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Codes and Standards Compliance Improvement Program Years 2013-14 Process Evaluation Final Report

California Public Utilities Commission

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1 EXECUTIVE SUMMARY

1.1 Introduction and research approach

The California Public Utilities Commission (CPUC) Codes and Standards (C&S) Compliance Improvement (CI) program aims to save energy on behalf of ratepayers by influencing continuous improvements in energy efficiency regulations, improving compliance with existing codes and standards, and working with local governments to develop ordinances that exceed statewide minimum requirements.

In program year (PY) 2013-14, for the first time the CPUC authorized two implementers to deliver programs aimed at supporting and improving energy code compliance: the California Investor-Owned Utilities (IOUs) and the Bay Area Regional Energy Network (BayREN). The primary goal of each CI program implementer is to help bridge the gap from the efficiency policy to successful, on-the-ground compliance.

1.1.1 IOU codes and standards CI program

In PY 2011-12, the IOU CI program team worked with building departments across California to learn about common barriers to energy code compliance and identify best practices in energy code enforcement. The majority of barriers identified were related to inadequate training and inefficient compliance documentation. The IOU CI team recognized that the energy code increased the workload of already resource-constrained building departments. In PY 2013-14, the IOU CI team developed ideas aimed at improving training, improving documentation, and developing tools that could help building department members work more efficiently. All of the IOU program offerings are branded under Energy Code Ace (ECA). The brand is statewide, providing cohesive messaging across utility territories and jurisdictions. The primary IOU CI program offerings included:

- Improved and expanded C&S trainings under ECA
- Developed the ECA website to serve as a "one-stop-shop" for California energy code resources (energycodeace.com)
- Assembled a toolkit to provide resources to building departments and building industry members

1.1.2 BayREN codes and standards CI program

The BayREN is a collaboration of nine counties in the Bay Area that implements regional energy programs. The counties making up the BayREN account for approximately 20% of California's population. BayREN developed its CI program to ensure Bay Area building upgrades comply with existing energy efficiency codes and to provide support to Bay Area local governments implementing "reach codes" to increase energy savings. The BayREN CI program had three primary components:

- Developed C&S trainings for Bay Area building departments and forums for all Bay Area energy code stakeholders
- Developed tools to help Bay Area building departments work more efficiently and effectively
- Worked closely with 15 Bay Area building departments under the Permit Resource Opportunity Program (PROP)

Through the BayREN PROP, BayREN's energy code experts conducted visits to building departments to learn about energy code enforcement barriers and challenges, identify successful enforcement strategies, and gather data about the impact of discrepancies found between as-permitted buildings and as installed energy

features on building performance. Each jurisdiction received a unique, detailed report outlining strengths and challenges with recommendations on how to improve compliance within their jurisdiction. The BayREN also provided a final aggregate PROP report, which documents findings, recommendations, and best practices to help local Bay Area jurisdictions enhance their enforcement of the energy code.

1.1.3 Research approach

The primary objectives of this evaluation are to determine if the compliance improvement (CI) program activities address known barriers to energy code compliance, if CI program participants found value in the program offerings, and which of the CI program components are effective in changing behavior and effecting compliance.

The research had four main evaluation tasks to meet the objectives: an in-depth document review, framing or preliminary telephone interviews with program participants, a participant web survey, and follow-up telephone interviews with program participants.

During the document review, we reviewed attendance records, reports, training materials, budgets, and white papers. We identified the key market actors and key program activities for the CI programs offered by both the IOUs and BayREN.

We conducted nine framing, or preliminary, in-depth interviews to refine our understanding of the program activities from a participant point-of-view before soliciting feedback from all the CI program participants. The main goals for the framing interviews were to understand participant exposure to and interaction with different CI program offerings such as trainings and tools, and to understand participants' overall experience. We paid particular attention to learning what, if anything, had changed about how interviewees do their job, what tools they use, and if they are more confident in their ability to enforce or comply with the energy code after their CI program experience.

In order to make generalizable findings, we conducted a web survey of participants of the BayREN and IOU program offerings. All participants of each of the programs were invited to participate in the survey by email, 7,077 in total, and 754 responded for a response rate of 10.7%. We covered similar topics to those of the framing interviews, but also included specific investigation into participant experience, satisfaction, and application of the trainings, tools, and access to information. The survey included modules for key activities (e.g., for type of training and use of tools such as compliance checklists and forms) and collected basic information across professional roles such as program awareness, experience and satisfaction, and market experience.

Finally, we conducted 28 follow-up in depth interviews. These interviews also focused on similar topics, but were customized to probe further on topics such as what drives compliance improvements, and gain a deeper understanding of web survey findings.

1.2 Findings and Recommendations

1.2.1 BayREN and IOU (ECA) Training

Previous IOU and BayREN reporting noted that prior training offerings lacked specifics on the energy code for certain professional roles and that training content was not applicable to many trainees. It was also noted in the reporting that the trainings were not conveniently located and were too long for the targeted market actors to attend. We asked all web survey respondents that had participated in a CI training (n=480)

to rate their satisfaction with these attributes of the trainings and overall on a scale of 1 to 7 where 1 is "not at all satisfied" and 7 is "very satisfied." All of the average ratings were 5.0 or higher, suggesting that the respondents are satisfied with the BayREN and ECA training offerings. Table 1 provides the average satisfaction ratings for these attributes and overall by training type.

Table 1: Satisfaction ratings for CI program trainings

Training Attribute	ECA Online Training (n=172)	ECA/Utility Classroom Training (n=309)	BayREN Forum (n=35)	BayREN Training (n=51)
Convenience	6.0	5.6	5.0	5.5
Length of training	5.7	5.6	5.2	5.3
Level of detail	5.5	5.5	5.1	5.2
Applicability to my area	5.6	5.5	5.4	5.2
Satisfaction overall	5.7	5.6	5.3	5.2

Based on these results, we found that the IOUs and BayREN were successful in addressing the previously identified barriers surrounding energy code trainings. Further, some interview respondents described using what they learned in the trainings to educate others in the building departments, contractors, consumers, and to advise others on projects. Our research indicates that education and training are important for effecting compliance, the IOUs and BayREN should continue to include such activities, with the few modifications noted below, in future programs to improve compliance.

The ECA trainings could benefit from the following modifications:

1. **Provide more focused trainings:** The IOUs, perhaps in conjunction with BayREN, should work to identify areas of the energy code that are most vulnerable to noncompliance. We suggest the IOUs develop focused, targeted, trainings that address these areas of the energy code. Trainings could identify common pitfalls and provide examples of compliant and non-compliant projects. This process of finding vulnerabilities and addressing them with trainings should be continuous. The IOUs and BayREN could develop quarterly surveys and administer them from existing channels of customer contact (e.g. email invitations for web surveys, or surveys during trainings) to help identify areas of noncompliance.

2. **Expand online trainings.** The evaluation team recommends offering more of the ECA training series online, especially the trainings targeted to the building industry professionals, who are less likely to attend classroom training. The IOU CI compliance team should also consider developing short, specific "how-to" trainings or videos for common compliance-related searches.

3. **Improve the reach of the trainings through strategic partnerships.** The IOU CI program should aim to increase its reach with strategic partnerships with building industry stakeholders and further leverage partnerships with local governments. The IOU CI program should encourage partners with audiences across the compliance chain to use, provide links to, and provide updates to, the ECA branded resources. The IOU CI program should make their materials available wherever building department

personnel and building industry members go to find out information about the energy code. The IOU CI program should consider integrating their materials with the California Energy Commission (CEC) website, building department websites, and the California Building Officials (CALBO) website. This is an opportunity to disseminate consistent information on how to interpret energy codes across regions in the state. The IOUs should also consider offering trainings that qualify for Continuing Education Credits (CUE) as a way to further broaden outreach.

The BayREN training series was well received and participants felt that the trainings were distinct from the ECA training offerings. Interview respondents that had experienced trainings from both implementers all agreed that, while some overlap is present, the different perspectives of the two programs make them complementary and not redundant. Specifically, they explained that ECA trainings are broad and comprehensive while the BayREN trainings are short and target specific aspects of the code. We recommend the IOUs and BayREN work together to identify areas of non-compliance and develop trainings that are delivered in both implementer formats to have the largest impact and greatest reach.

The primary objective of the BayREN forums is to disseminate best practices and lessons learned among local Bay Area jurisdictions. While the evaluation found that some forum participants attend forums to learn about best practices, we determined participants found the most value in the networking and did not find any evidence of best practice adoption. We recommend that the BayREN reconsider the forum design to better encourage adoption of best practices and/or to best facilitate networking.

1.2.2 BayREN and ECA Tools

Development of tools was a top recommendation in previous BayREN and IOU reporting on C&S compliance improvement.[1] The ECA and IOU CI programs developed tools to address barriers around the complexity of energy code compliance forms and inefficiencies in compliance documentation. Tools help users with energy code in a variety of ways; from helping permit applicants identifying required compliance forms for projects to helping building plan checkers prioritize their plan review.

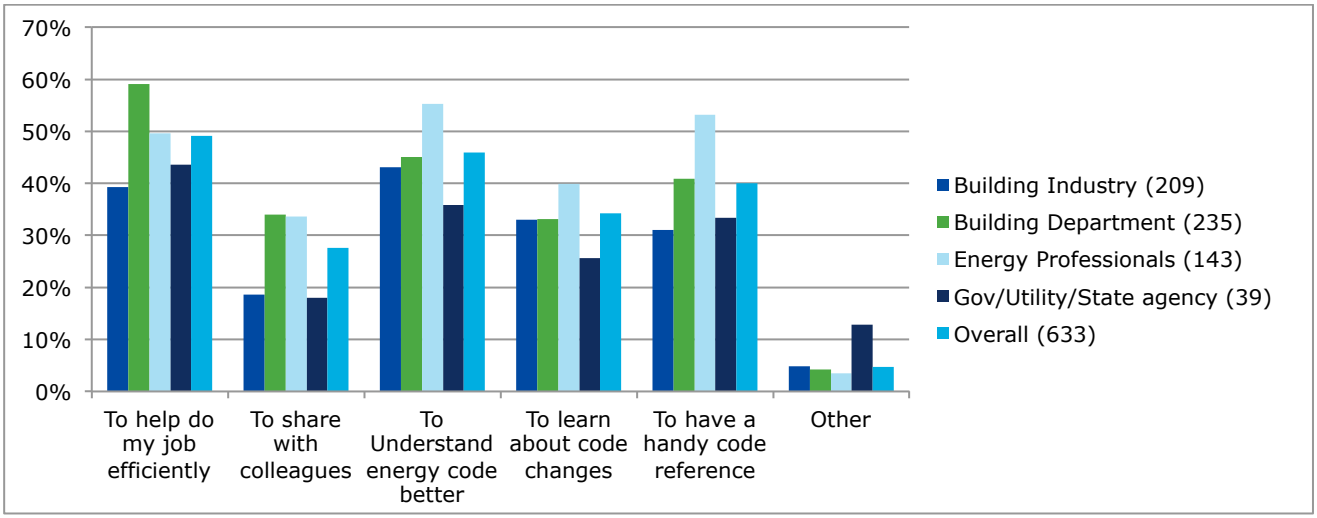
Web survey respondent tool users were asked to identify which of the tools developed by BayREN and IOUs they were aware of. The majority (98%) of web survey respondents indicated they had heard of at least one ECA tool and 19%[2] of respondents had heard of any of BayREN's tools. While a lower percentage of the web survey respondents had heard of the BayREN tools and participated in the trainings, this is due to the more limited geographic scope of the BayREN programming.

The web survey further questioned those that were aware of the tools about why they used them. Almost half (49%) said it was to help do their job efficiently (Figure 1). Building department members were the most likely to indicate that they used the tools for this reason, with nearly 60% responding.

[1] The IOU funded Architectural Energy Corp, *Title 24 Part 6 Best Practices Program Final Report.* San Francisco, CA: December 2012 and the BayREN funded *BayREN Codes & Standards 2013 SURVEY REPORT: Questions, Responses, Findings and Recommendations*. 2013.

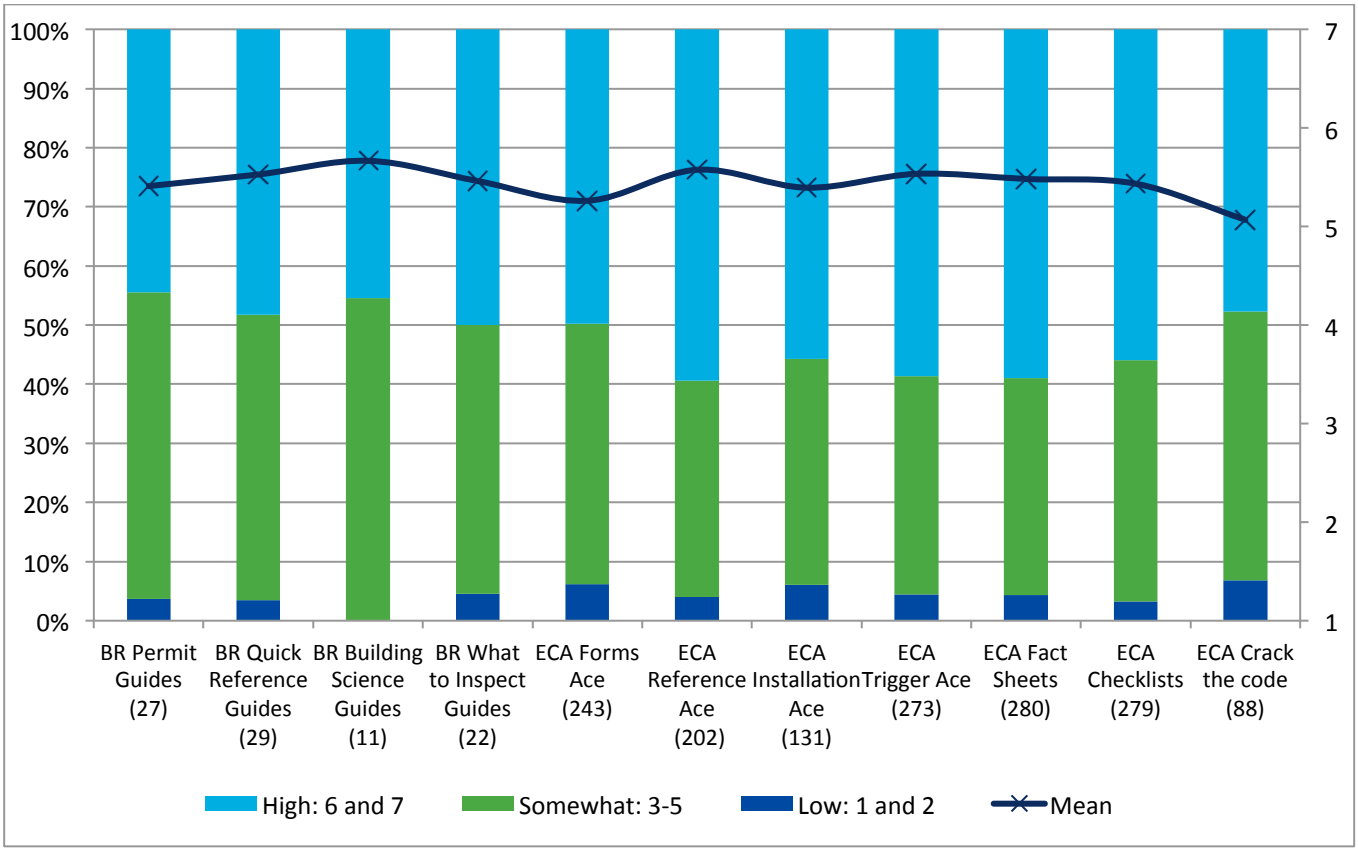
[2] The BayREN program is regional and their programming primarily targets building departments in the Bay Area. The ECA program is statewide and targets all actors in the compliance chain.

Figure 1. Reasons given for why respondents use tools



Similar to trainings, web survey respondents were asked about their overall satisfaction with the tools they indicated using and asked to give a value using the same 1 (Very dissatisfied) to 7 (Very satisfied) scale. The results were very high for tool satisfaction, with all tools scoring average above 5.0. Results are shown in Figure 2.

Figure 2: Satisfaction of BayREN and ECA tools



Follow-up interview respondents rated the ECA tools similarly, averaging 6.2 and indicating broad satisfaction. We asked the respondents who rated the tools to explain the reason behind their rating. One commented:

> *"They are very user-friendly, helpful in explaining certain [complicated] things, [they are] interactive."*

We found that the tools are effective at simplifying complicated energy code compliance requirements.

We recommend that the IOU CI team continues to develop ECA tools. Tools present an opportunity for the IOUs to enable building department members to effectively and consistently communicate code requirements to permit applicants, increase ECA brand awareness, and drive traffic to the ECA website and trainings.

We recommend that going forward, the BayREN CI team collaborates with IOU CI team to develop tools for a more widespread audience than the BayREN tools are currently reaching. The BayREN and IOU CI teams should work together to identify needs of the community and then, develop, implement, and iterate on tools together based on those needs. They should work in close coordination to ensure the tools best serve the audiences and each program can focus on their strengths; the IOU CI program for a statewide, broad reach and the BayREN CI program for engaging with building departments in an ongoing dialogue. We urge BayREN to leverage their partnerships with building departments to encourage them to disseminate tools to help customers comply with energy code. Similar to the IOUs, this is an opportunity for BayREN to enable

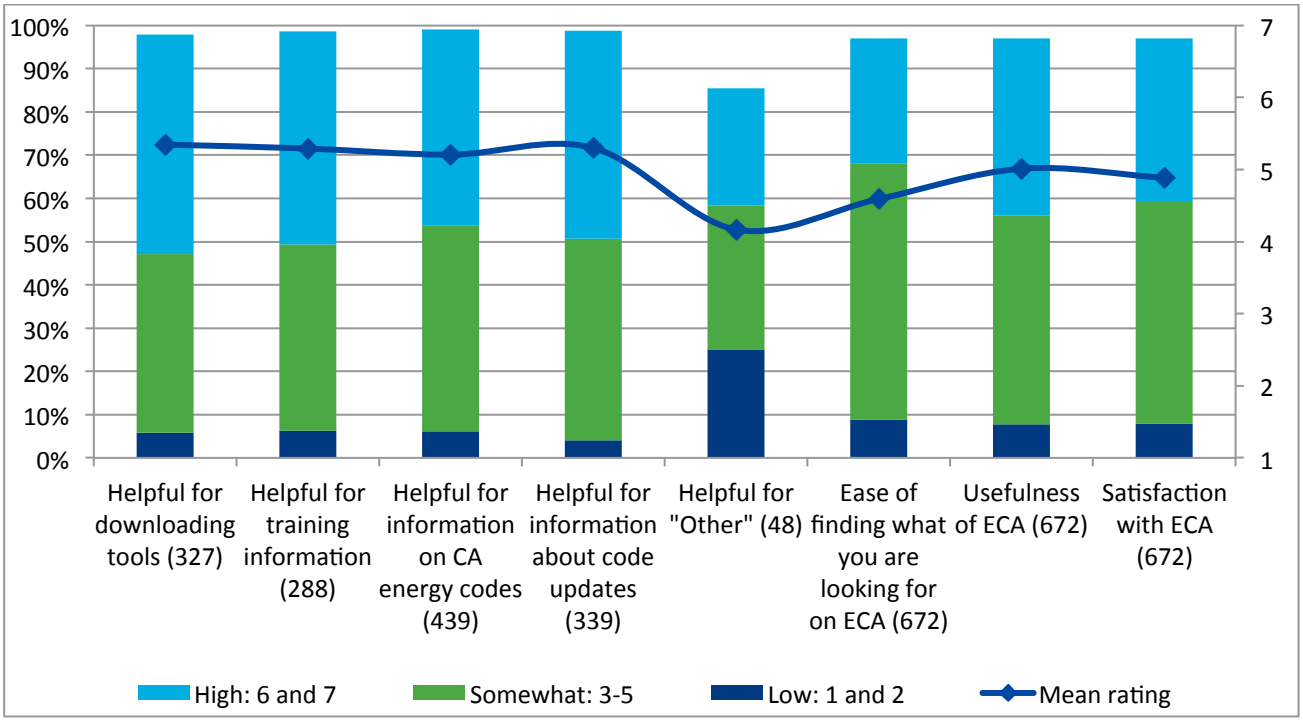
building department members to effectively and consistently communicate code requirements to permit applicants.

1.2.3 ECA Website

Previous reporting indicated that expanding the codes and standards website was an opportunity for the CI program. The ECA website, energycodeace.com, was launched in 2014 and has thousands of registered users.

The web survey included a series of questions about the helpfulness and satisfaction with the ECA website. When asked if the website was helpful for the specific reason the user came to the website, the respondents tended to be pleased with the website, giving a mean rating ranging from 5.2 to 5.4, on a scale of 1 to 7. Respondents found the website most helpful in obtaining tools and training. We also asked web survey respondents to rate, on the same 7-point scale, how easy it was to find what they were looking for, how useful the website was overall, and their overall satisfaction. The ratings to these broader questions were lower, as shown in Figure 3.

Figure 3: Web survey respondent user satisfaction with the ECA website



These responses indicate not only that there is broad satisfaction with the website, but also that there is room for improving the website. We find the ECA website is a go-to destination for finding information and resources for energy code users. However, we recommend that the IOU CI team further explores why and how users are coming to their website and how the organization, content, and function could be improved to best meet user needs.

We recommend three ways to improve user experience and optimize the website for all users:

1. **Improve functionality of the ECA website.** We recommend that the IOUs conduct further qualitative research to explore what design features would meet most users' and potential user's needs.

2. **Improve organization of the ECA website.** We recommend that the IOU CI team further explores why and how users are coming to their website and how the organization could be improved to meet user needs.

