS, TECHNICAL ASSISTANCE TO CODE OFFICIALS, STIPENDS TO HIRE ADDITIONAL CODE OFFICIALS, PURCHASE OF COMPLIANCE SOFTWARE, ETC.**

43. On a scale of 1 to 10 where 1 means “not at all effective” and 10 means “very effective”, how effective do you believe local code officials in [STATE] are in regard to: ENTER 1 – 10; 99 FOR DK/REF

- a. Identifying instances of non-compliance with energy codes in plan reviews and inspections \_\_\_\_\_
- b. Informing architects and builders of energy code compliance issues in the course of plan reviews and inspections \_\_\_\_\_
- c. Suggesting energy code compliance strategies in the course of plan reviews and inspections \_\_\_\_\_

44. Would you say that local energy code enforcement activities have become more effective, less effective, or remained about the same over the past five years?

- a. More effective
- b. Less effective
- c. Stayed about the same
- d. DK/REF

45. How about over the period since [PROGRAM YEAR]?

- a. More effective
- b. Less effective
- c. Stayed about the same
- d. DK/REF

46. IF 44 OR 45 = a or b, ASK: Can you provide any examples of changes in enforcement activities that are associated with the changes in effectiveness?

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47. Has your firm made any changes in the procedures it follows to ensure compliance with energy efficiency elements of the building code since [PROGRAM YEAR]? IF YES: What are those procedures?

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48. On a scale of 1 to 10, where 1 means “very unlikely” and 10 means “very likely”, how likely is it that your firm would have undertaken these changes if code enforcement activities had not changed?

ENTER 1 – 10, 99 IF DK OR REF \_\_\_\_\_

49. Has the percentage of your firm’s projects that meet the specifications for key exterior, mechanical, and lighting elements of energy efficiency codes increased, decreased, or stayed about the same since [PROGRAM YEAR]?

- a. Increased
- b. Decreased
- c. Stayed about the same
- d. DK/REF

IF 49 = INCREASED, ASK. For which of the following code elements has compliance improved?

50. FOR EACH ELEMENT IDENTIFIED ASK:

- a. What was the compliance rate prior to the start of the program?
- b. What is the current compliance rate?

ASK FOR COMMERCIAL AND RESIDENTIAL PROJECTS AS APPROPRIATE PER PRIOR RESPONSES IN SECTION B.

51. Are there factors other than increased enforcement efforts that have contributed to increased compliance rates? IF YES: Could you identify those factors.

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52. IF 51 = YES: Compared to these other factors, would you say your enforcement efforts had less, more, or about the same level of influence in changes in compliance rate?

- a. Less
- b. More
- c. About the same
- d. DK/REF

**Commercial Code Compliance**

Component	IECC 2009 Specification*	46. Compliance Improved	47a. Pre-Program Compliance Rate	47b. Current Compliance Rate
Roof Insulation	R-19 for standing seam roof /single fiberglass layer; R-19 + R13 for multiple layers			
Wall Insulation	R-19 for single faced fiberglass insulation layer between wall panels & steel frame. R-13 + 5.6 rigid insulation			
Maximum Window Area	40% of above-grade wall area			
Unitary AC/Air Cooled	< 65 kBtu/hr, ~ 5 tons SEER 13.0 65 – 135 kBtu/hr, ~ 10 tns EER 11.0 135 – 240 kBtu/hr ~ 20 tns EER 10.6 > 240 kBtu/hr EER 9.5			
Packaged Thermal AC & Heat Pumps	AC EER 12.5 HP EER 12.3			
Water cooled chillers	< 300 tons .634 kW/ton 300 – 600 tons .576 kW/ton			
Thermostatic Controls	Automatic setback and shut-off capability for 7 daily schedules/week			
Demand Control Ventilation	Required in all spaces > 500 sf with average occupancy > 40 persons/1000 sf			
Energy (Heat) Recovery Ventilation	All fans $\geq$ 5,000 CFM and $\geq$ 70% outside air supply			
Economizers	Required in all cooling systems $\geq$ 54 kBtu			
Interior Lighting Controls	Dual switching to reduce connected load by 50% or occupancy sensors			
Interior Lighting Controls	Automatic shut-off via time clock, EMS, or occupancy sensors			
Interior Lighting Power Density	Office 1.0 Watt/sf Retail 1.5 Watt/sf School/University 1.2 Watt/sf			
Exterior Lighting Control	Motion sensor or time clock			

\* Some specifications for shell elements change depending on climate zone. Consult IECC 2009 for correct values.