3. **Partner and integrate.** Strategic partnerships could expand the reach of ECA by providing links to the ECA website. This could also improve consistency in messaging about energy code requirements statewide.

4. **Track user satisfaction.** We recommend that the ECA periodically ask users for feedback to track user satisfaction, determine user needs, and to determine future updates.

1.2.4 BayREN Permit Resource Opportunity Program

The primary objective of the evaluation of the PROP was to determine if the involvement with PROP changed or improved the approach or process of how jurisdictions enforce the energy code. A number of the interview questions focused on what, if anything had changed about how the building departments do their jobs. Four of the five building officials interviewed indicated their association with BayREN did not have an effect on how they approached energy code compliance. One of the building officials interviewed noted their interaction with BayREN has helped improve how they go about processing energy code paperwork.

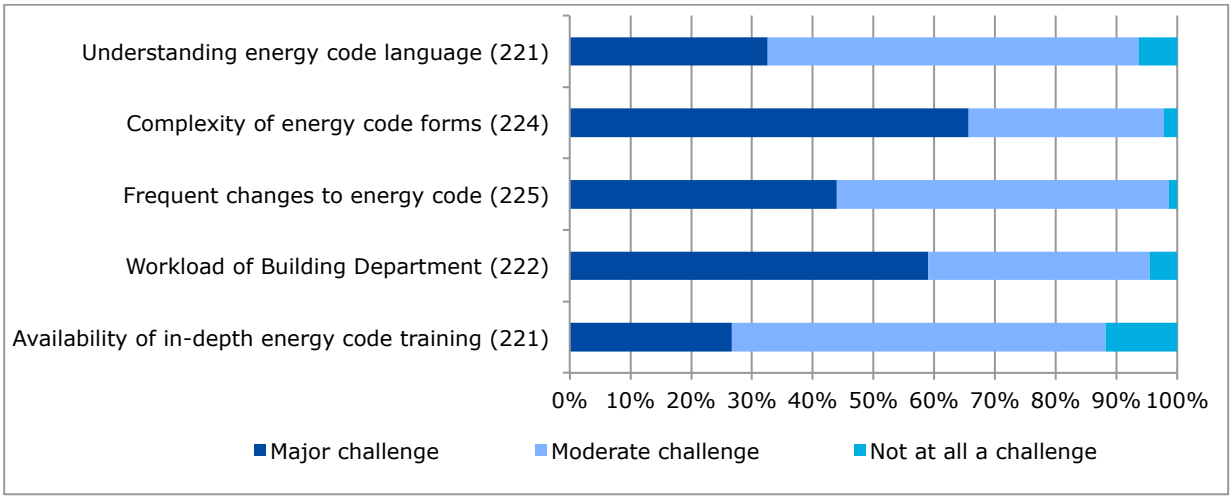
In each individualized report to the participating jurisdictions, BayREN provided three to five recommendations. The building officials we spoke to indicated the impact/usefulness of the BayREN report recommendations was high, but indicated they were mostly activities that they should have been doing. They also conveyed that they did not implement some or all of the recommendations. The jurisdictions were happy to have participated in the program and thought highly of BayREN staff.

We found that the BayREN PROP did identify challenges to complying with the energy code and uncovered discrepancies between code implementation and the code as it is written. However, the evaluators found no evidence that participation in the PROP program changed behavior of the participating jurisdictions. We also found that the program is resource intensive, difficult to scale, and did not appear to have lasting impacts. BayREN should re-evaluate the objectives of the PROP program and determine how to best add value to stakeholders and build on the successes.

1.2.5 Remaining barriers to energy code compliance

We asked web survey respondents who worked in a building department to rate if previously identified challenges were a major challenge, moderate challenge (somewhat a challenge, or slight challenge), or not a challenge at all. Results are given in Figure 4.

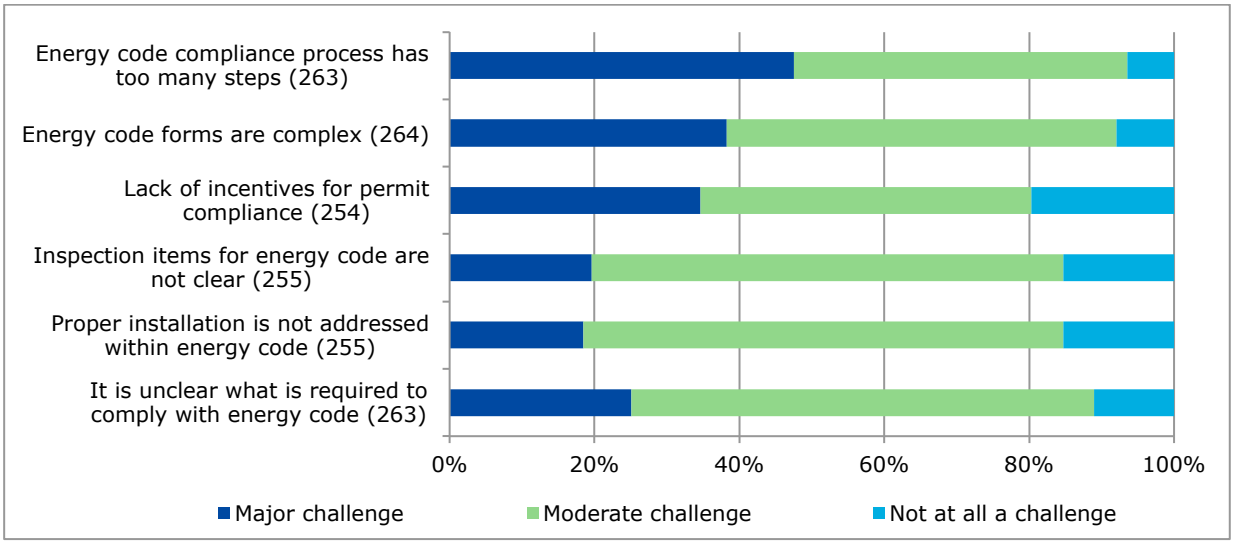
Figure 4: Building department remaining barriers to energy code compliance



The majority of building department web survey respondents indicated that complexity of forms was still a major challenge (66%) as is the workload of the building department (59%). Only 27% indicated that the availability of in-depth energy code training was a barrier.

These building industry respondents were asked a similar line of questioning about challenges in complying with the energy code. The results are shown in Figure 5.

Figure 5: Building industry remaining barriers to energy compliance



Building industry professionals indicated that a remaining barrier to energy code compliance is that the compliance process has too many steps, with 94% indicating that it was at least a moderate challenge. Complex energy compliance forms and uncertainty about energy code requirements were also seen as at least a moderate barrier to 92% and 89% of building industry web survey respondents, respectively.

2 INTRODUCTION

The California Public Utilities Commission (CPUC) Codes and Standards (C&S) Compliance Improvement (CI) program aims to save energy on behalf of ratepayers by influencing continuous improvements in energy efficiency regulations, improving compliance with existing codes and standards, and working with local governments to develop ordinances that exceed statewide minimum requirements.

In program year (PY) 2013-14, for the first time CPUC authorized two implementers to deliver programs aimed at supporting and improving compliance: the California investor owned utilities (IOUs) and the Bay Area Regional Energy Network (BayREN). Prior to that, only the IOUs had been delivering codes and standards related programs. The BayREN program first received funding in 2013 and now actively implements a number of programs in the nine counties that make up the San Francisco Bay Area.

The primary goal of each CI program implementer is to help bridge the gap from the efficiency policy to successful, on-the-ground compliance. BayREN and the IOUs partnered with building departments and collected primary data to identify existing code enforcement processes, best practices, gaps in enforcement, barriers to compliance, and needs of the building departments and community. They then developed programs to overcome challenges and meet needs. The approaches of each implementer are further described in Section 2.1.

It is important to note that during PY 2013-14, there was a change in the Title 24 Part 6 (the California state energy code, or energy code) itself. Effective July 1, 2014, all jurisdictions began enforcing the 2013 version of the building code. All previously developed tools, trainings, and resources had to be updated to reflect these changes. While this was a considerable burden to program implementers, this evaluation is code-year agnostic.

2.1 Program descriptions

2.1.1 IOU codes and standards CI program

In PY 2011-12, the IOU CI program team worked with building departments across California to learn about common barriers to energy code compliance and identify best practices in energy code enforcement, which was published in a Best Practice Report.[3] The majority of barriers identified were related to inadequate training and inefficient compliance documentation. The IOU CI team recognized that the new energy code increased the workload of already resource-constrained building departments. Subsequently, the IOU CI team developed ideas aimed at improving training, documentation, and tools that could help building department members work more efficiently.

In PY 2013-14, the IOU CI team continued the work to bridge the gaps documented in the previous cycle Best Practice Report and expand on the ideas. Per the PY 2013-14 IOU program implementation plan (PIP) and included logic model, the IOU CI program focused on two main areas; infrastructure support and education and training. All of the IOU program offerings are branded under Energy Code Ace (ECA). The brand is statewide, providing cohesive messaging across utility territories and jurisdictions.

[3] Architectural Energy Corp, *Title 24 Part 6 Best Practices Program Final Report.* San Francisco, CA: December 2012.

2.1.1.1 Outreach and Infrastructure support

The IOU CI program, per the CPUC's directive, created a communication plan to improve awareness of codes and standards and the IOU CI program resources. The communication plan outlined the following strategies:

- Build and brand the IOU CI program as a trusted and welcoming source of information (via tools, trainings, and resources that is helpful and easy to find and understand.
- Engage industry "evangelists" to help spread the word
- Leverage the energy code update to drive market actors to the CI program tools, trainings, and resources
- Foster and leverage existing industry and building department relationships and communication channels
- Collaborate with government agencies and complementary IOU departments and programs
- Build relationships with big box stores, trade industry associations, professional organizations, and trade unions
- Seek out speaking opportunities for IOU CI program team members
- Engage Compliance Improvement Advisory Group (CIAG) to identify how CI program tools are used in the field
- Seek out and highlight organizations and individuals who have benefited from CI program influence and/or those that are following the permitting process.

To support code infrastructure and outreach, the IOU CI team took a number of actions based on the communication plan and needs assessment. The primary activities included:

- Developed the ECA brand and website to serve as a primary outreach channel and "one-stop-shop" for all things energy code (energycodeace.com)
- Assembled a toolkit to provide resources to building departments and building industry members
- Convened and participated in the Compliance Improvement Advisory Group (CIAG)
- Helped to launch the Certified Energy Analyst (CEA) credential

The ECA website was launched in March 2014 and serves as a one-stop-shop for IOU-generated energy code content and other energy-code relevant information. It is now a key educational portal where visitors can download ECA tools, find information on upcoming classroom and online trainings, participate in online trainings, and complete self-study trainings. Users can register to receive email updates on the energy code, trainings and other energy code resources, and can save their projects online. The site received over 190,000 page views in the first 10 months of operation and had over 3,000 registered users by the close of 2015.

The IOU CI program team assembled, piloted, and refined a toolkit to help building departments, contractors, and other building professionals navigate the energy code compliance process and forms required to comply with code. As with all the IOU CI program team offerings, the current suite of tools is branded as Energy Code Ace and includes online electronic forms, 15 checklists, eight code-trigger sheets, an online code look-up reference, and other resources. The tools in the ECA toolkit and their page views and downloads during the program cycle are summarized in Table 2.

Table 2. ECA website and tool descriptions

ECA Tool	Description	Number of titles	PY 2013-14 Page Views	PY 2013-14 Downloads /Uses
Forms Ace	Determines which compliance forms are needed based on project scope, provides online forms	1	11,686	4,891
Reference Ace	Allows you to navigate the energy codes and standards electronically	1	7,047	5,013
Installation Ace	Show pictures of correct energy code installations	31	4,589	2,694
Trigger Sheets	Indicate which energy code sections are applicable based on scope	8	No data	12,121
Fact Sheets	Summarize technical requirements and references	9	No data	9,517
Checklists	Lead plans examiners and building inspectors through energy code compliance checks	15	No data	13,667
Crack the Code	Training package that can be used to conduct technical training	1	2,844	234

The CI program team also convened and participates in the CIAG, a stakeholder group with roughly 30 members who represent all major market actors in compliance with the energy code. CIAG meets quarterly to identify and discuss current compliance issues, provide a "boots on the ground" perspective of current issues, and serve as a vehicle to assess ongoing needs and identify potential solutions. They document their discussions and assessments in the form of white papers. White paper topics to date are listed below:

- Code Simplification via use of Dynamic Forms
- Alternatives within Prescriptive Approach
- Creating Incentives for Contractors to Comply
- Identify Compliance Issues in the 2013 Energy Code
- Preparing Industry for New Standards
- Tracking Sales and Permit Volume
- Help Consumers Realize the Value of Compliance
- Standardize Over-the-Counter Building Permit Requirements
- Increasing Contractor Participation in Accreditation Programs
- Help the Design and Construction Industries Comply with the Standards
- Contractor Self-Certification
- How Professional Engineers and Commissioning Agents Will Affect the Compliance Process

- What Can Be Done to Reduce the Transactional Cost of Energy Code Compliance?
- Simplifying the Code
- What Needs to Change for the Energy Standards to Better Address the Existing Building Market and the Constraints of Working within an Existing Building?

Additionally, in collaboration with the California Association of Building Energy Consultants (CABEC), the CI program team helped to launch the Certified Energy Analyst (CEA) credential, a professional certification for those who assist the building industry in meeting and exceeding energy codes and standards. The CI program supported the beta CEA residential and nonresidential examinations to test and certify applicants and facilitated the roll out of the new certification process.

2.1.1.2 Education and training

During PY 2013-14, the IOUs expanded their previous training offerings and branded all of their trainings and materials under the ECA brand. They also organized the trainings into a series that includes both role- and project-based offerings. The expanded and updated (to 2013 energy code) trainings are known as the Energy Code Ace Title 24 Part 6 Standards Essential trainings. Current role-based titles in the series include Residential and Nonresidential Title 24 Part 6 Essentials for Plans Examiners and Building Inspectors, Energy Consultants, and Air Conditioning Quality Installation Contractors. Current project-based titles include Title 24 Part 6 Essentials for Retail Lighting, Residential Lighting, and Office Lighting. Due to the increased reliance of the 2013 energy code on building models, the IOUs also offer modeling trainings and training on compliance software programs such as EnergyPro, CBECC-Com and IES-VE.

Further, the IOUs expanded training delivery mechanisms beyond the traditional classroom and created a variety of ECA online training experiences:

- ECA Decoding Talks: Interactive, facilitated online discussion forums for building department personnel and other industry professionals
- ECA Virtual Classroom: Interactive, live facilitated online version of the Title 24 Part 6 Essentials courses

ECA Online Self-Study: On demand, self-directed version of the Title 24 Part 6 Essentials courses Table 3 shows the participation in training course through August 2015 (those who were eligible to provide feedback for this evaluation) for both ECA classroom and online trainings and website users.

Table 3. IOU ECA trainings and Website participation

	Number of participants
ECA Classroom Trainings	4,215
ECA Online Trainings	884
ECA Website Registered Users	3,341
Average Number of Unique Visitor Sessions per day PY 2013-14	611

2.1.2 BayREN codes and standards CI program

In CPUC Decision 12-05-015, the Commission recognized that BayREN was in a unique position to leverage existing local government partnerships to help influence adoption and enforcement of local codes and standards. BayREN developed its C&S CI program to ensure building upgrades comply with existing energy efficiency codes and to provide support to local governments implementing "reach codes" to increase energy savings. Per the BayREN PIP and accompanying logic model, the BayREN CI program had three primary components: education and training, enforcement of existing energy code, and sharing best practices for reach codes. The existing energy code enforcement component originally aimed to establish an energy code compliance baseline and to create metrics for ongoing measurement of energy code compliance within each BayREN county. The enforcement component scope was later changed to the Permit Resource Opportunity Program (PROP) and is described in Section 2.1.2.2.

2.1.2.1 Education and training

The BayREN CI program team developed trainings to educate building officials in key aspects of code compliance and enforcement. The trainings were designed for functional roles of building department staff and to be more accessible and convenient than prior utility offerings by offering them onsite in a short-duration format. BayREN trainings were also offered as a series and they were designed to be modular. Each training topic offered a 60-minute brown and two two-hour workshops option. Each module could be scheduled separately; alternatively two workshop modules could be combined into a half-day workshop. Each module addressed a specific energy-code compliance strategy or best practice. Training topics included energy code compliance in low-rise new construction, forms and permit submittals for residential additions, compliance for residential and nonresidential envelopes, compliance for nonresidential mechanical systems, and compliance of nonresidential lighting. Since inception in 2013, BayREN held a total of 63 training sessions for a total of 396 trainees through August 2015 (eligible to provide feedback for this evaluation). The training targets in the PIP for this program were 71 total trainings with a total of 1,650 participants.

BayREN also developed tools to aid building departments in enforcing the energy code. The tools help building department processes and align local official interpretation of state codes. The BayREN tools are summarized below:

- BayREN Permit Guides: Presents key requirements for permit applicants with projects that do not require plan check
- BayREN Quick Reference Guides: Summarizes required efficiency minimums for building inspector and contractor use in the field
- BayREN Building Science Guides: Details building science principles for specific energy code requirements
- BayREN What to Inspect Guides: Highlights sections of Compliance Forms that will have the most significant impact on compliance and energy use

2.1.2.2 Permit resource opportunity program

As noted earlier, BayREN changed the scope of the original enforcement component to the Permit Resource Opportunity Program (PROP). Under the program, BayREN collaborated with 15 Bay Area building departments and conducted visits to each building department, interviewed building department staff, and performed onsite inspections of permitted projects with participating building departments. During the visits,

BayREN inquired about energy code enforcement barriers and challenges, gathered data on the impact of discrepancies between energy code and building energy performance, and identified successful energy code enforcement strategies.

The BayREN CI program team presented participating building departments with findings from their PROP visit in summary reports unique to their jurisdictions. The reports included recommendations and resources that each building department could use to enhance energy code compliance. BayREN also produced a report summarizing their findings in aggregate to inform chief building officials and other stakeholders across the Bay Area region of the findings.[4] The report included data on discrepancies between energy code compliance documentation and actual buildings and the BayREN findings on common errors and pitfalls in the energy code compliance process. The CI team made recommendations for improving processes to improve energy code enforcement.

2.1.2.3 Policy support and advocacy

The BayREN CI team developed a public-agency quarterly forum for sharing tools, best practices, lessons learned, and resources for energy code compliance stakeholders in the Bay Area region. The forums were held throughout the Bay Area and addressed the basics of energy code compliance and enforcement. The forums were directed to a wide audience including contractors, local government officials, building department members, and outside stakeholders such as the California Energy Commission (CEC) and the California Building Officials (CALBO). Per the BayREN PIP, a key aspect of the forums was peer-to-peer training and professional exchange among building department and local government staff. The PIP explains that through these exchanges, peers could leverage and adopt work of leading departments throughout the region. Jurisdictions could learn from and help one another align the interpretation of current codes and to adopt new practices and innovative new policies such as energy labeling and reach codes. The PY 2013-14 forum topics are listed in Table 4 along with the attendance of each forum.

Table 4. PY 2013-14 BayREN forum key topics and number of attendees

Forum Date	Forum Title	Key Topics	Number of Attendees
1/2014	Energy Efficiency Policy and Climate Action Plan	Links between energy codes and standards enforcement and local climate action planning; using code enhancement strategies to achieve greenhouse gas emissions reduction; and Leveraging BayREN resources for local benefit	56
3/2014	Benchmarking Ordinances and Programs	Financial benefits and cost considerations of benchmarking to the private sector; understanding policy drivers and which policy options might work best in your jurisdiction; and tools and resources available for benchmarking	42
6/2014	Regional Best Practices in Green Building	Legislative updates on green buildings and energy efficiency; role of local governments in municipal green building policies and their accomplishments to date; what are zero net energy buildings, and policies and regulations that influence their design	62

[4] https://www.bayren.org/sites/default/files/BayREN_CS_PROP_Final_Report_2015_0401.pdf

Forum Date	Forum Title	Key Topics	Number of Attendees
7/2014	The Water-Energy Nexus: Strategies for Local Action	Programs and technologies that help consumers reduce their water and water heating use; how local governments can leverage these programs to help reach their climate action plan goals; and innovations water utilities can adopt to address the drought in cost-effective ways	67
9/2014	CEC Guidance in Energy Code Interpretations	Frequently asked questions and answers received by the CEC Energy Code Hotline; Q&A with CEC staff on compliance energy code interpretation; Common compliance issues code enforcement agencies are encountering; and additional resources for assistance and how to participate in the process of new code development	43
11/2014	Local Government Resources for Energy Efficiency	How local governments can increase compliance and enforcement effectiveness; review and consider successful policies in green building, electric vehicle infrastructure, renewable energy, energy efficiency finance, water efficiency, and more; sustainability best practices and policy frameworks for local action; and Bay Area climate leaders share the benefits and challenges of implementing climate and energy policies	66

3 METHODS

3.1 Objectives of the program evaluation

The primary objectives of this evaluation are to determine: do the CI program activities address known barriers to energy code compliance; do CI program participants find value in the program offerings; which CI program components are effective in changing behavior and effecting compliance; and, are the IOU and BayREN program activities complementary or duplicative.

3.2 Research approach

To establish a research approach to meet the objectives, DNV GL first reviewed PIPs and conducted short interviews with staff of both the IOUs and BayREN CI programs. The interviews allowed us to better understand the program scope and activities. Then we conducted an in-depth review of program materials including program tracking files, websites, training materials and guides, tools and resources, program reports, and other literature. From this review, we identified the key market actors involved in delivering the codes and standards program activities offered by both the IOUs and BayREN for improving C&S compliance. Through the document review and interviews, we validated if the activities were still consistent with those documented in the PIPs. We found that most of the activities in PY 2013-14 were consistent with the PIPs. Activities not necessarily consistent with the PIPs were identified and/or clarified via the program staff interviews.

The research approach had four main evaluation tasks: the aforementioned document review, framing interviews, web survey, and follow-up interviews. Table 5 summarizes the range of activities identified and includes, at a high-level, the proposed evaluation approach and target population. The following sections provide a more detailed discussion of each method in the evaluation research.

Table 5. Program activities and evaluation approach

Program Implementer	Program Activities	Data Collection Method	Target Population
IOU	ECA Classroom Title 24 Standards Essentials trainings	Framing interviews Web survey Follow-up interviews	Building industry, energy professionals, and building department
	ECA Online Compliance Training	Web survey	Building industry, energy professionals, and building department
	ECA Tools	Framing interviews Web survey Follow-up interviews	Building industry, energy professionals, and building department
	Best Practices	Framing interviews Web survey	Building department
	CIAG	Document review, web survey, follow-up interviews	Building industry, energy professionals, and building department

Program Implementer	Program Activities	Data Collection Method	Target Population
	CEA exam development, facilitation support, and maintenance	Web survey Follow-up interviews	Building industry, energy professionals, and building department
BayREN	Permit Resource Opportunity Program	Framing interview Follow-up interviews	Building department
	BayREN trainings	Framing interviews Web survey Follow-up interviews	Building department
	BayREN tools	Framing interviews Web survey Follow-up interviews	Building department
	BayREN forums	Framing interviews Web survey Follow-up interviews	Building industry, energy professionals, and building department

3.2.1 Document review

The document review identified important program activities and characteristics and guided the development of data collection tools and subsequent analysis and reporting. Key documents we reviewed include:

- BayREN and IOU program implementation plans
- CIAG white papers
- IOU best practices reports
- Training and forum attendance records
- Training and forum pre/post surveys
- Training handouts, slides, and activities
- BayREN PROP reports
- BayREN and ECA website materials
- BayREN and ECA user records
- IOU plan for compliance improvement communication campaign
- ECA and BayREN compliance reports
- BayREN and IOU program budgets
- BayREN C&S Survey Report

Table 6 presents the data collected by stakeholder group and research topics.

Table 6. Document review research topics by stakeholder group

Survey and Interview Research Topics	Stakeholder Group			
	Building Department	Energy Professionals	Building Industry	Staff and Stakeholders
Awareness, knowledge, perceptions				
Best practices	X	X	X	

Survey and Interview Research Topics	Stakeholder Group			
	Building Department	Energy Professionals	Building Industry	Staff and Stakeholders
Trainings offerings	X	X	X	
Tools and Resources	X	X	X	
Building code and ability to comply	X	X	X	
Energy Code Ace brand	X	X	X	
Compliance Challenges	X	X	X	X
Program Influence				
BayREN offerings	X	X	X	X
IOU offerings	X	X	X	X

The goals, instrument development, and implementation for the framing interviews, web survey, and the follow-up interviews are discussed in more detail next.

3.2.2 Framing interviews

We conducted nine (of twelve targeted) framing, or preliminary, interviews to refine our understanding of the program activities from a participant and implementer point-of-view before soliciting feedback from all the CI program participants. The in-depth framing interviews included interview questions that were tailored to different stakeholders. In this stage we found building department members difficult to reach with limited time available and we aimed to keep the interviews less than 30 minutes. The main goals for the framing interviews were to understand participant exposure to different codes and standards program offerings such as trainings and tools, and find out where, if at all, the program activities overlapped, and to understand participants' overall experience. We paid particular attention to learning what, if anything, had changed about how interviewees do their job, what tools they use, and if they are more confident in their ability to enforce the code after their CI program experience. The framing interviews included questions addressing each of the topics listed previously in Table 6.

We analyzed the interviews according to the research goals. We looked for convergence of themes, which are those that are common across different groups, as well as divergent themes and observations that highlight individual and distinctive experiences related to the codes and standards. The interviews provided important data on the experience of different stakeholders in the codes and standards compliance chain. While the framing interviews yielded useful information, since the sample size was small (n=9, including all different groups) the responses were not necessarily generalizable to the larger market. In order to collect, generalizable findings, DNV GL conducted the web survey of participants.

Table 7 shows the interview stakeholders we targeted and the actual sample size.

Table 7. Framing interview sample size

Program role or participation	Target	Complete	BayREN	IOU
Implementer	2	2	1	1
PROP Jurisdiction	2	1	1	

Program role or participation	Target	Complete	BayREN	IOU
Forum	2	2	2	
Best Practice Jurisdiction	2	1		1
BayREN Training/Tools	2	1	1	
IOU Training/Tools	2	2		2
Totals	12	9	5	4

3.2.3 Web survey

DNV GL developed and implemented a web survey of participants of the BayREN and IOU program offerings. It covered similar topics to those of the interviews, but also included specific investigation into different participant experience, satisfaction, and application of the trainings, tools, and access to information. The primary data source for developing the online survey was the data collected during the framing interviews; other sources included the research plan for the program evaluation, the IOU Best Practice feedback survey, participant feedback forms, and the BayREN survey report.

We worked with the CPUC and BayREN and IOU CI teams to ensure that our survey instrument correctly targeted the program information needs. The survey included modules for key activities (e.g., for type of training and use of tools such as compliance checklists and forms) and collected basic information across stakeholders on program awareness, experience and satisfaction, and market experience. The web survey topics are summarized in

Table 8. Due to our finding during the framing interview phase that building department members have limited time available, we aimed to keep the survey short. The survey lasted approximately 10 minutes, depending on how many modules the respondent competed.

Table 8. Summary of web survey topics

Survey Topics		Key Activity			Professional Role	
		Website	Tools	Training	Building Department	Building Industry or Energy Professional
Awareness	Source of information	X	X	X		
	Use	X	X			
	Expectations	X	X			
Experience and Satisfaction	Satisfaction/usefulness/value	X	X	X		
	Tools downloaded		X			
	Reason for downloading		X			

	Reason for attending			X		
	Behavior change effectiveness	X	X	X		
	Suggestions for improvement	X	X	X		
Market Experience	CEA awareness/value				X	X
	Helpfulness of suggested changes				X	X
	PROP/Best Practice report				X	X
	Categorical rating of challenges to building industry				X	X

We used our in-house web tool to field the survey. To maximize the response to the web survey, we worked with the IOU and BayREN CI program teams to identify who should send the email invitation for each type of program participant. For example, forum participants received an email from "BayREN Codes & Standards Team," the same email that BayREN uses to communicate information about forums, trainings, and tools. The evaluators and program teams also worked closely to field questions and comments, and to encourage participation. After the initial invitation to participate, program participants received up to three reminders. The survey data collection period was three weeks.

In total, across all program components from both entities, more than 7,000 invitations were sent to BayREN forum and training participants, IOU ECA trainings participants, and ECA website registered users. Many participants overlapped across program components and entities. DNV GL ensured that each participant was only invited to participate once, if a participant was on the BayREN forum list, they were removed from all other invitation lists. The survey used screening questions and skip logic to guide the respondents to the appropriate questions given their program experience. The total number of participants and web survey invitations are given in Table 9.

Table 9. Program participation and web survey invitations

	Number of Participants	Web Survey Invitations
BayREN Forums	373	373
BayREN Training	369	353
ECA Website Registered Users	3,341	3,257
ECA Classroom (4,215) and Online (884) Training	5,099	3,094
Total		7,077

3.2.4 Web Survey Response

The response to the web survey was strong, with over 750 completed surveys, and a response rate of 10.7%, far exceeding expectations. This can be an indication of high self-interest in the programs, meaning the programs are connecting with users.

The web survey respondents said they interacted with the ECA and BayREN CI programs as shown in Table 10. The majority of respondents (89%) had been to the ECA website and 82% used at least one ECA tool. In contrast, only 16% had used at least one BayREN tool and only 11% had been to a BayREN forum or training. While more people had interacted with the ECA program, the BayREN program is limited to nine counties in the San Francisco Bay Area while the ECA program is statewide.

Table 10. Web survey response rates on ECA and BayREN interactions

Survey Question	% Answering Yes
Have been to the ECA website	89%
Used at least one BayREN tool	16%
Used at least one ECA tool	82%
Attended at least one BayREN forum or training	11%
Attended at least one ECA or training	58%

The web survey asked each respondent for a job role and title. For analysis and reporting, the web survey respondents were divided into five job categories based on their responses and their professional relationship to the energy code and permitting (

Table 11).

Table 11. Job categories used in this analysis and reporting

Job Category	Roles and Titles
Building Department Staff	Responsible for enforcing the energy code in some capacity. Job titles include permit technician, building inspector, plan examiner, and building official.
Government/Utility Staff	Local government officials, state agency employees, utility employees
Building Professionals	Responsible for complying with the energy code in some capacity. Job titles include contractor, architect, electrician, and designer.
Energy Professionals	Responsible for understanding the code. Job titles include energy consultant, sustainability manager, and ESCO employee.
Other	Home owners, energy product manufacturers, other interested parties

The web survey received strong responses from both CI program participants and across all job categories. More than one-third identified as building department staff (35%) and another one-third identified as building professionals (36%) as shown in Table 12. Nearly all (97%) of respondents had interacted with the ECA in some way, with training, tools, or website, and more than one-fifth had interacted with the BayREN program (21%).

Table 12. Response to BayREN and IOU interaction by job category

Job Category	Total (n=754)	BayREN Training and/or Tools	ECA Training and/or Tools	Website only
Building Professionals	36%	5%	31%	5%

Job Category	Total (n=754)	BayREN Training and/or Tools	ECA Training and/or Tools	Website only
Building Department Staff	35%	9%	33%	1%
Energy Professionals	21%	5%	19%	1%
Government/Utility Staff	6%	1%	5%	0%
Other	1%	0%	1%	0%
Total	**100%**	**21%**	**89%**	**8%**

Overall, the survey provided a broader picture on the level of program participation and the effectiveness of tools, trainings, and other program offerings than interviews alone.

3.2.5 Follow-up interviews

DNV GL developed interview guides for the follow-up in-depth interviews based on the interim findings from the framing interviews and the web survey. Table 13 shows the follow-up interview topics and target population.

Table 13. Follow-up interview topics and interviewees

Follow-up Interview Topics	Forum Participants	PROP Participants	Building Department BayREN Participants	Building Department IOU Participants	Building and Energy Industry Participants	BayREN and IOU Participants
Interaction with C&S programs	X	X	X	X	X	X
Forum usefulness and value	X					
ECA website						
Use and usefulness	X		X	X	X	X
Satisfaction	X		X	X	X	X
Suggestions for improvement	X		X	X	X	X
Training						
Use and usefulness			X	X	X	X
Satisfaction			X	X		X
Suggestions for improvement			X	X	X	X
Tools						

Follow-up Interview Topics	Forum Participants	PROP Participants	Building Department BayREN Participants	Building Department IOU Participants	Building and Energy Industry Participants	BayREN and IOU Participants
Use and usefulness			X	X	X	X
Satisfaction			X	X	X	X
Suggestions for improvement			X	X	X	X
Energy code best practices		X	X	X	X	X
Energy code barriers		X	X	X	X	X
Interaction with BD		X			X	
Recommendations for improvement	X	X	X	X	X	X
BayREN and ECA comparison						X

The in-depth interview guides and questions were tailored to each targeted stakeholder and asked specifically about the respondent's experience based on his or her role in the codes and standards market. We reviewed the interview drafts with the CPUC and the IOU and BayREN codes and standards program managers and made revisions to reflect recommendations. Once the guides were approved, experienced DNV GL staff recruited and conducted the interviews. The target populations and the completed interviews (final sample) are given in Table 14.

Table 14. Follow-up interview targets and final sample

	Target	Final Sample	BayREN	IOU
BayREN + IOU Training Participants (Both)	9	7	7	7
BayREN Building Department Training	3	3	3	
IOU Building Department Training	3	3		3
Forum Participants	2	4	4	
Building Industry IOU Training Participants	8	7		7
PROP Building Official Interviews	5	5	5	
Totals	**30**	**29**	**19**	**17**

4 FINDINGS

This section provides the findings of this process evaluation by activity for both implementers from all data collection activities. The budgets for both the BayREN and IOU program activities are included in Appendix C. We present the findings in the following order:

- ECA and BayREN Training
- ECA Website
- ECA and BayREN Tools
- BayREN PROP
- Remaining barriers to energy code enforcement
- Best practices and suggestion for energy code enforcement

4.1 Study limitations

The CI compliance improvement evaluation team notes the following limitations of this study:

- This study targeted feedback through interviews and an online survey. While the response rates were fairly high (i.e., over 10%) the survey was voluntary. We cannot assess how representative the responses are for all participants without providing an assessment of the non-respondent bias. However, to determine the non-respondent bias would require some demographic or behavior indicator across all participants that will allow for comparison of respondents and/or weighting to normalize the responses. Such variables are not available in the participant population frame. The results can still provide a deeper understanding of barriers that exist in energy code compliance and highlight some opportunities for improvement.
- There was limited information on tool users, especially for BayREN tools.
- This study does not address whether the activities provided actually improve code compliance. The study does focus only on whether these activities are having an impact on the barriers to compliance that the IOUs and BayREN have targeted, from the point of view of respondents.

4.2 ECA and BayREN training

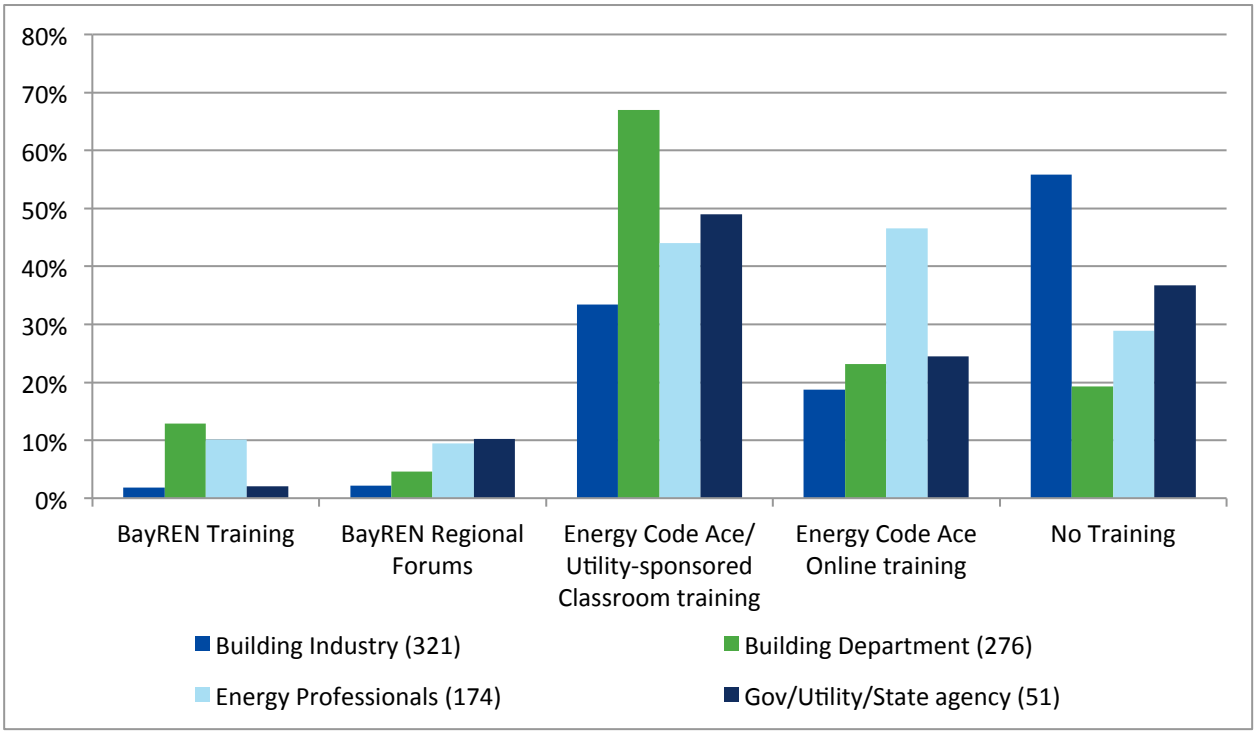
Both BayREN and the IOUs identified lack of knowledge on energy code particulars and lack of energy code specific trainings as a gap or barrier to energy code compliance in their independent studies before the PY 2013-14 program cycle: The IOU 2012 Best Practice Report found this to be a major barrier in six out of the seven building departments they worked with. In the Codes and Standards Survey Report, BayREN stated that "most stakeholders" would like training on the updated energy code and on understanding and navigating compliance forms. We gathered feedback and data on the ECA and BayREN trainings during all data collection phases of this evaluation.

4.2.1 Participation

Overall, we found that participation in trainings among the web survey respondents was high—with the majority (64%) indicating they had attended at least one ECA or BayREN training. Building department

employees were most likely to attend an ECA classroom training while building industry members were most likely to not have attended a training at all. ECA online training was most popular with energy professionals.

Figure 6. Training participation of web survey respondents by job type



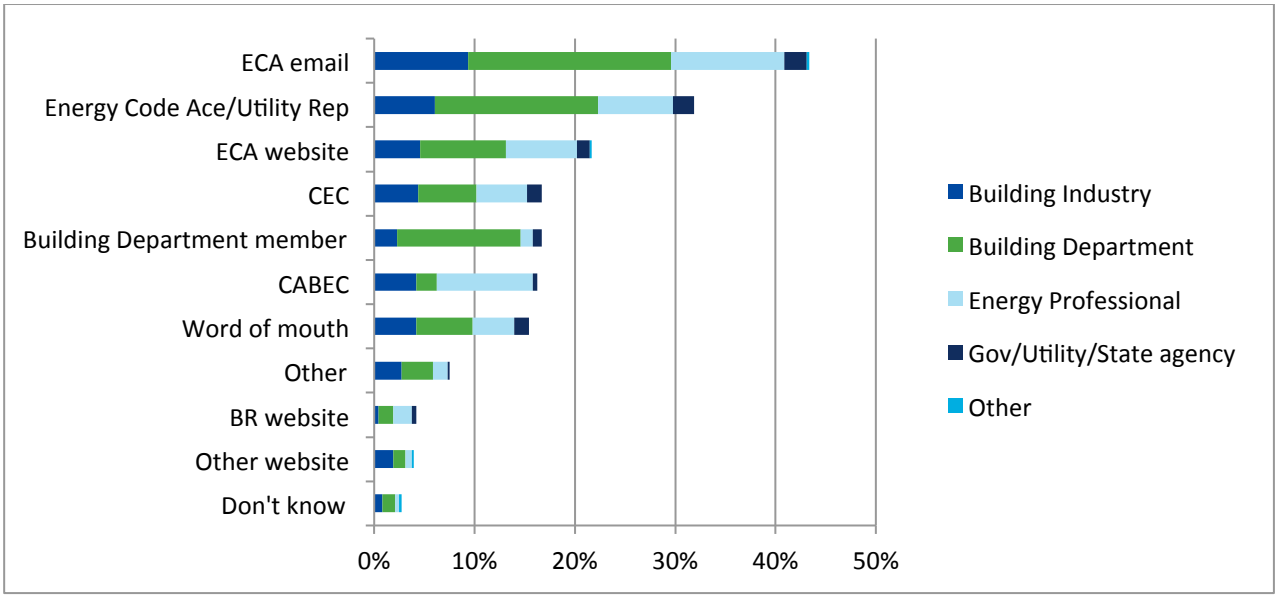
While more respondents attend ECA trainings, it is important to remember that the BayREN CI program limited their geographic focus to nine counties in the San Francisco Bay Area while the ECA program is statewide. The BayREN also primarily targeted building departments with their training programs, delivering them directly onsite. Table 15 breaks down the building department web survey respondents that participated in training (213) and were in the BayREN CI program target population (73). As shown in Table 15, 67% of the web survey respondents in the BayREN target population were BayREN participants. The IOU CI program targeted the same population and 90% of the web survey respondents in the same population were IOU program participants.

Table 15: Web survey respondents in BayREN target population

	n	%
Total Building Department survey respondents	276	
Total Building Department survey respondents participating in trainings	213	77%
Total Building Department survey respondents participating in trainings based in BayREN territory	73	34%
Total Building Department survey respondents participating in trainings based in BayREN territory that participated in BayREN programs	49	67%
Total Building Department survey respondents participating in trainings based in BayREN territory that participated in ECA programs	66	90%

When probed on how they found out about the trainings; respondents indicated that an email from the ECA listserv (43%) and from an ECA or utility representative (32%) were the most popular method amongst all job types, with the exception of energy professionals who stated that they found out via the ECA listserv or the California Association of Building Energy Consultants (CABEC). Building department members were also likely to find out from colleagues. The results from the web survey are shown in Figure 7.