**Residential Code Compliance**

Component	IECC 2009 Specification	46. Compliance Improved	47a. Pre-Program Compliance Rate	47b. Current Compliance Rate
Ceiling Insulation	CZ 1-3 R-30 CZ 4-5 R-38 CZ 6-8 R-49			
Wall Insulation	CZ 1-4 except Marine R-13 CZ 4 Marine-6 R-20 CZ 7-8 R-21			
Floor Insulation	CZ 1-2 R-13 CZ 3-4 except Marine R-19 CZ 4 Marine - 6 R-30 CZ 7-8 R-38			
Basement Insulation	CZ 1-2 0 CZ 3 R-5 Sheathing or R-13 Cavity Fill CZ 4 Marine - 6 R-10/R-13 CZ 7-8 R-15/R-19			
Slab Insulation	CZ 1-3 0 CZ 4-5 R-10 to 2 ft depth CZ 6-8 R-10 to 4 ft depth			
Fenestration U Factor	CZ 1 1.20 CZ 2 0.65 CZ 3 0.50 CZ 4 – 8 0.35			
Air Leakage	Tested – maximum 7 air changes/hr at 33.5 psf (50 pascals) or detailed visual inspection by independent inspector			
Duct Insulation	R-8 for all supply ducts in attic; others R-6			
Duct leakage	Rough-in and post construction testing of all ducts in non-conditioned areas. Maximum 8 cfm leakage per 100 sf of conditioned space			
Mechanical Ventilation	Automatic or gravity dampers on all outdoor air intakes and exhausts			
Heating & Cooling System Sizing	Per Manual J or International Residential Code			
Interior Lighting	50% of lamps in permanent fixtures must be high efficacy (Fluorescent, CFL, LED)			

## H. Effects of Programs to Train Builders and Architects in Code Issues

**ASK THIS SECTION ONLY IF PA INCLUDES ELEMENTS TO EDUCATE BUILDERS AND DESIGNERS ON CODE REQUIREMENTS AND COMPLIANCE MECHANISMS.**

**THESE QUESTIONS ARE TO BE ADDRESSED TO PARTICIPANTS IN THE PROGRAM.**

53. In [PROGRAM YEAR], the [NAME OF PROGRAM SPONSOR OR CONTRACTOR, AS APPROPRIATE] offered workshops/training programs/[OTHER INFORMATION RESOURCES] to construction professionals on the [CONTENT RELATED TO BUILDING CODES]. According to program records, you or other members of your firm attended one or more of these sessions [OR OTHERWISE MADE USE OF THE INFORMATIONAL RESOURCES]. Is this correct?

- a. Yes
- b. No
- c. Don't Know

**IF 53 = NO OR DON'T KNOW, ASK:** Is there someone in your firm who may be more familiar with your participation in the education/training/information program?

May I speak with that person?

**ONCE THE APPROPRIATE RESPONDENT IS IDENTIFIED, PROCEED.**

54. How many members of your firm participated in the program?

ENTER NUMBER OF ATTENDEES: \_\_\_\_\_

55. What positions or roles do these individuals have in your firm?

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56. What kinds of information or techniques did members of your firm learn about in these sessions [from these information resources]?

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57. Has your firm made any changes in the procedures it follows to ensure compliance with energy efficiency elements of the building code since participating in the program? IF YES: What are those procedures?

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58. On a scale of 1 to 10, where 1 means “very unlikely” and 10 means “very likely”, how likely is it that your firm would have undertaken these changes if code enforcement activities had not changed?

ENTER 1 – 10, 99 IF DK OR REF \_\_\_\_\_

59. Has the percentage of your firm’s projects that meet the specifications for key exterior, mechanical, and lighting elements of energy efficiency codes increased, decreased, or stayed about the same since [PROGRAM YEAR]?

- a. Increased
- b. Decreased
- c. Stayed about the same
- d. DK/REF

IF 59 = INCREASED, ASK. For which of code elements has compliance improved?

60. FOR EACH ELEMENT IDENTIFIED ASK:

- a. What was the compliance rate prior to the start of the program?
- b. What is the current compliance rate?

ASK FOR COMMERCIAL AND RESIDENTIAL PROJECTS AS APPROPRIATE PER PRIOR RESPONSES IN SECTION B.

61. Are there factors other than the information and training you received from [PROGRAM SPONSOR] that have contributed to increased compliance rates? IF YES: Could you identify those factors.

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62. IF 61 = YES: Compared to these other factors, would you say your enforcement efforts had less, more, or about the same level of influence in changes in compliance rate?