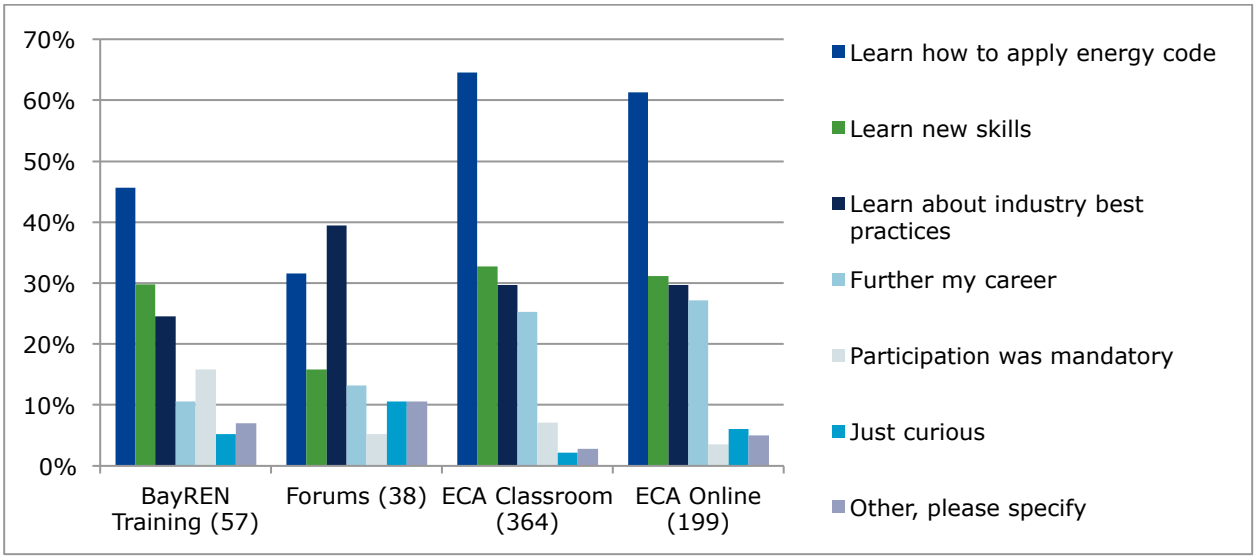
Figure 7. How respondents heard about trainings by job type (n=480)



We completed follow up interviews with 20 building industry and building department members about their experiences with C&S trainings and four forum participants. Nearly all of the trainees (17) participated in at least one training, and seven participants trained with both implementers. Interview respondents were also most likely to say they found out about the trainings from an email. Word-of-mouth within the building department was another popular method for building department members. Interviewed BayREN trainees mentioned hearing about them at an International Code Council meeting.

When asked why they chose to attend a particular training, unsurprisingly, the number one reason was to learn about the energy code. Nearly two-thirds (65%) of those who chose the ECA classroom or online trainings (61%) did so to learn about the energy code. Nearly half (46%) who attended the BayREN trainings did so to learn about the energy code. Forum participants most frequently chose to indicate that they attended forums to learn about industry best practices (39%). A total of 16% of BayREN training participants said they attended the trainings because they were mandatory. These results are shown in Figure 8.

Figure 8. Respondents' reasons for attending training



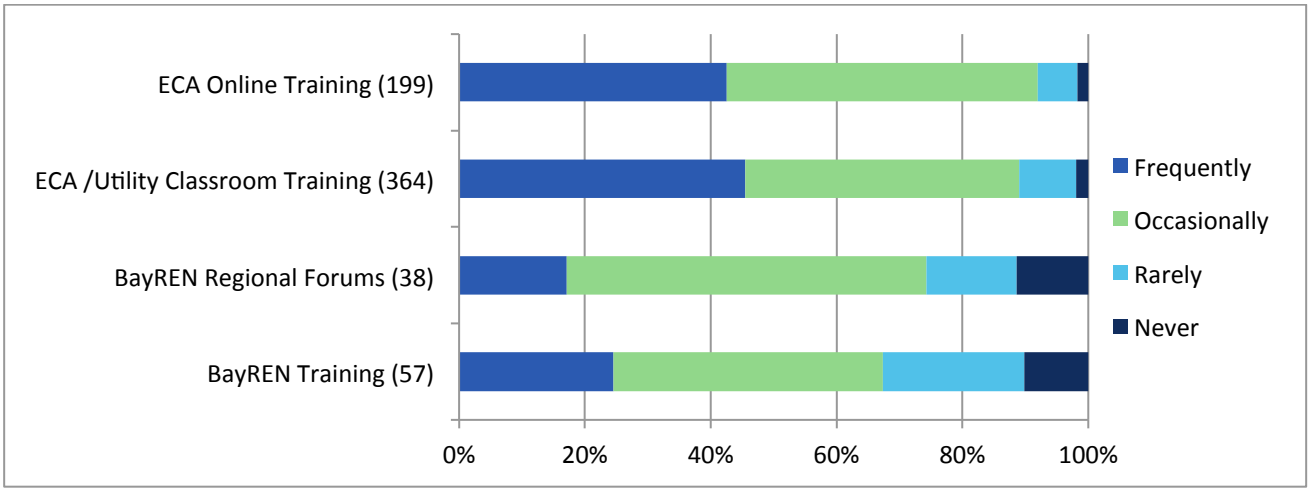
Follow-up interview respondents also mentioned a variety of reasons for attending trainings. All of the forum participants and building industry trainees mentioned connecting with others or networking in addition to learning something that applied to their job as primary reasons to attend the trainings. Most of the building department members gave some variation of simply learning about or staying up-to-date with the energy code. Specific learning goals mentioned included: learning a new skill, continue learning the complicated code, refreshing their understanding on code specifics, and staying up-to date with the code.

4.2.2 Value of training offerings

One of the primary research objectives was to determine if the participants in CI programs found value in the program offerings. We sought information on the participants' use of knowledge and materials, their satisfaction with the trainings, and how applicable the trainings were to their jobs.

We asked web survey respondents how often they use resources and knowledge gained from the trainings in their everyday job activities. ECA online and classroom trainees responded positively, indicating that they use the material often ("frequently" or "occasionally") 80% and 78% of the time (Figure 9). Interestingly, BayREN Forum respondents (68%) were more likely than BayREN training participants (58%) to indicate they often use the material presented.

Figure 9. Frequency of using knowledge and resources from trainings



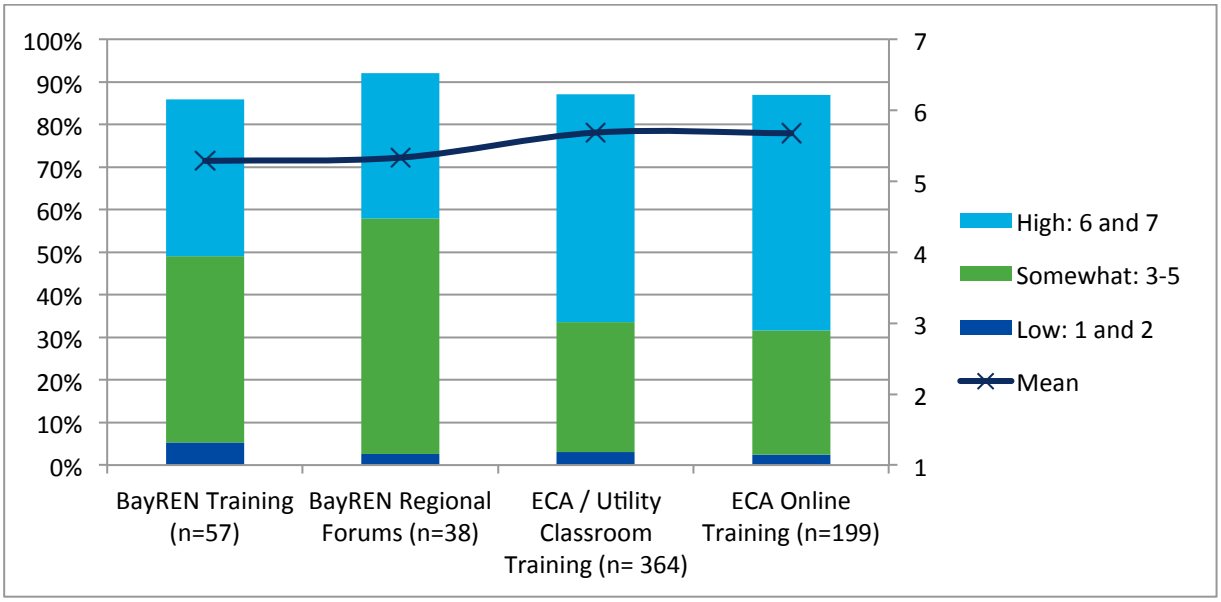
The follow-up interviews echoed the web survey responses regarding how often they used the materials. All ECA training participants reported using resources and knowledge from training sessions in their everyday job activities. The majority stated they continue to use these resources long after the training and a couple of respondents stated they used the references only until they became more comfortable with the energy code changes. More than half of follow-up interview ECA respondents remarked on the binders handed out during the ECA training as being a particularly valuable resource that they often use.

Additional helpful materials mentioned by the interview respondents included a copy of the codebook, which several respondents said were crucial, as their department did not hand out copies of the codebook to everyone in the building department. They also found links to the website and general knowledge of the energy code valuable. Four (of 10) of the interviewed BayREN trainees indicated they used materials from training. A few respondents remarked that they or their department took reference materials from the training and distilled or modified it to suit their particular situation.

The web survey and interviews probed further to address how much value the trainings are adding. We asked about usefulness, overall satisfaction, and indicators of satisfaction- how satisfied participants were with training specifics such as convenience, duration of training, level of detail provided by the training and the applicability to their jobs. Respondents were asked to give ratings on a scale of 1 (not at all satisfied) to 7 (very satisfied).

Figure 10 provides web survey results regarding whether the trainings are useful to the respondents' job. The overall response was positive, with the BayREN trainings and Forums earning a mean score of 5.3 out of a possible 7 points, and the ECA online and classroom trainings earning a mean score of 5.7. Of the 31 web survey respondents that had participated in both BayREN trainings and an ECA training, mean score for ECA trainings was similar to all respondents for both classroom (5.7) and online (5.8) while the mean score for the BayREN training was lower at 5.0.

Figure 10. Usefulness of codes and standards trainings



As shown in Figure 10, the majority of ECA trainees of both the classroom (54%) and online (55%) trainings indicated that the trainings were very useful, scoring it a 6 or 7. Only about one-third of the BayREN trainees said the same about the trainings (37%) and forums (34%).

Previous IOU and BayREN reporting[5] noted that prior training offerings lacked specifics on energy code for certain roles or their content was not applicable to many trainees. It was also noted that the trainings were not conveniently located and were too long for the targeted market actors to attend. We questioned web survey respondents about their overall satisfaction and their satisfaction with these attributes of the trainings. Figure 11 shows these mean ratings for each type of training. A discussion of training convenience, length, and level of detail and applicability follows.

[5] The IOU funded Architectural Energy Corp, *Title 24 Part 6 Best Practices Program Final Report.* San Francisco, CA: December 2012 and the BayREN funded *BayREN Codes & Standards 2013 SURVEY REPORT: Questions, Responses, Findings and Recommendations*. 2013.

Figure 11. Mean ratings for areas of training satisfaction

Convenience: ECA online trainings scored highest in convenience, while the BayREN Forums scored lowest. ECA classroom trainees specifically stated in follow-up interviews that the time was relatively convenient and there was ample notice for the trainings. Most said the location was convenient, however, a few people noted they traveled over an hour to attend.

A number of the BayREN and ECA trainings were arranged by the building department and took place at or near the building department. Those that participated in these trainings were grateful, remarking that the close proximity allowed more staff from their department to attend and learn relative to the number that would have been able to have their travel and expenses covered by their department.

Two of the four forum interviewees also indicated that the forums' time and location were convenient for their work and personal schedules, the remaining two indicated they would have attended more had they been more convenient. The early time was convenient because it did not take all day. All of the interviewees stated that they had sufficient notice to decide whether to attend.

Length of Training: Building industry and building department members can be difficult to reach and generally do not have time to attend trainings. However, the results of the survey indicate that the longer duration of the ECA trainings is preferred to the shorter BayREN trainings.

Level of Detail and Applicability: A specific barrier described in the IOU Best Practice report was a lack of technical trainings and the BayREN Survey Report noted a need for specific role-based trainings. We asked the web survey respondents and some interviewees whether the ECA and BayREN trainings presented the right level of information. The web survey respondents indicated the ECA trainings did- rating them 5.5 (classroom) and 5.6 (online). The BayREN trainings and forums each were rated at 5.1. This is interesting as the targets for the forums and trainings vary widely. The forums are designed to bring all energy code stakeholders together while the trainings are specific to building departments.

Almost all of the interview respondents agreed that the level of information was appropriate in terms of the level of complexity that is presented. However, four ECA trainees commented negatively during a follow-up survey. They felt that that the quantity of information presented in a relatively short period of time was somewhat overwhelming. Nearly all BayREN interviewees responded positively and felt that the information was presented at an appropriate level, with some commenting on the ample opportunities for Question-and-Answer as well as customization to the audience in the room.

According to nearly all (19 of 20) the ECA and BayREN trainee interview respondents, the trainings were either directly applicable to their job or to others in their department. Most respondents agreed that both ECA and BayREN trainings were applicable to their region and the climate zones in which they work. Several ECA trainees stated that, while the presentation materials were geared towards the whole state, the trainer(s) made a point to skip presentation sections that were not applicable and to frequently call attention to how the code fits within the relevant climate zone. Respondents described using what they learned in the trainings to educate building departments, contractors, consumers, and to advise others on projects.

One building industry interview respondent discussed the training's impact on his ability to comply with code. This interviewee said that knowing more about code showed how often correct code requirements are circumvented by homeowners:

> *"The training ends up showing how much happens that isn't following what is required. As a designer, you always advise your client and do your best, but then you hear: well I know that is required but let's see if we can get away without it. Seventy-five percent of the time they find a way to get away with it. And it's not obvious or terrible, but it might be just a little tweak, but I think it serves the client better to do what code says to do."*

4.2.3 Outcomes of trainings

We asked web survey respondents to provide a rating related to specific outcomes of trainings. Respondents were asked if they agreed on a scale from 1 (strongly disagree) to 7 (strongly agree) with the following statements:

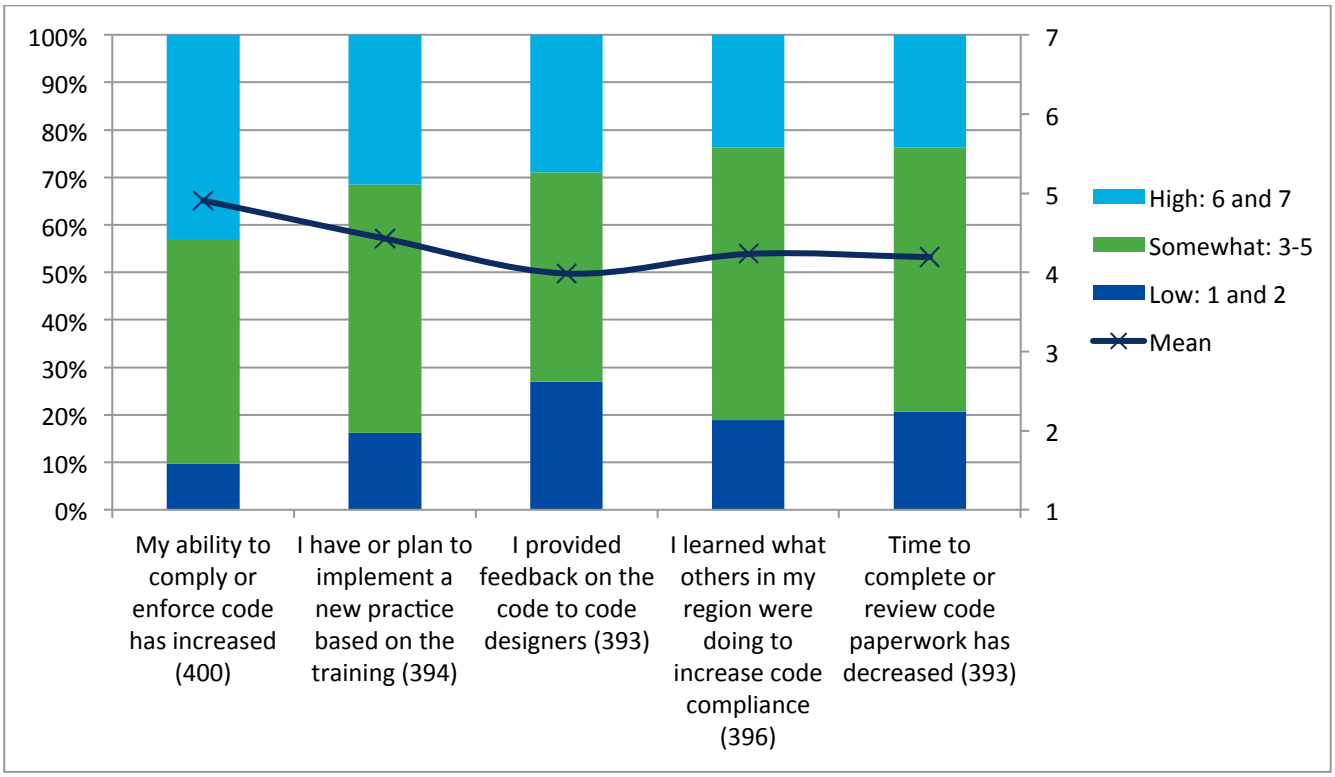
"Because of training……."

- Time to complete or review code paperwork has decreased
- My ability to comply or enforce code has increased
- I learned what others in my region were doing to increase code compliance
- I have or plan to implement a new practice based on training
- I provided feedback on the code to code designers
- I interacted with regional counterparts at Forums (Forum only)

- I learned from regional counterparts at the Forums (Forum only)
- I have or plan to communicate after the Forum with regional counterparts (Forum only)

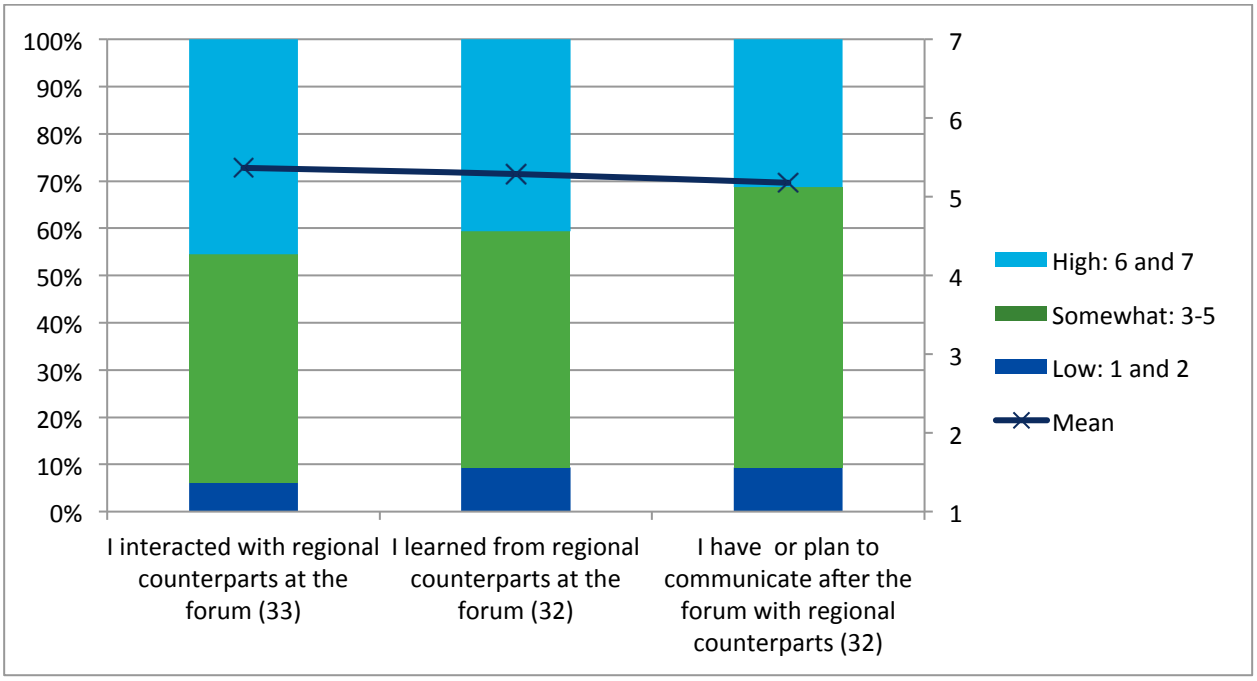
The results are shown in Figure 12 and Figure 13. Here, the ratings were lower than for satisfaction (ranging from 4.0- 4.9), but still positive overall. In this line of questioning, the participants were asked about all the training opportunities as a whole, and not about individual trainings. Respondents were most likely to indicate that because of trainings, their ability to comply with or enforce code had increased, and least likely to have provided feedback to code designers.

Figure 12. Specific outcomes from codes and standards trainings



Forum participants were asked a further line of questioning about specific goals of the forums. The ratings to these questions were similar to the results of the satisfaction ratings, ranging from 5.2-5.4. Respondents were most likely to indicate they had interacted with regional counterparts at the forums. The results of the questions on the web survey to the forum participants are below in Figure 13.

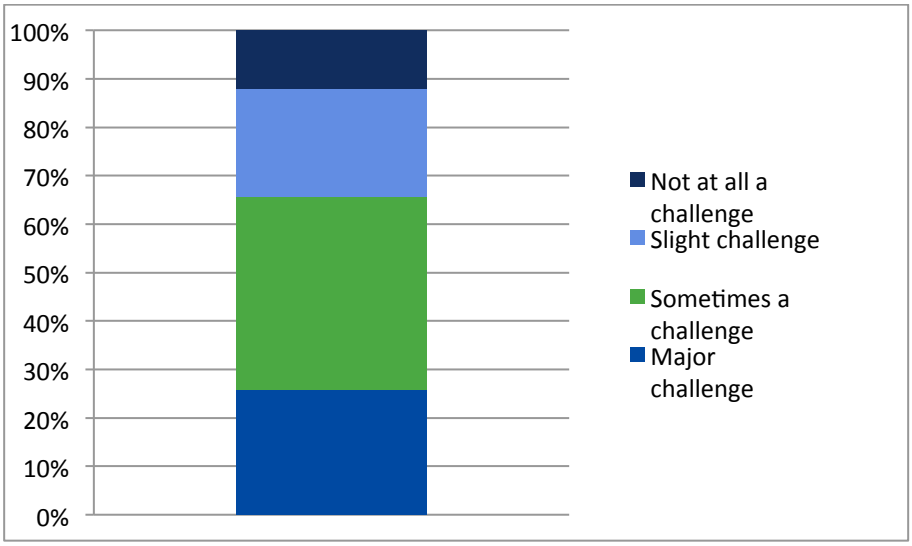
Figure 13. Specific outcomes of forums



4.2.4 Training as a barrier to code compliance

We asked web survey respondents if "availability of in-depth training on the energy code" was a major challenge, sometimes a challenge, slight challenge, or not a challenge at all. Most respondents (74%) of the web survey respondents indicated that lack of training was not a major challenge. This indicates that the CI programs have made progress in overcoming the lack of training barrier as previously identified by the BayREN and IOUs.

Figure 14. Availability of in-depth training (n=209)



4.2.5 Feedback from participants on trainings

During the follow-up interviews, we asked trainees to rate the programs and provide feedback on the training programs. Below are the responses for the BayREN trainings, BayREN forums, and ECA classroom trainings (we did not interview anyone who had experience with the online version of the ECA series).

BayREN Trainings: Interviewed BayREN training participants were asked to rate the program in terms of how valuable it has been in assisting them in their job. Similar to web survey responses for satisfaction, interview respondents on average rated the value of the BayREN training as a 5.5 and their satisfaction with the training as 6; with specific praise for the presenters and very little critique. Below is a collection of responses:

- *"The trainers were excellent, and the slides were good and easy to follow."*
- *"Quality of trainers has been outstanding."* Their building department had to reschedule a training session at the last minute, and the respondent *"could not believe how understanding and accommodating the whole BayREN team was."* The feedback from building staff has been great, as well as the willingness to come to them and customize their presentation.
- *"BayREN gears the training towards our department and answers our questions. We have a small group so they can do a Q and A, it's not like they leave right after the training. They answer questions offline too."*
- One respondent was *"slightly less satisfied"* with the BayREN training compared to the Energy Code Ace training because, he felt, ECA focuses more on the practical tools.

BayREN Forum: Interviewed forum participants were also asked about the use, value, and learning from the forums. Two out of the four respondents did not provide specific ratings, but interview respondents reported that they use the information and tools presented in the forums often, one mentioning they use the information and tools presented in the trainings to give to contractors and building or home owners. Another stated they use the forums for networking only. He stated that his everyday work does not involve energy codes and the others stated they appreciated the networking opportunities.

All the interviewees described the Question-and-Answer time and the discussion/networking time as the most helpful part of the forums. Networking opportunities mentioned included time to share diverse experiences, discussions of potential challenges and solutions in regards to BayREN programs, and HVAC technical discussions.

We asked forum interviewees to describe the interactions and what they learned from regional counterparts at the forums. One interviewee from local government mentioned that a presenter talked about a local code related to saving water. While they didn't have plans to do anything similar in their jurisdiction, it was nice to know that there were programs like that out there and people in the area have had success in implementing them.

ECA training: On average, ECA training interview respondents rated both the value of the ECA training as well as their satisfaction with the training as 6 out of a maximum 7 points. Below is a collection of verbatim responses that indicate high praise for the presenters and attendees had very little critique.

- *"They have been able to provide the level of detail we need to implement the code properly and inform the public and other professionals as to what's needed."*
- *"It was very good. The presentation materials were very thorough and easy to understand, visually" (in terms of being color-coordinated).*
- *"It was well-organized, well presented, extremely useful."*
- *"The instructor was so qualified, so organized, so familiar with the code, and simplified it. It was convenient."*
- *"They did a pretty good job. There is so much material that they have to go through it very fast."*
- *"It was good training, good information, but about three-quarters of the way into it, there is so much information that your mind neglects to take in more information."*

4.2.6 BayREN and ECA training comparison

We asked the seven interviewees that participated in both ECA and BayREN training opportunities about the major differences between the organizations in terms of the training. The interviewees explained the differences between the two types of trainings. They said that the ECA training sessions tended to be longer sessions focused on providing a broad, comprehensive view of the code changes, and an introduction to the ECA website and ECA tools. On the other hand, BayREN training sessions tended to be shorter sessions focused on how to practically enforce and ensure compliance with the code, targeting specific aspects of the energy code in greater depth. They also noted the BayREN took feedback on the code and was more engaging; they described it as more of a dialogue with participants, and articulated that BayREN customized trainings to the building department's particular situation.

These seven respondents were also asked whether the ECA and BayREN trainings complement or overlap one another. Respondents all agreed that, while some overlap is present, the different perspectives of the two programs make them complementary and not redundant. Respondents indicated that they were glad to participate in energy code-related training from two programs with different perspectives rather than a single program.

4.2.7 Training participant suggestions for improvement

Finally, we asked respondents of both the web survey and the follow-up interviews for suggestions for improvements to trainings. Interestingly, the recommendations for improvement were similar for or non-specific to the BayREN and ECA trainings. The recommendations for improving trainings are summarized below, with illustrative quotes when applicable:

- **More hands-on/real-life examples.** Go through, step-by-step, real or hypothetical projects in the training. *"There is something to be said from people learning by rote. The first time is tough, the second time a little easier, and eventually they have the hang of it."* This was the most frequent suggestion from the web survey participants.

- **More illustrations and images.** Provide more diagrams and charts in the presentation, including figures to illustrate the processes one needs to go through to ensure compliance. Provide images of correct and incorrect installations.
- **More climate zone specific information.** Present checklists of energy code sections that apply in each climate zone. Address regional differences in air conditioning presentations.
- **Make trainings more accessible.** Make recordings of the training available afterwards for those who could not attend and those who would like to refresh their memory from the training. Repeat (and slightly tweak) a version of the same training to participants throughout the year to help with knowledge retention. *"Provide more webinars I think. Or even a recording of the Forums, so if someone missed it they could listen online. Building Officials are really busy."*
- **Partner up.** Partner with CALBO (California Building Officials) to present training at meetings for that organization, as some building staff are reluctant to participate in training from other organizations. Offer credits for continuing education. "*The American Institute of Architects allows you to submit credits, and having Title 24 training count for continuing education would really increase attendance for architects, engineers, LEED certifiers etc. The Title 24 is not preapproved for credits. It's always an afterthought.*
- **Expand trainings.** Explain how to sell benefits of code to convince homeowners to commit to follow codes on projects. Provide more training to contractors on which forms are required for which situations and how to complete those forms. Improve training for EnergyPro software (BayREN respondent).

In summary, the ECA and BayREN trainees found the trainings valuable. Interview and web survey respondents were able to mention specific training presenters, materials, and instances that were valuable to the participant. Overall, the web survey results and the interviews indicate that the ECA trainings are more successful than the BayREN trainings, but that both trainings added value in working toward improving energy code compliance.

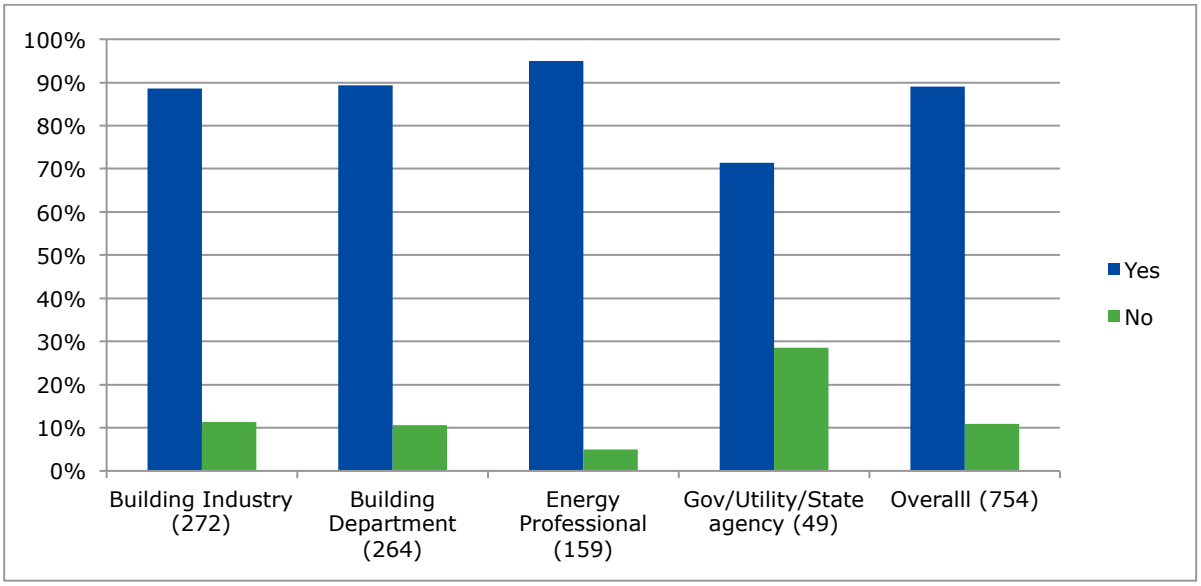
4.3 ECA website

The 2012 Best Practice Report determined that expanding the 2012 version of the codes and standards website (then known as the energy design resource website) was an opportunity for the program. The IOUs worked with Wilkins Communications to develop the ECA website, brand, and cohesive messaging. The ECA website, energycodeace.com, was launched in 2014 and has thousands of registered users.

4.3.1 ECA website use

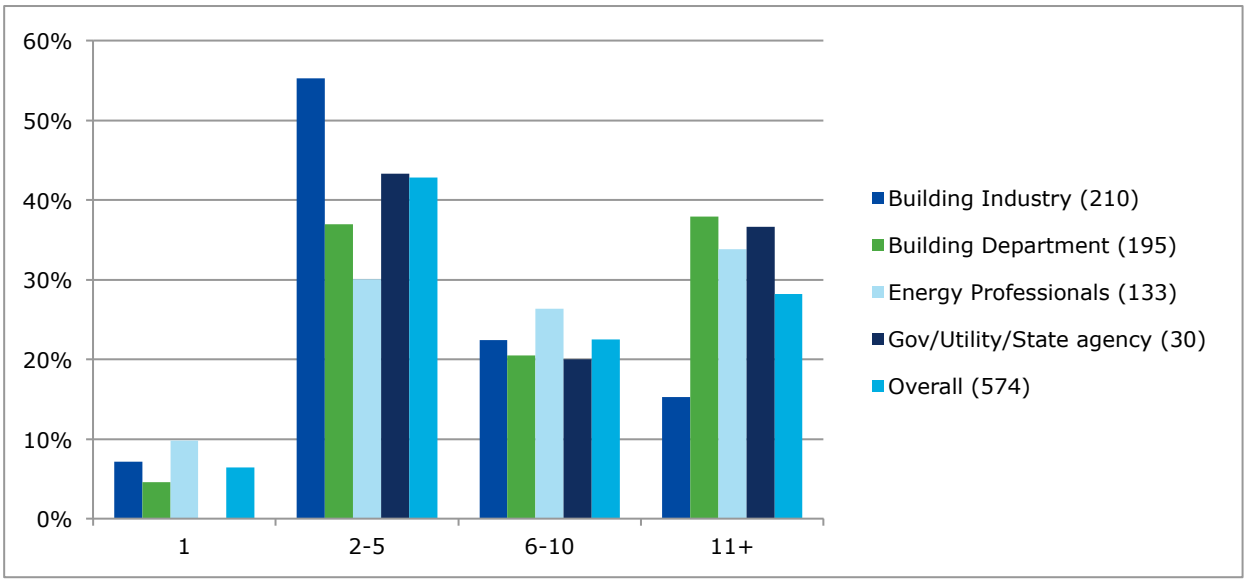
The web survey asked respondents a number of questions about the ECA site. Nearly nine-in-ten web survey respondents indicated they had visited the website, indicating a high awareness of the website (Figure 15). Energy professionals were the most likely to indicate they had been to the website, with 95% of them indicating "yes" they had visited the website, followed by building departments and building industry (89% each), and government and utility workers (71%). We spoke with 17 follow-up interviewees about the ECA website and found that 12 out of 17 were website users.

Figure 15. ECA website visitors by job type



We questioned web survey respondents how many times the respondents had been to the website. The majority (94%) of website users indicated they had been to the website more than once, and 28% of users indicated they were heavy users, visiting more than 10 times (Figure 16). Proportionally, there was a divide in the use of the website by job type. Around 60% of respondents in the following job types indicated they were frequent users of the website (had made at least six visits); energy professionals (60%), building department (58%), and government and utility (57%) members, while building industry members were most likely to make 2-5 visits (55%). Developers, system designers, contractors, and architects were amongst the specific job types to indicate they used the website infrequently.

Figure 16. Number of ECA website visits by job type

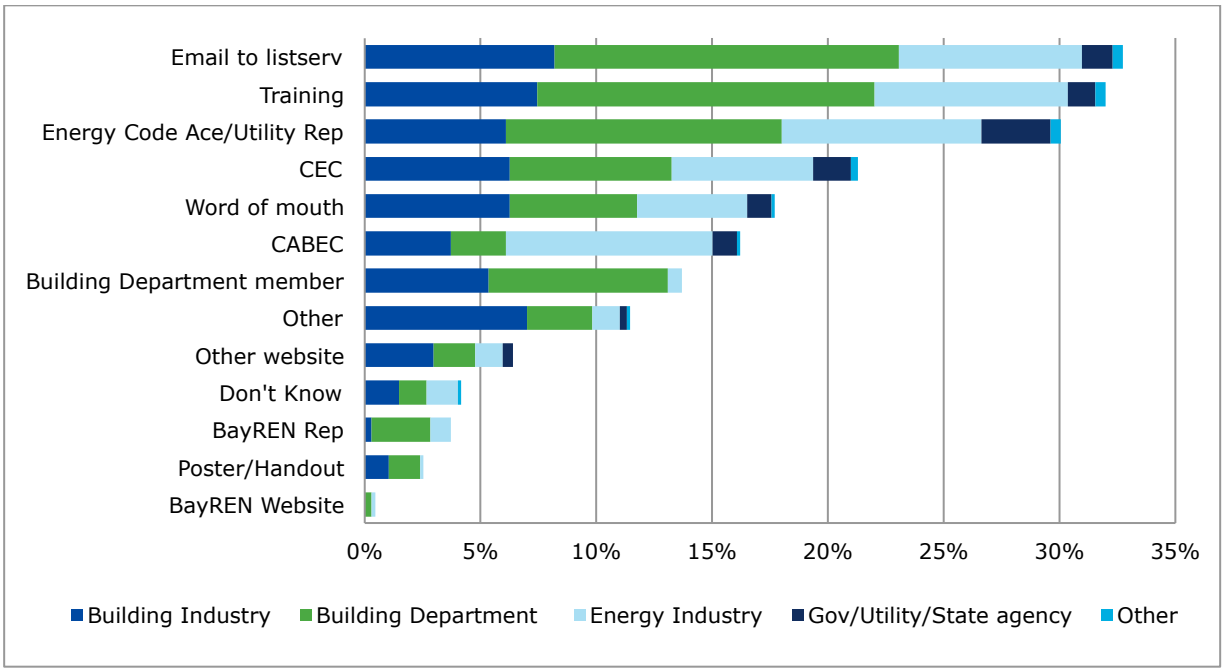


The web survey queried how the respondents had heard of the web site. Results are shown in Figure 17. Based on the responses, three methods used for communicating about the website are equally successful with at least one-third of respondents stating they heard about the website either from an email to a listserv (33%), from a training (32%) or from an ECA or utility representative (30%).

Among the job categories, building department members are more likely to hear of the website via an email (20% of building department responses) or a utility or ECA representative (16%). Government officials and utility workers are more likely to hear about the website from a utility or ECA representatives (30%) followed by the California Energy Commission (16%). Energy industry members most commonly found out about the website from CABEC (18%), or utility and ECA representatives (17%).

Building industry members had the most variation in their responses with 10%-15% finding out from an email (15%), a training (13%), a utility or ECA rep (11%), the CEC (11%), word of mouth (11%), other (11%), and a building department representative (10%). We also asked building department users if they direct others to the website, and 29% indicated they did so frequently and another 45% indicated they did so occasionally.

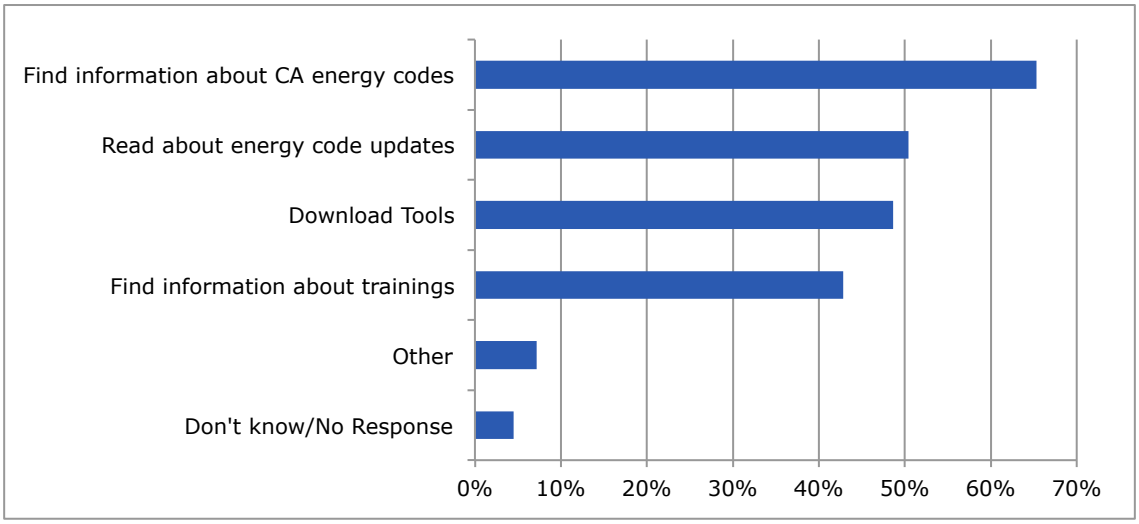
Figure 17. How respondents heard about the ECA website by job type



Respondents were asked why they went to the ECA website. Unsurprisingly, the number one reason to visit the site was to find information about the California energy building codes, with two-thirds (65%) indicating that was a reason they had visited as shown in Figure 18. Users also came to read about code updates (50%), download tools (49%), and find information about trainings (43%). The most common "other" response for why users came to the website was to research or fill out forms. Most users indicated they visit

the website for more than one reason (64%). Users came to the website for similar reasons, regardless of job type.

Figure 18. Reasons users visit the ECA website (n=672)



These results indicate the website is a go-to destination for finding information and resources for energy code users.

We also asked respondents during the follow-up interviews the most frequent reason for why and how they use the website. Users indicated they frequented the site to use or to look at the tools provided there. The most prevalent was the use of trigger sheets (six respondents) followed by Forms Ace (three respondents) and the checklists and other worksheets or cheat sheets (three respondents). Additionally, one building industry representative mentioned flow charts for the prescriptive approach. Some verbatim responses involving the website from interviewees are summarized next:

> An '"*argumentative customer that doesn't believe*" what forms are required. The respondent said he would "*[go to the site and] plug in the project type … to show the contractor or mechanical engineer or architect that it tells them to use the forms.*"
>
> "*The rules and regulations are very complex. Most rules will say you need to do something AND refer to another section—on and on, I take all the [resources] and put them together in a sheet for me—put together multiple sheets to make a master cheat sheet.*"

Other interviewees said they visit the website to look for or register for the various training opportunities through ECA. Similar to the web survey results, a few respondents also mentioned that they go to the website to better understand the energy code in general or to give themselves a refresher after the training. One respondent in particular summarized why they visited the website with this sentiment:

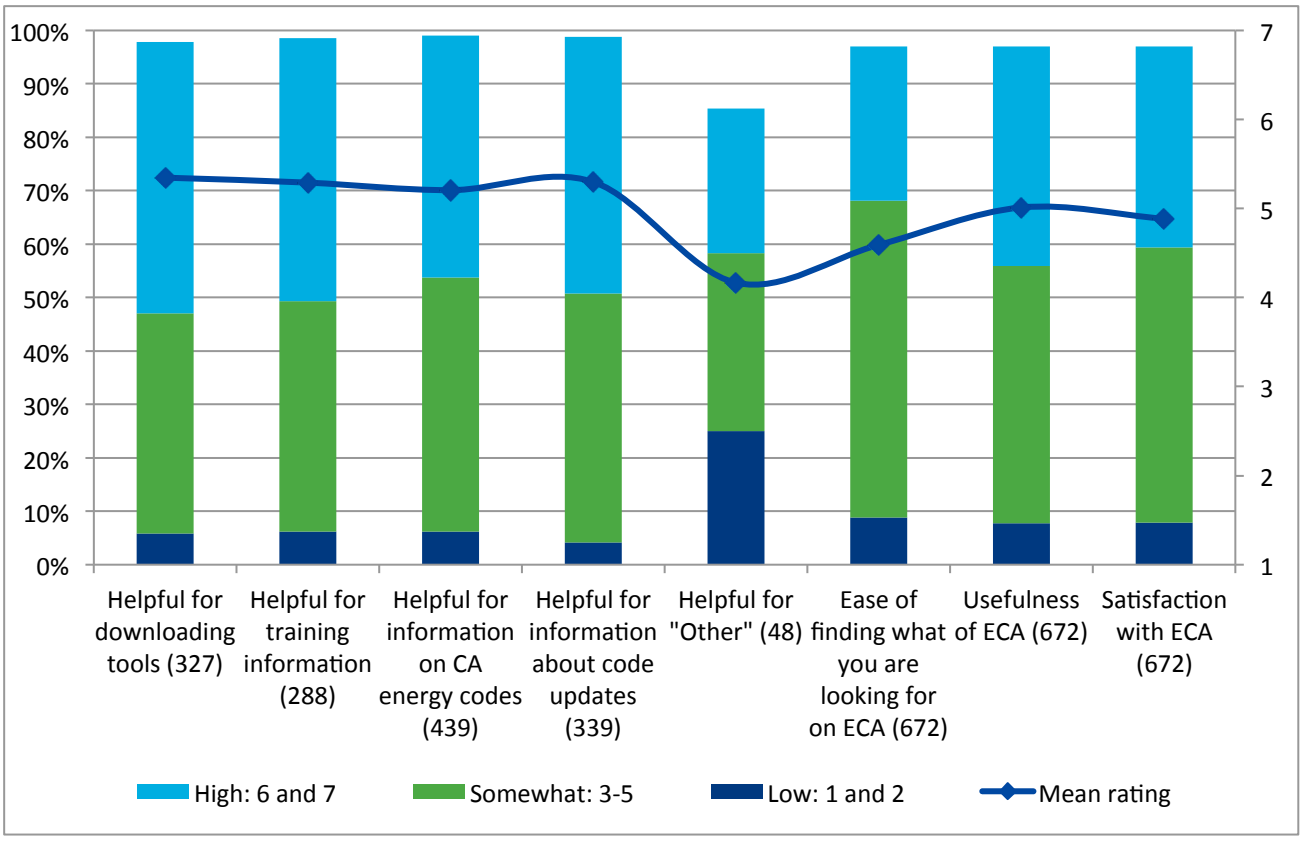
> "*To better understand the energy code—because from 2008 codes they have changed so fast and become so detailed that we no longer understand what the codes are. We—as in building officials, general contractors, electricians, etc.—anyone who touches the energy side (this is true for).*"

4.3.2 ECA website value

The web survey included a series of questions about the helpfulness and satisfaction with the Energy Code Ace website. The results are summarized in Figure 19. When asked if the website was helpful for the specific reason the user came to the website, the respondents tended to be pleased with the website, giving a mean rating ranging from 5.2 to 5.4, on a scale of 1 to 7 where 1 is "not at all helpful" and 7 is "very helpful." Respondents found the website most helpful in obtaining tools and training. The exception to this was few respondents who came to the website for "other" reasons. Other reasons included looking for specific forms and to fill them out, looking for information on what is required for a specific project, and CEA examinees and building department members looking for specific references. These users gave the website a mean rating of 4.2 on the seven point scale. The responses tend to support that the website was delivering on the reasons why they visited in the first place.