- a. Less
- b. More
- c. About the same
- d. DK/REF

**Commercial Code Compliance**

Component	IECC 2009 Specification*	46. Compliance Improved	47a. Pre-Program Compliance Rate	47b. Current Compliance Rate
Roof Insulation	R-19 for standing seam roof /single fiberglass layer; R-19 + R13 for multiple layers			
Wall Insulation	R-19 for single faced fiberglass insulation layer between wall panels & steel frame. R-13 + 5.6 rigid insulation			
Maximum Window Area	40% of above-grade wall area			
Unitary AC/Air Cooled	< 65 kBtu/hr, ~ 5 tons SEER 13.0 65 – 135 kBtu/hr, ~ 10 tns EER 11.0 135 – 240 kBtu/hr ~ 20 tns EER 10.6 > 240 kBtu/hr EER 9.5			
Packaged Thermal AC & Heat Pumps	AC EER 12.5 HP EER 12.3			
Water cooled chillers	< 300 tons .634 kW/ton 300 – 600 tons .576 kW/ton			
Thermostatic Controls	Automatic setback and shut-off capability for 7 daily schedules/week			
Demand Control Ventilation	Required in all spaces > 500 sf with average occupancy > 40 persons/1000 sf			
Energy (Heat) Recovery Ventilation	All fans $\geq$ 5,000 CFM and $\geq$ 70% outside air supply			
Economizers	Required in all cooling systems $\geq$ 54 kBtu			
Interior Lighting Controls	Dual switching to reduce connected load by 50% or occupancy sensors			
Interior Lighting Controls	Automatic shut-off via time clock, EMS, or occupancy sensors			
Interior Lighting Power Density	Office 1.0 Watt/sf Retail 1.5 Watt/sf School/University 1.2 Watt/sf			
Exterior Lighting Control	Motion sensor or time clock			

\* Some specifications for shell elements change depending on climate zone. Consult IECC 2009 for correct values.

**Residential Code Compliance**

Component	IECC 2009 Specification	46. Compliance Improved	47a. Pre-Program Compliance Rate	47b. Current Compliance Rate
Ceiling Insulation	CZ 1-3 R-30 CZ 4-5 R-38 CZ 6-8 R-49			
Wall Insulation	CZ 1-4 except Marine R-13 CZ 4 Marine-6 R-20 CZ 7-8 R-21			
Floor Insulation	CZ 1-2 R-13 CZ 3-4 except Marine R-19 CZ 4 Marine - 6 R-30 CZ 7-8 R-38			
Basement Insulation	CZ 1-2 0 CZ 3 R-5 Sheathing or R-13 Cavity Fill CZ 4 Marine - 6 R-10/R-13 CZ 7-8 R-15/R-19			
Slab Insulation	CZ 1-3 0 CZ 4-5 R-10 to 2 ft depth CZ 6-8 R-10 to 4 ft depth			
Fenestration U Factor	CZ 1 1.20 CZ 2 0.65 CZ 3 0.50 CZ 4 – 8 0.35			
Air Leakage	Tested – maximum 7 air changes/hr at 33.5 psf (50 pascals) or detailed visual inspection by independent inspector			
Duct Insulation	R-8 for all supply ducts in attic; others R-6			
Duct leakage	Rough-in and post construction testing of all ducts in non-conditioned areas. Maximum 8 cfm leakage per 100 sf of conditioned space			
Mechanical Ventilation	Automatic or gravity dampers on all outdoor air intakes and exhausts			
Heating & Cooling System Sizing	Per Manual J or International Residential Code			
Interior Lighting	50% of lamps in permanent fixtures must be high efficacy (Fluorescent, CFL, LED)			

**THESE QUESTIONS ARE TO BE ADDRESSED TO ALL A/E AND CONSTRUCTION FIRMS IN THE SAMPLE**

63. Based on your experience, would you say that builders' and architects' awareness of the energy efficiency requirements of the building code has increased, decreased, or stayed about the same since [YEAR PRIOR TO PROGRAM YEAR]?
- a. Increased
  - b. Decreased
  - c. Stayed about the same
  - d. DK/REF

64. What observations lead you to conclude that?

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65. Would you say that the level of voluntary compliance with the energy efficiency aspects the building codes among builders and architects has increased, decreased, or stayed about the same since [YEAR PRIOR TO THE PROGRAM YEAR]?
- a. Increased
  - b. Decreased
  - c. Stayed about the same
  - d. DK/REF

66. What observations lead you to conclude that?

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67. IF 65 = a OR b ASK: What factors do you believe have led to changes in voluntary levels of compliance with energy efficiency aspects of the building codes?

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68. **IF RESPONDENT FIRM DID NOT PARTICIPATE IN TRAINING PROGRAMS, ASK:** Are you aware of efforts by the state energy office to inform and train builders and architects concerning building code requirements and compliance strategies?
- a. Yes
  - b. No

69. IF 68 = YES: Compared to other factors affecting levels of code compliance, would you say these education efforts have had less, more, or about the same level of influence in changes in compliance rate?

- a. Less
- b. More
- c. About the same
- d. DK/REF

Thank you for your time and insights