We also asked web survey respondents to rate, on the same 7-point scale, how satisfied they were with the website, how easy it was to find what they were looking for, and about their overall satisfaction. The ratings to these broader questions were lower. The mean rating for usefulness, satisfaction, and ease of use were 5.0, 4.9, and 4.6 respectively. These responses indicate there is room for improving the website's usability.

Figure 19. Web survey respondent user satisfaction with the ECA website



The average satisfaction response given by the interviewees was very similar at 4.8. Overall, these responses indicate that website users were more satisfied than dissatisfied. The interviewed users found the website more useful than those from the web survey, with 11 of 12 website users said that the information

they found on the website was useful to them, and all 12 said that they refer or direct others to the website as well.

The follow-up interviews also reinforced the previous findings that the web survey respondents are finding the website useful in addressing their reasons for visiting the site. For four building department representatives we asked them to rate how valuable the ECA website is in assisting them in their job, using the 7-point scale. Interviewees on average provided a rating of 6.25, meaning they thought the website was very valuable in their role. However, while interviewees found the website useful and appreciated its content, the same group showed more mixed reactions about the functionality and mechanics of the website. When asked whether it was easy to find what they are looking for, half of the twelve interviewees said that it was. The other half ranged from saying it was "very difficult" to "somewhat difficult" to find what they were looking for. Two respondents summed up their reasons:

> *"For first-time users it's a bear. And when they make a major change to the website, [such as when] the position of icons are changed- you have to re-learn it again, that is difficult."*
>
> *"I think it's easier if you are familiar with the website. You have to learn any tool that you get, and there is maybe a lot of stuff on there that you have to sort through. It mixes promotional material with actual stuff. It depends what level you are at. If you don't know what Title 24 is, then that is hunting and searching – most people don't know what they are looking at, but an energy consultant can navigate it."*

Further, the general feeling was that, while the information on the ECA website was well organized, respondents found that they had to click through the menus in order to find what they were looking for. And, as one building department representative put it, *"You have to know what you're searching for. And if you don't have enough education to know what you're looking for, then you're just grabbing at straws."*

On a related note, a few interviewees mentioned that the search bar did not function as well as desired. One building industry representative said that, when putting a phrase into the search bar, there was a wide range of return results. For this respondent, it was difficult to find the right search term to return the applicable results.

4.3.3 ECA website user suggestions for improvement

Finally, we asked the web survey respondents and interviewees to offer their recommendations for improving the website. The most common ones are summarized here:

- **Improve the search function.** This allows users to avoid attempting to find what they are looking for through the menu system (described above). Some specific suggestions included search by project type, form, area of building, or residence.
- **Create pages specific to each climate zone**. Two interview respondents said that they became frustrated going from page to page looking for different pieces of information relevant to their climate zone. A dedicated page would theoretically put all of the information they need closer together, minimizing the time required to look up all of the information.
- **Maintain consistency with the website**. As one building department representative put it, *"Building departments have gotten smaller and smaller … and if they change the website so drastically to 'improve' it, it's difficult for people in smaller cities who use it intermittently because*

you have to re-learn it. Plan checkers throw up their arms and say 'forget it,' especially if you need to figure it out in 10 minutes or so."

- **Provide more introductory materials on the website**. As one building industry representative put it, *"most of the courses are geared to someone that already has an idea of what is going on. It's really hard for a new person to come in. And we need a lot of new blood to be energy consultants."* A number of web survey respondents also asked for a tutorial on how to use the website.
- **Integrate with other code related websites and do more outreach.** Web and interview respondents suggested that the ECA could partner with other organizations. Some specific suggestions included local building department websites, CEC website, and the various Home Energy Rating System raters' websites. Web survey respondents also wanted to hear more from the ECA in their inboxes. They suggested a newsletter with tips on the website or code in weekly emails or perhaps a twitter account or you tube channel. Some users indicated that they were unaware that the website was publicly funded, and links or outreach from state or local governments would lend credibility.

4.4 ECA and BayREN tools

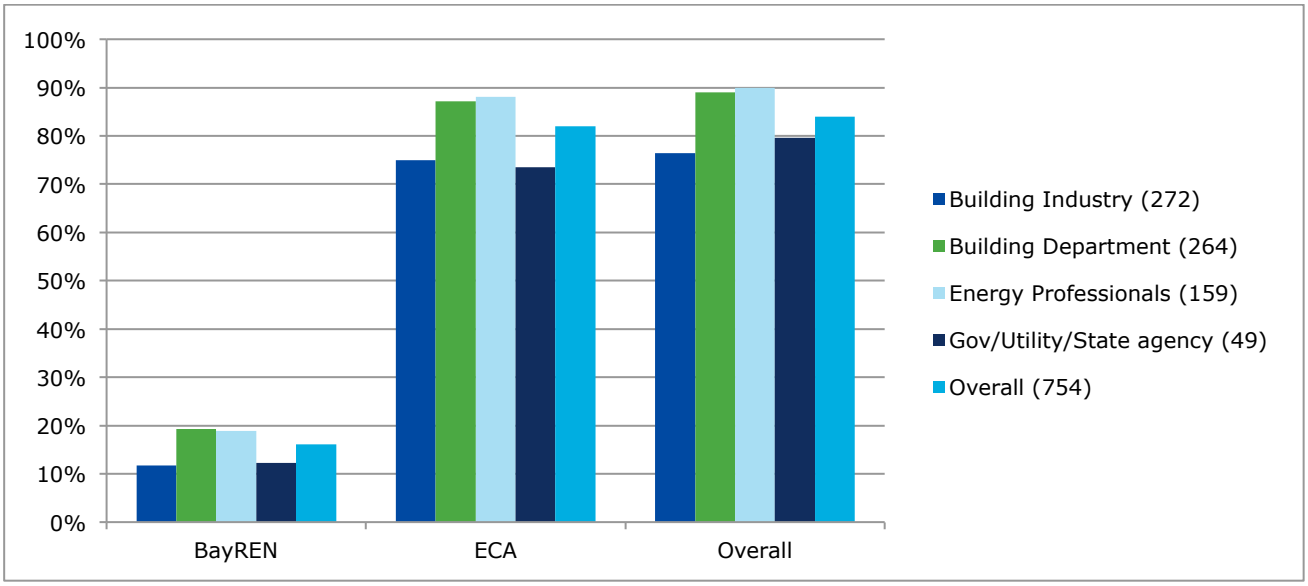
The ECA and IOU tools aim to address barriers around the complexity of forms and inefficiencies in compliance documentation. Tools were a top recommendation in both the 2012 Best Practice report and the 2013 BayREN Codes and Standards survey report. The first versions of the ECA tools were developed as part of the 2012 Best Practice program and the BayREN tools were conceptualized in this program cycle.

4.4.1 ECA and BayREN tool use

The web survey included questions that covered the BayREN and Energy Code Ace tools. As shown in Figure 20, 84% of the web survey respondents indicated they knew of at least one of the tools when they were shown a table of the tools and their descriptions. This level of awareness is similar to the awareness of the ECA website. Energy professionals were the most likely to indicate they had heard of at least one of the tools (90%), followed by those from the building departments (89%), government and utilities (80%), and then building industry (76%).

There is limited tracking data available for tools. Some tools are entirely web based and others did not track number of downloads. Tools are also downloaded, printed, and distributed within building departments and handed out over the counter. Thus, those that were aware of the tools were considered tool users for the analysis, not only those that indicated they had downloaded them.

Figure 20. Awareness of tools of web survey respondents by job type



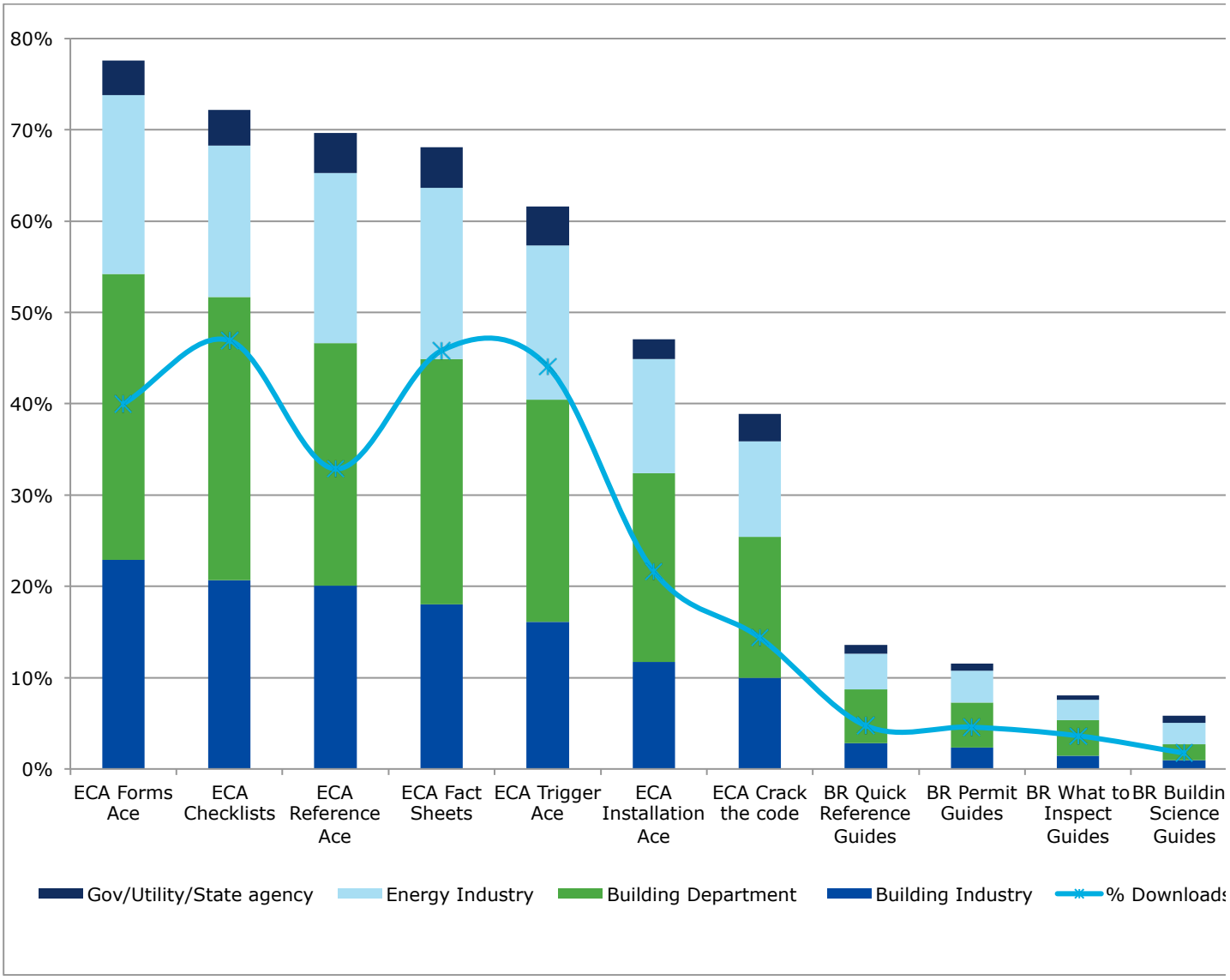
Tool users were asked to identify which of the tools developed by BayREN and IOUs they were aware of. The majority (98%) indicated they had heard of at least one ECA tool, while around one-fifth indicated they heard of any of BayREN's tools (19%) and a similar number had heard of at least one from each program (17%). While more people were aware of the ECA tools, the BayREN CI program limited their geographic focus to nine counties in the San Francisco Bay Area while the ECA program is statewide.

As shown in Figure 21, the ECA Forms Ace was overall the most well-known tool, with 78% of tool users indicating they were aware of the tool. The BayREN Building Science Guides were the least popular tool, with only 6% awareness. In fact, those that indicated they were aware of the Building Science Guides indicated they were aware of all eleven tools included in the survey. The most popular BayREN tool was the Quick Reference Guide with 14% awareness.

Level of awareness of specific tools was similar across job type, but building department members were the most likely to indicate tool awareness (85%), followed by energy professionals (82%), government and utility workers (76%), and building industry members (65%). On average, respondents indicated that they were aware of 4.8 tools (there are seven tools developed by the IOUs and four developed by the BayREN).

Four out of five (78%) of the web survey respondents that were aware of the tools indicated they downloaded them. Again, some tools are designed to be downloaded to use (e.g., ECA checklists), while other tools are online references (e.g., ECA Reference Ace). The rate at which users indicated they downloaded the tools is also included in Figure 21.

Figure 21. Awareness of tools by job type and percent downloads (n=633)

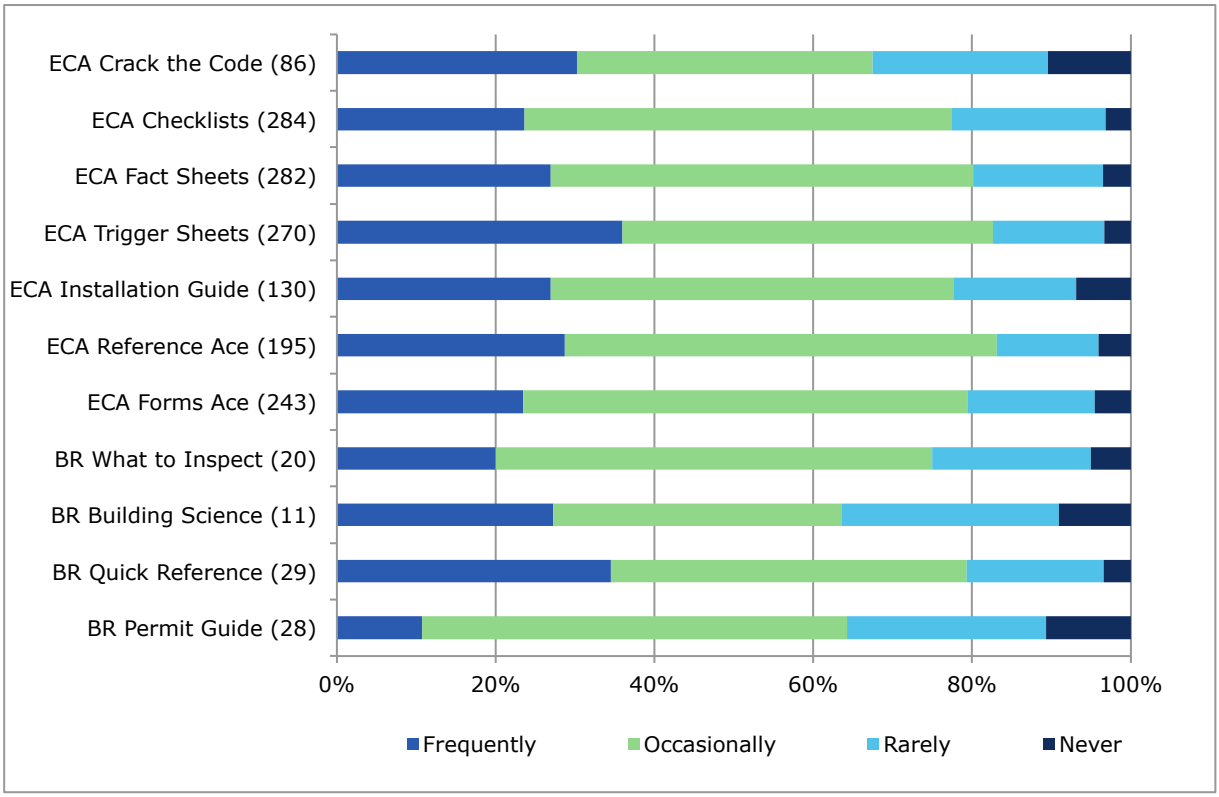


It is also worth noting that the make-up of the respondent population in terms of job title and responsibilities will likely have a major impact on these findings, as some tools are designed to be used only by certain members of the building department or community. For example, the BayREN "What to Inspect Guide" is designed for building inspectors. However, web survey respondents from job types other than the specified target audience indicated using the tools, and thus all responses are included in the analysis.

We also asked web survey respondents about how often they use the tools and the results are reported in Figure 22. Among users of a particular tool (the number of which varied widely), 83% reported that they use the tools often, either "frequently" or "occasionally." ECA Trigger Sheets and ECA Reference Ace are used the most. In fact, 36% of ECA Trigger Sheet users reported using the tool "frequently." BayREN Permit

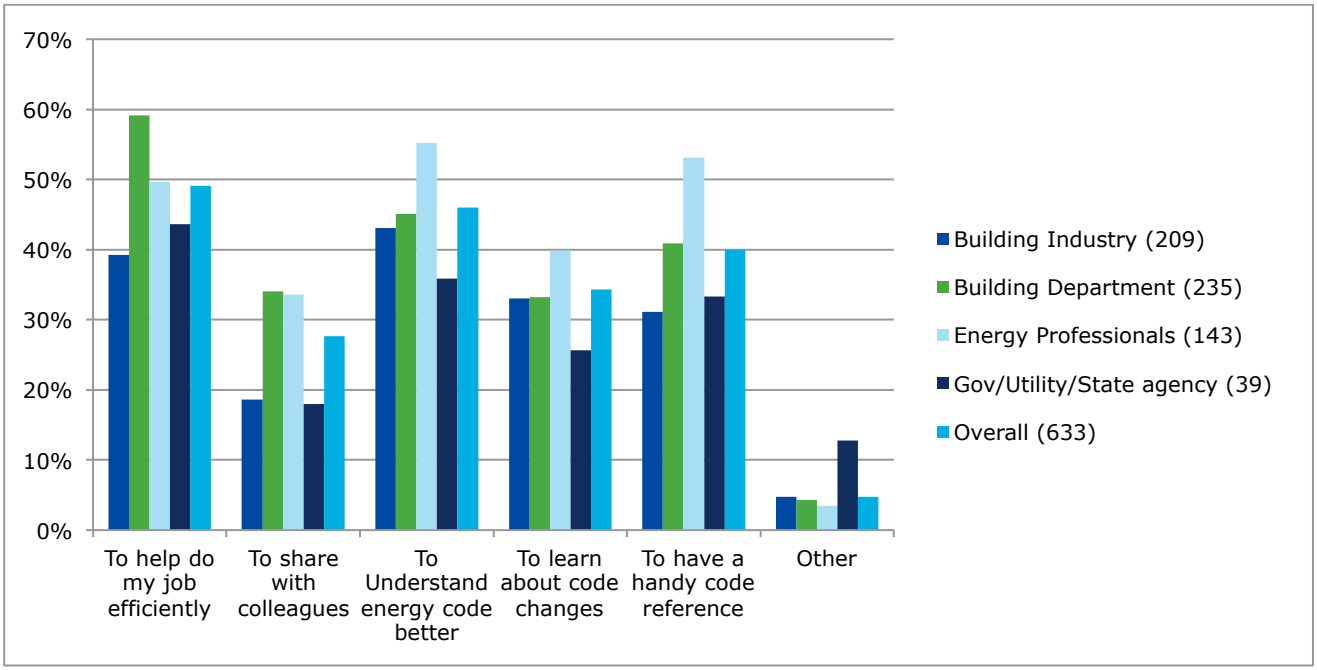
Guides, Energy Code Ace Crack the Code, and BayREN Building Science Guides, tools are used less frequently, with 11%, 10%, and 9%, respectively, of the users reporting that they "Never" use them.

Figure 22. Frequency of tool use by web survey respondents



The web survey also asked why respondents used the tools. Almost half (49%) said it was to help do their job efficiently (Figure 23). Building department members were the most likely to indicate that they used the tools for this reason, with 60% responding. This was also the most common reason given by government and utility workers. Building industry and energy professionals were most likely to indicate they used the tools to help understand the code (43% and 55% respectively) and the energy professionals were also likely to indicate they used the tools as a code reference (53%). The most common "Other" reason reported was to help others (e.g., clients, contractors, and permit applicants) understand the energy code.

Figure 23. Reasons given for why respondents use tools



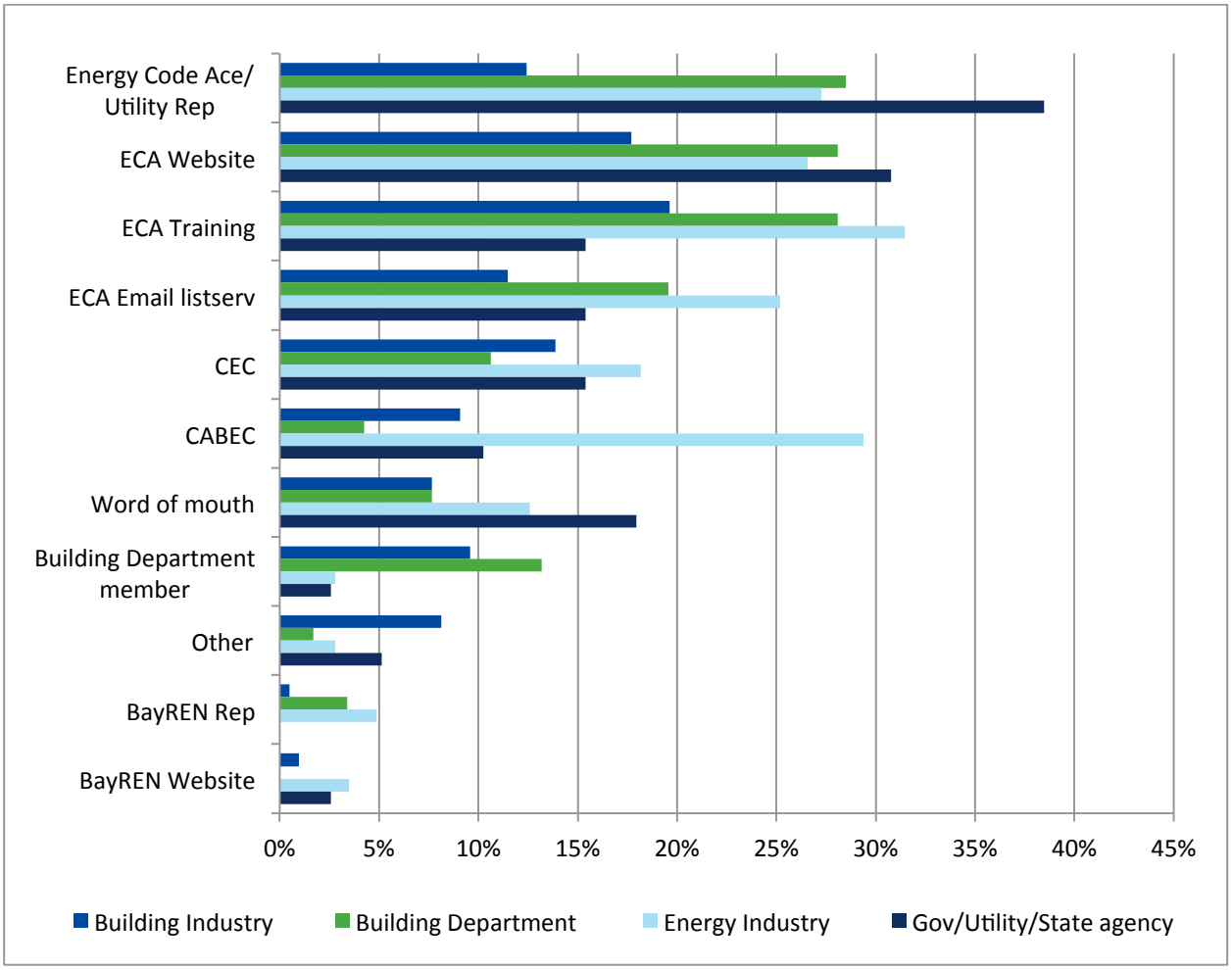
We also asked about the tools in follow-up interviews. Among those responding who used Trigger Sheets, three reported handing the Trigger Sheets directly to customers to explain the complicated codes. Two respondents mentioned handing out the Fact sheets and the Reference Ace and another two used the Trigger Sheets and the Forms Ace to learn what information Building Departments or energy code consultants will need to know for a specific project. Some of the statements made were:

> *"I also use many of the worksheets to educate my customers and give them reference materials. My customers say that they really appreciate that. It's a quick reference so they know what they need to provide."*

> *"The trigger sheets I use a lot, I pass them out in classes, I give to contractors. It's good for [nonresidential] compliance for HVAC."*

We also asked web survey respondents how they heard about the tools. The most common ways for a building department member to hear about the tools was from a utility or ECA representative (29%) or at an ECA training (28%) or on the ECA website (28%). Building industry members were most likely to indicate they didn't know (36%) or they heard during training (20%). Government officials and utility workers found out about the tools from utility or ECA representatives most frequently (38%). Energy industry members most commonly found out about the tools from the ECA trainings (31%) followed by CABEC (29%). Figure 24 summarizes these findings.

Figure 24. How respondents heard about BayREN and ECA tools by job type (n=633)



4.4.2 ECA and BayREN tool value

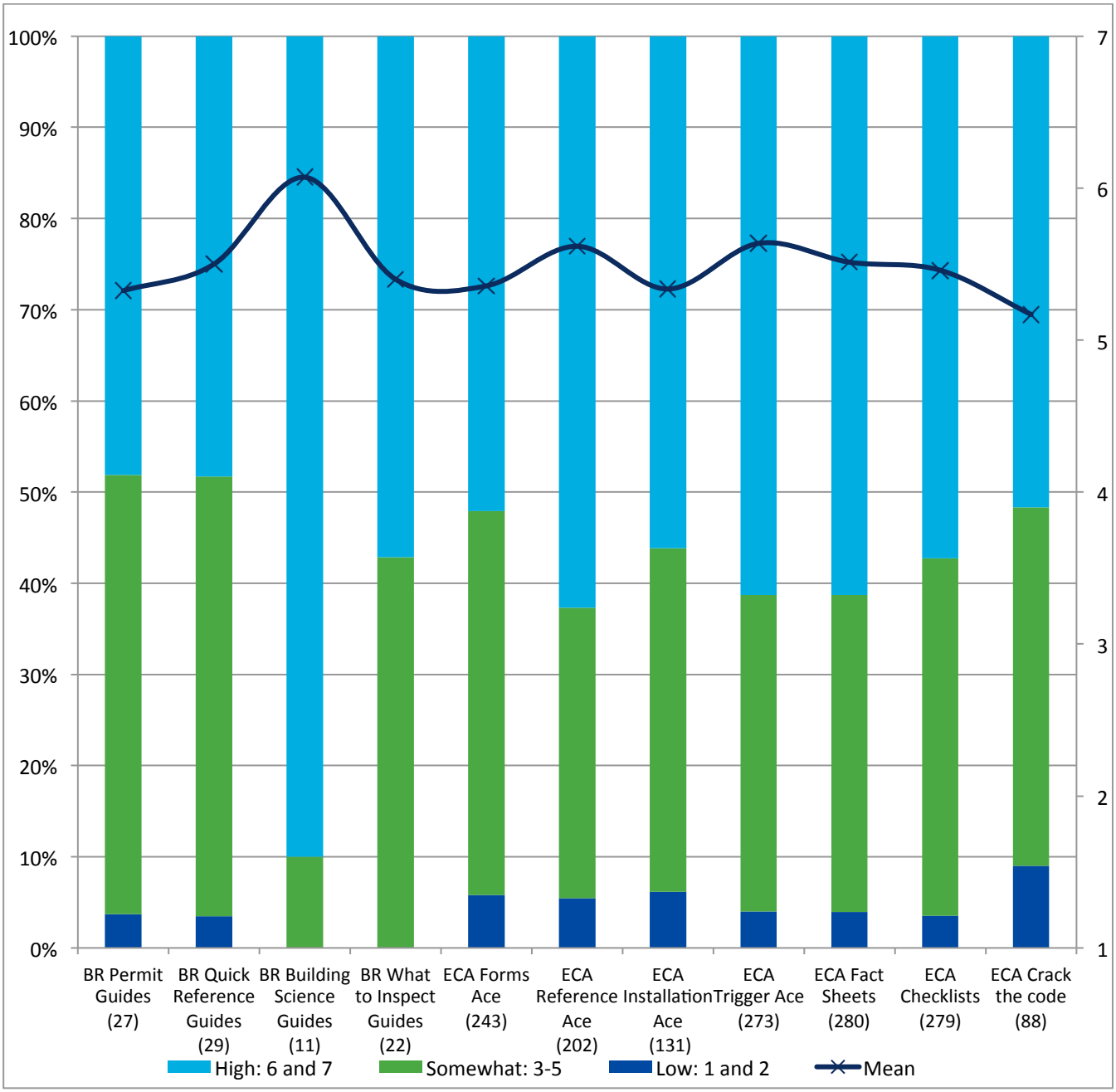
The web survey included questions asking those who have used the tools to rate how useful each of the tools were on a scale of 1 to 7 and the results are summarized in Figure 25. Across the tools, the percent of users that found the tools "Very Helpful" (rating of 6 or 7) ranged from 48% (BayREN Permit Guides and BayREN Quick Reference Guides) to 90% (BR Building Science Guides).

Overall, the ratings were very high, indicating the respondents that used the tools found them very useful. The mean rating given by the web survey respondents ranged from 5.2 (ECA Crack the Code) to 6.1 (BayREN Building Science Guides). One in-depth interview respondent rated the tools a "6" and commented,

> *"Most useful was the worksheets that they (ECA) put together. The checklists and worksheets that combined and compile the info in a digestible format. I used a few different worksheets."*

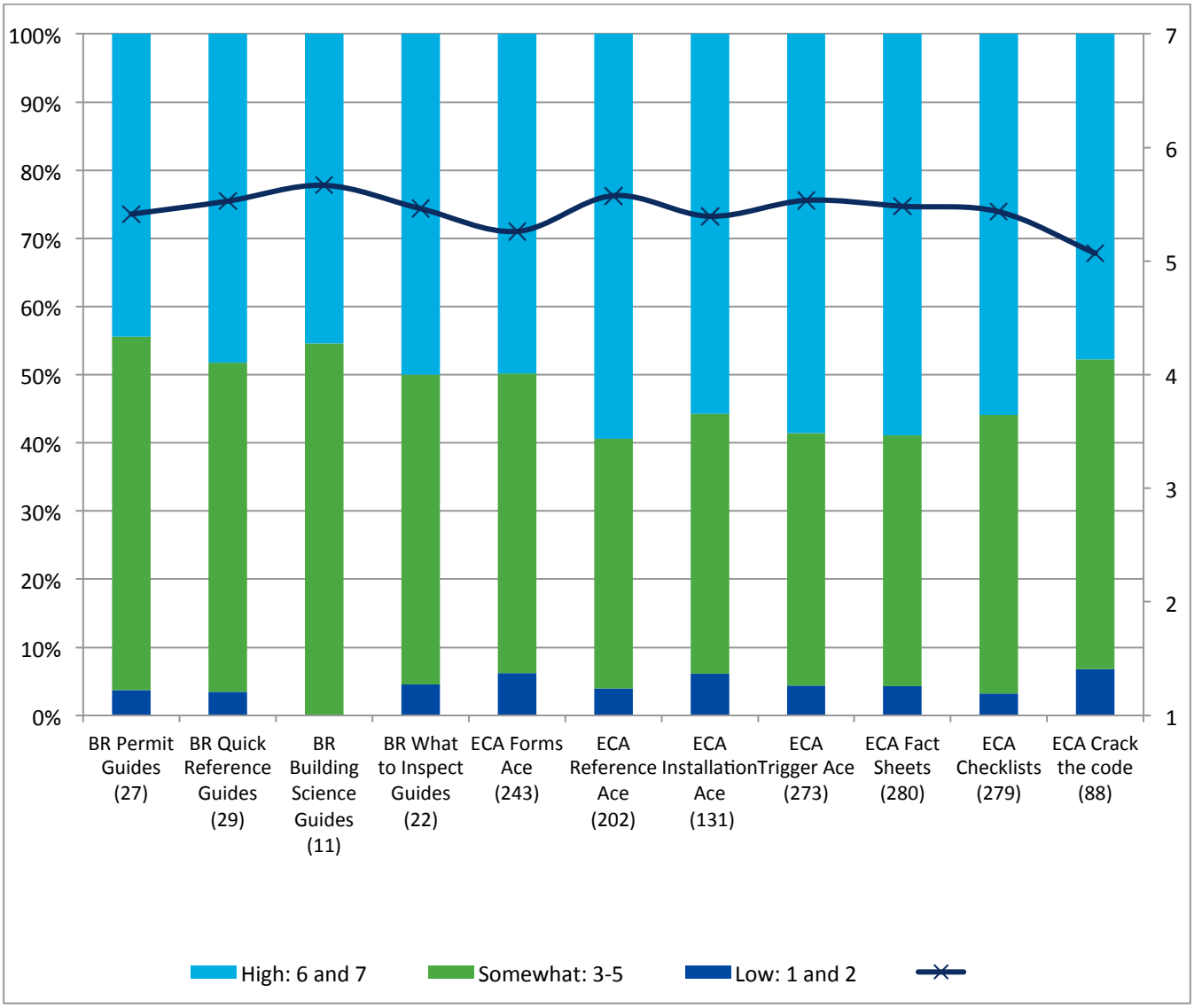
These results are summarized in Figure 25.

Figure 25. Usefulness of BayREN and ECA tools



Similarly, web survey respondents were asked about their overall satisfaction with the tools they indicated using and asked to give a value using the same 1 (Very dissatisfied) to 7 (Very satisfied) scale. Again, the results are very high for satisfaction, all tools scoring above 5.0. Results are shown in Figure 26.

Figure 26. Satisfaction of BayREN and ECA tools



Follow-up interview respondents rated their satisfaction with the ECA tools on the same 1 to 7 scale. The average satisfaction among these respondents was 6.2, indicating broad satisfaction. We asked the respondents who rated the tools to explain the reason behind their rating. Respondents stated they value the organization of the tools and that they appreciated that the "Trigger Sheets, Fact Sheets, and Checklists do a good job in explaining something so complicated."

Other comments when asked to explain their rating, included:

> *"There were some hiccups in the beginning, but they have worked out some of the initial issues. People can easily access it and find what they need."*

"It [Forms Ace] is a pretty good interface, but not a slam dunk. It probably needs some upgrades, but is pretty good overall."

"They are really good for referencing if you don't understand something about [the code]."

"They are very user-friendly, helpful in explaining certain things, interactive."

There were two respondents who reported using both BayREN and ECA tools. They were asked to explain the differences between the tools provided by the two agencies, but were not able to specify- all the tools have their own purpose. Both reported using ECA tools more often than BayREN. When asked why, one respondent said that the only difference was that the ECA website is on the tool bar in his web browser and another indicated that she was introduced to the ECA tools first, so those are the ones the use.

4.4.3 Recommendations from tool users

Finally, we asked both web survey respondents and interviewees how the tools could be improved or be easier to use. Interestingly, the web survey respondent's most common comment was that the tools were great and the community was appreciative of them and the work that went into putting them together. There were also a number of comments that the tools should simplify the code information even further, but an equal number of people thought there was too much emphasis on trying to shorten/simplify and that information should be added back in. Other suggestions from respondents were:

- **Organize tools** by climate zone, building type, and/or project type.
- **Provide more examples and visuals** of processes ("if I am doing this, then I follow this track") to make it easier for new staff or consultants. Examples of completed forms would be helpful: *"If we could see what was needed for a project with example forms online then that would be great. In contrast, last week I talked to a building official about a plan I am reviewing. They want to use the prescriptive approach and we were trying to figure out where to put a particular component of the building. So it was like where does this go? It would be good to see examples. Knowing where things should be input and where it would be on the form. It would help many people, including the building departments."* Web survey respondents also recommended more photos and videos.
- **Integrate with other agencies, perform more outreach, and make tools interactive,** and have the information in one form be available for others needed for the project. There needs to be more integration with CEC, CalGreen, building departments etc. Hyperlink to the code sections referred to in the tools. Conduct more outreach to contractors.
- **Ensure tools are up-to-date.** One interviewee and a number of web respondents reported a tool contained incorrect information. A number of web respondents also recommended that ECA keeps the forms updated and to contact users when they have changed.
- **Increase search functions.** One interviewee and a number web survey respondents wanted the ability to search within the Tools to find specific information: *"If I do a search for something about lighting, it will refer to the Fact Sheet page, but it won't get me the specific place. If I could use Boolean terms and search within the Fact Sheets that would be better. It does not give me the granularity that I need. Additionally, I want to be able to categorize; can I search limited to just three specific Fact Sheets? Because there are many Fact Sheets, so I need to limit to Fact Sheets that I need."*

A number of web respondents and most interviewees mentioned that unfortunately, the codes are still very complicated and the only hope is that the codes get simpler.

4.5 BayREN PROP

DNV GL Energy staff conducted five follow-up in depth interviews with building officials representing five of the fifteen jurisdictions that participated in the BayREN PROP. The primary goal of the interviews was to get an idea about the influence and impact of the BayREN PROP program in helping jurisdictions improve codes and standard compliance in California.

The primary objective of the interviews with the PROP departments was to determine if the involvement with PROP changed or improved the approach or process of how jurisdictions enforce the energy code. A number of the interview questions focused on what, if anything had changed about how the building departments do their jobs. Interviewers asked about ease of job, approach to code compliance, and understanding of code. They also asked if the time per project had decreased at all and about the recommendations provided by the BayREN specifically for their jurisdictions.

4.5.1 Value of PROP

Four of the five building officials interviewed indicated their association with BayREN has not made their job noticeably easier. One respondent indicated the presence of BayREN helped raise awareness about new energy code, but that it was growing more complex over time. This sentiment was highlighted by another building official conveying that while thankful for recommendations provided by BayREN, they are "still buried under the weight of the energy code that continues to change without any regard to how to be able to actually enforce." Another building official stated that the partnership with BayREN did make the job easier as the department had gained a lot of insight into the code from BayREN. The tools help the department with plan checks so that they can do their jobs more efficiently and accurately. This building official has also shared BayREN's information with contractors to help them better understand the energy code.

Four of the five building officials interviewed indicated their association with BayREN has not changed the way they approach overall code compliance. Many of these building officials mentioned being understaffed and wanting to be able to bring on an additional energy expert(s) to help out with plan sets, compliance documentation, and verification during inspection and commissioning of buildings. One of these building officials conveyed that having the financing to add an energy expert to staff would go a long way toward ensuring a higher level of compliance.

Three building officials indicated that BayREN has helped with better knowing how to effectively enforce the current energy code. These building officials appreciated how BayREN provided suggestions about how to approach the code and that the BayREN PROP reports helped point out what they were doing well and what they needed to work on. Two of the building officials interviewed indicated their association with BayREN has not significantly helped with their understanding of how to best enforce the energy code. One of these building officials conveyed the best way to understand how to enforce the energy code involves training, but that it is difficult to figure out and keep up with what the energy commission wants to enforce.

Four of the five building officials interviewed indicated their association with BayREN has not impacted the time it takes to complete code paperwork. A couple of these building officials noted they often have to outsource with contractors to conduct plan checks, which often requires getting them up to speed with how plan checks are done locally. It was mentioned that if these jurisdictions could afford an energy expert who was involved with plan checks every day, would likely lead to significant decrease in time to process code paperwork. One of the building officials interviewed noted their interaction with BayREN has helped improve

how they go about processing energy code paperwork. Specifically, he noted that BayREN helped them identify "hot spots" that made processing the paperwork easier. The building official also mentioned making use of a hotline to help address problems when completing paperwork.

4.5.2 PROP recommendations and effect on energy code compliance

BayREN provided three to five recommendations in its report for each of the five jurisdictions interviewed. Many building officials indicated the impact/usefulness of the BayREN report recommendations was a 4 or 5 on a scale of 1 to 5 where 1 represents "Not at all useful/impactful" and 5 represents "Very useful/impactful". The jurisdictions also thought highly of BayREN staff, as expressed by the following comments:

> *"Think BayREN program is good and glad that we went through the process—think BayREN was thorough in review of plans and onsite inspections. [BayREN] cast beneficial light on what [to] do with energy every day on each project."*

> *"BayREN really knows the energy code—if there is something they do not know, they find it out."*

Building officials were asked if they implemented recommendations contained in the BayREN PROP report that were specific to their jurisdiction. All five of the building officials interviewed conveyed that at least a portion, if not all, of the BayREN PROP report recommendations were something that they should have been doing, but were still a good reminder. However, all the building officials interviewed reported not having implemented at least a portion of the recommendations contained the BayREN PROP report.

Building officials reported the following about the recommendation to make use of BayREN guides:

> *"We are looking into doing more automated permitting next year for projects that do not require plan checks. [BayREN guides] would be beneficial because would use best practices in information put online for people doing those installations without having to set foot in building official office. Would issue permit and then go out and do inspection."*

> *"Have to see permit guide – potentially could be very helpful because enable to give better information to customers (e.g., contractors, homeowners) at beginning of project."*

These responses indicated that they thought the BayREN guides could be useful for their customers, if not for the departments themselves. Others were not sure how they would use the guides:

- *"What would be the purpose of using the BayREN guide for residential water heaters? Instead of using the guide, we actually help the applicants. So instead of giving them a handout, we help them with information. [Applicants] come in unaware of what they are doing, and then we help them through the process. And like I say, water heaters are one of the easiest things to enforce because they are not changing their water heater other than changing out their existing water heaters—same size, same location, and with a high-efficient water heater."*

- *"[Replacement windows] are an easy one—We just cut to the chase and tell customers what the code requirements are for window replacements. It's really easy. We have Climate Zone 3, and we have Climate Zone 12. We have a table they can use. We tell people, we're really customer service-*

oriented here. We just give them the information. And if people do want handouts, we can provide them to them. For the most part, they just accept our expertise, and they're appreciative, and they walk out with a permit and get their windows replaced."

- *"The checklist is good for training purposes and when you are getting a new building inspector out in the field to understand for what they are responsible. But we do not want any of our building inspectors to be reliant on any checklist. They need to understand and know the code. That makes them efficient at their job."*
- *Rather than another checklist, what has been effective has been Benningfield coming out and actually watching our staff do their job, and then getting instant feedback. That's where I see the benefit. It's not, be a big list of recommendations. What's the practicality of that?"*
- *[Forms in general] We appreciate all the forms and all the paperwork and everything, but we really do enforce the energy code here. We try to make it easy because if it is too complicated, people go underground. Because we are so busy, we do not have time to look at a separate piece of paper every time we make a decision about something —Otherwise, we'd be looking at 3,000 pieces of paper in the course of the day.*

These responses indicated that the BayREN recommendations to use tools such as checklists were viewed as cumbersome rather than helpful to the building department on a day-to-day basis. However, they did view them as helpful for training or educating applicants.

Finally, another primary goal of the BayREN CI program is to encourage dissemination of reach codes appropriate to the Bay Area and the spread of best practices and interviewers asked participants about this component of their experience. All the building officials interviewed said they interact with other local building departments in the region on a regular basis, but at industry meetings (e.g., CALBO and International Code Council chapter meetings) and not through the BayREN. They indicated they share information about forms, processes and upcoming trainings, and that these interactions are not always focused on energy code issues.

In summary, building officials indicated that BayREN has not impacted how they work with the energy code in their jurisdiction. Officials expressed that while energy code compliance is important, it is not the most important thing they do relative to the consideration given to building structure, health and safety. Officials are confused by the changing energy code regulations, finding them to be complicated and taking more of their time to address than they have available. However, building officials are appreciative of BayREN, with one respondent stating that "BayREN has done a somewhat heroic effort trying to provide training."

4.6 Remaining barriers to energy code compliance

We asked interview respondents about what barriers remain to energy code compliance, other than the complexity of the code. Interviewees cited barriers to energy code compliance both from the building department perspective as well as from the building industry perspective.

In terms of barriers from the building department perspective, the most commonly mentioned barrier (with six interviewees) was the time required to thoroughly enforce the energy code. Most of these respondents

referred specifically to the time demands of inspectors in the field. Some of the things respondents said included:

- *"In the field, it's hard – you just don't have time to check everything in terms of quality of air sealing and that type of stuff, some of the green code."*
- *"Time in terms of doing inspections is one. In the field, for [me] to tell if they've complied with the lighting requirements in the kitchen (for example), I just don't have time to sit down with a calculator and figure it out. In the field, what they put on a plan sometimes is different than what's actually done…"*
- *"If we were to expect a project to ensure all energy compliance, we would be there all day (with ceilings and window seals, etc.)."*
- *"It is a [time-sensitive] document, and if you enforce it to a T, it takes hours to make sure a whole plan is Title 24 compliant."*

Because of the time and workload, four building department representatives said, inspectors and plan reviewers must prioritize, and energy code carries a lower priority than health and safety factors. For instance, one respondent remarked that, while her building department did a good job of ensuring that windows and insulation were installed correctly, that was mostly the extent of their inspectors' checks. *"Energy code stuff is less of a priority than safety stuff,"* she said. Another remarked:

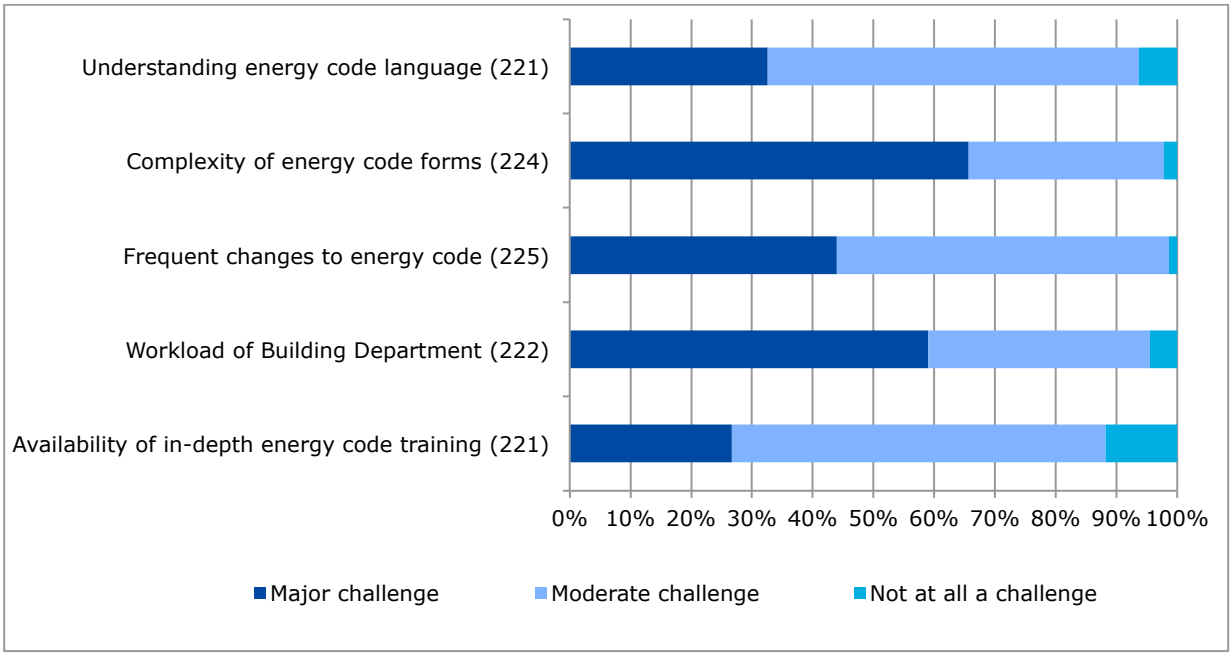
> *"Energy used to be a lot simpler, and because of the increased complexity, it has fallen through the cracks. The culture of building department personnel, historically they have seen safety, and not energy, as being primary. They have not connected those dots with climate and health importance. It's hard for staff to relate to it."*

Three interviewees also mentioned the difficulty they had had with the energy code forms, including ongoing changes that confuse both building departments and applicants. One interviewee remarked, *"Because it is complex, CEC is on an ongoing basis making changes with the forms and the program … it's like a moving target."* While working at the counter, she had been presented with updated forms, which she had not seen, and that had caused issues. Another said *"I am really frustrated with the new forms. They are hard to read, I can't read them anymore in the field."*

Another interviewee stated that, from the building department perspective, there is no incentive to enforce the energy code. Building departments are not "forced to enforce," and there are no penalties or consequences for not properly enforcing the code.

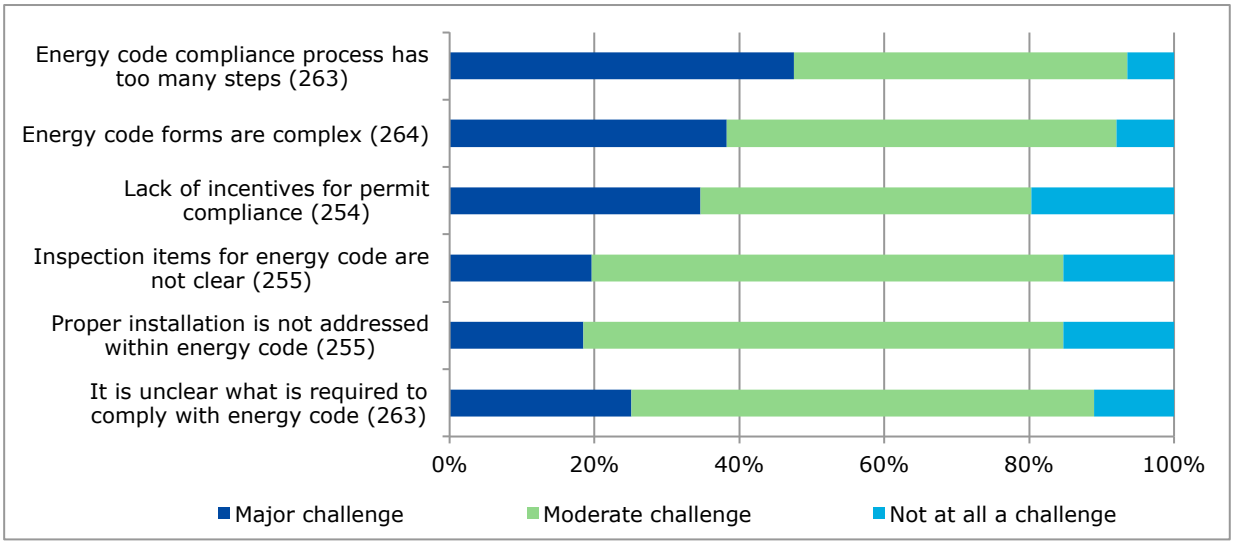
The web survey also asked building department members about previously identified barriers and if they were still challenges. The majority of building department members (66% and 59% respectively) indicated that the complexity of energy compliance forms and the workload were still major challenges. Figure 27 illustrates these results.

Figure 27. Building departments remaining challenges



Those that identified as working in the building industry were asked a similar line of questioning about challenges in complying with the energy code. The results are shown in Figure 28.

Figure 28: Building industry remaining challenges



Building industry members indicated that a remaining barrier to energy code compliance is that the compliance process has too many steps, with 94% indicating that it was at least a moderate barrier. Complex energy compliance forms and uncertainty about energy code requirements were also seen as at least a moderate barrier to 92% and 89% of building industry web survey respondents, respectively.

From a building industry perspective, one of the most commonly mentioned barriers (with 3 interviewees) was uneducated, unlicensed, or simply apathetic contractors. One respondent summed up this sentiment:

> *"The biggest thing is the contractors don't have a clue. They don't have the information. Plan checkers and architects communicate, but a lot of times the contractor is not sure why they're using these products. When a certain product is not available, they don't understand that they need to make sure it meets the energy code, they can't just go out and buy whatever."*

According to one respondent, lack of energy education from the general public exacerbated this barrier.

Another barrier mentioned from this perspective, also by three respondents, was the time and money required to acquire a permit. *"People don't want to spend the money on a permit, don't want to take the time to call for an inspection"* one said. *"To a handy-man type contractor, time is money, so they are just not doing it. I cannot even tell you the amount of times I've seen water heaters completely unvented."* The suggested solution to this barrier offered by the interviewee was to require registration with the state when purchasing major energy-using equipment (such as furnaces or water heaters) that can be traced back to individuals.

The final barrier mentioned by respondents, which applied to both the compliance and the enforcement sides, was a lack of meaningful penalties. For installers/builders, one interviewee said:

> *"No one enforces it, so why bother pulling a permit and filling out the forms when they don't have any inspectors that enforce? The fees are minimal if you're caught doing work without permits and if they do catch you, they may give a warning and not a fine."*

4.7 Best practices and suggestions for energy code enforcement

We asked the interviewees that had participated in ECA or BayREN training to discuss some best practices or things that their department does that work well for enforcing the energy code. Responses were scarce, but two respondents said that using checklists (one specifically mentioning the ECA checklists) worked well for enforcement. Another respondent said that taking the time to enforce everything, no matter how long it took, and electronically scanning all documents for official record keeping were best practices for his department.

We asked web survey respondents to rate a number of previously documented recommendations for improving energy code compliance. Respondents used a 1 to 7 scale in which 1 indicated "not at all helpful" and 7 indicated "extremely helpful." Building department members rated the following recommendations as follows:

Figure 29. Rankings of recommendations by building department members

Theme	Description	Mean Rating	Value
Outside influence	Permit applicants were knowledgeable of the energy code (213)	6.0	
Outside influence	Permit applicants were aware of the value of complying with the energy code (213)	5.5	
Experts	Design professionals could receive accreditation of expertise in energy code compliance (213)	5.4	
Documentation	Provide "Plans Examiner Priority Sheet" to help Plan Examiners prioritize energy code (70)	5.4	
Simplify	Standardize building department energy code enforcement across jurisdictions (211)	5.4	
Time	More time to prepare to enforce energy code (211)	5.2	
Training	Energy code training provided at my facility (213)	5.2	
Simplify	Standardize over-the-counter permits across jurisdictions (213)	5.2	
Simplify	Expand the prescriptive approach options (209)	5.1	
Experts	Support for in-house energy code Expert/Champion (215)	5.0	
Outside influence	Permit applicants were provided an incentive to comply with energy code (211)	5.0	
Experts	Contractors could be pre-qualified to self-certify their energy code work (211)	4.9	
Tracking	Rewrite energy code to integrate into city code more easily (213)	4.9	
Others	Invest in stronger relationships with building industry community (213)	4.8	
Simplify	Streamline permitting process (211)	4.7	
Tracking	Provide compliance tracking software for Building Inspectors to use onsite (215)	4.7	
Tracking	Integrate energy code into computer software that tracks permit process (209)	4.5	

The recommendations rated as most helpful by building departments were for permit applicants to have more understanding of the code and its value. Recommendations to standardize were also rated highly. Efforts to integrate energy code to into tracking software were rated as helpful, at a 4.5, but not as high of a priority.

We asked building industry web survey respondents to rate a number of similar recommendations for improving energy code compliance on the same scale. Building industry members ratings were as follows:

Figure 30. Rankings of recommendations by building industry

Theme	Description	Mean Rating	Value
Simplify	Simplify building energy code (257)	6.3	
Simplify	Simplify compliance process (260)	6.2	
Simplify	Increase consistency in code enforcement across jurisdictions (250)	5.6	
Simplify	Standardize over-the-counter permits across jurisdictions (249)	5.4	
Documentation	Permit-specific guides and checklists (256)	5.3	
Training	More training on Mechanical systems (255)	5.1	
Experts	Establish pre-qualification for accredited professionals to self-certify their work (250)	5.0	
Experts	Establish energy code accreditation programs in the industry (ex: contractors, designers) (250)	4.9	
Simplify	Expand prescriptive approach options (249)	4.9	
Training	More in-depth training on other energy topics (244)	4.9	
Tracking	Integrate energy code information into electronic permitting systems (243)	4.8	
Training	More training on Lighting code (252)	4.7	
Training	More training on Envelope measures (253)	4.7	
Tracking	Integrate HERS registry information into electronic permitting systems (247)	4.4	

Building industry members responding to the web survey were most interested in simplification strategies, with simplifying the code, the compliance process, and increasing enforcement consistency getting the highest ratings. They rated recommendations for more training options as the least helpful. They were also not interested in integrating energy code into other tracking methods.

A number of the recommendations the web survey had both the building department members and the building industry rate had to do with having experts to act as a resource for the respective communities. Both the building departments and building industry rated these recommendations as only "Somewhat helpful."

We asked the interviewees that had participated in ECA or BayREN training to review and respond to a subset of the same recommendations for improving code enforcement in order to add insights from building departments to previous research. Suggestions were addressed one by one, including: online forms and submittal, more prescriptive alternatives, standardization across jurisdictions of over-the-counter permits, accreditation programs in the industry (for contractors and designers), self-certification (of over the counter permits, or other permits), permit applicants being knowledgeable about the energy code, and integrating the energy code into electronic permitting processes. Interviewees used a 1 to 7 scale in which 1 indicated "not at all useful" and 7 indicated "extremely useful." The results from the interviews are summarized below.

Permit applicants being knowledgeable about the energy code

All of the interviewees said that permit applicants being knowledgeable about the energy code would be useful for enforcing the energy code, while many acknowledged the unlikelihood of such a thing happening on a grand scale considering the complexity of the code. The average rating was 6.7, the highest of all

suggestions. One respondent likened the issue with the recent drought and water rationing in California, saying that a similar citizen education campaign and "media bombardment" could help in this effort.

Accreditation programs in the industry (for contractors, designers, etc.)

Most interviewees had positive reactions to the suggestion of mandatory accreditation programs in the industry, with an average of 5.8 on the 7-point scale. The main improvement from the building department perspective seemed to be less hand-holding with contractors and others leading to decreased workloads for building department staff. One respondent mentioned that there are already accreditation programs in the industry (the certified energy analyst).

More prescriptive alternatives

Opinions were mixed to negative for the possibility of having more prescriptive alternatives, with an average rating of 3.4 on the 7-point scale. Three said that more prescriptive alternatives could potentially be useful, with one adding *"if it was a simplifying alternative, and understandable, and implementable."* Otherwise, they argued, it would not be useful. Two of these three mentioned that the custom (performance-based) approach can be both more cost-effective for applicants and easier for building departments staff to review. Two respondents in particular were very pessimistic about this suggestion, stating:

> *"There are already a couple prescriptive options, and introducing more would just bring more confusion."*
>
> *"More 'exceptions' means more confusion. I like it when they just have table A (energy for this house needs to be at this level) and leave it at that."*

Standardization across jurisdictions of over-the-counter permits

Opinions were also mixed about whether standardization would be useful for enforcing the energy code, with an average rating of 3.4. One respondent in particular said this would be very helpful, and another sympathized with the idea that different jurisdictions currently enforce the energy code with varying levels of rigor:

> *"If everyone knows what they are looking for and understand it. The biggest complaint from the applicant side is in how rigorous the different departments check the plans on."*
>
> *"That would be a good idea. Unfortunately, politics doesn't let that happen. Our requirements are not as strict as the county. People are so afraid of going to the county, they do so much illegal construction."*

One respondent, however, voiced much more negative feelings: *"Do not standardize permits, standardize the code book. Instead of having a zillion exceptions, make everyone play by the same rules."*

Self-certification (of over-the-counter or other permits)

Responses to self-certification were generally poor, with an average rating of 2.7 on the 7-point scale. Two respondents thought it might work, with one giving the caveat of *"If the certification program was good and had quality monitoring of qualifications of the individuals"* self-certifying. The others were much more opposed to the idea. One interviewee said that their department had instituted self-certification with other parts of the code and had gotten complaints from home-owners that contractors did not complete work correctly as a result. Others said:

- *"It's just another form of 'liar loans' just like we had in the housing crash … people will sign whatever. But no one's going to come after them or sue them."*
- *"It leaves a lot of the hard work on the inspector because they have to deal with the issue: they already installed x, do you make them change?... [There may be] potential issues in the field."*
- *"The majority of over the counter permits are residential, and property owners never have a clue of what is required. It's hard to get them to follow even the basics."*

Online forms and submittal/integrating energy code into electronic permitting process

Interviewees thought these suggestions would be the least helpful for enforcing energy code, with a combined rating of 2.3 on the 7-point scale. Three respondents mentioned that their department did not have online forms or electronic permitting processes, with one remarking that applicants would expect their submitted forms back unrealistically quickly if they had such a process and another remarking that it might create monetary hardship for smaller building departments. Others said:

- *"Inspectors might rate it a 4 or 5. From a plan check perspective, it would be not all that useful because we look at forms in a physical format. If they were online, we would check partly online and partly physical to make sure they line up."*
- *"Think about the contractor out there. They have to deal with everything, and then you are throwing a smorgasbord of 20 different forms. What is the benefit to the contractor?"*
- *"If we don't understand what energy forms apply, our clients are not going to have a clue."*

One respondent was relatively optimistic about this suggestion, stating *"the department is heading towards that way. Responses could be given faster."*

5 CONCLUSIONS AND RECOMMENDATIONS

Through the research described in previous sections, we have collected information on all aspects of the CI programs. This section summarizes our conclusions on which activities are most effective at improving compliance and provides recommendations for possible improvements.

5.1 Recommendations for IOU CI program

5.1.1 ECA trainings

The IOU CI program trainings were a series of role and/or project based trainings that were well received by participants. The strength of the ECA trainings was that the information provided on the energy code was comprehensive. Participants reported the trainings served to provide a knowledge base on the energy code, provided practical information on how to find out more detailed code information, and provided take home materials to use as an ongoing resource.

The trainings could benefit from three measures:

1. **Provide more focused trainings:** Our findings indicate that participants find value in the ECA trainings. However, while the trainings provide a lot of information on broad aspects of code compliance and build knowledge of the energy code, they may not be leading to improved code compliance. All market actors, especially plan checkers and building inspectors, have limited time available per project to focus on energy code. We recommend that the IOUs, perhaps in conjunction with BayREN, work to identify areas of the code that are most vulnerable to noncompliance. We suggest the IOUs develop focused, targeted trainings that address these areas of the code to both the supply side (building department staff) and the demand side (building industry members). Specifically, the IOUs should consider trainings that aim to:
    a) simplify the code for building industry members and provide trainings that are applicable to targeted groups (i.e. electricians that focus on residential improvements).
    b) maximize building department members time effectively

   The trainings should be hands-on and offer instant feedback for sample projects, identify common pitfalls, and provide examples of compliant and non-compliant projects. These trainings should be updated frequently as needs of building department and industry change.

2. **Expand online trainings.** Users were very satisfied with the online trainings that were offered by ECA as described in previous sections. The evaluation team recommends offering more of the Title 24 Essentials training series online, especially the trainings targeted to the building industry, who are less likely to come to classroom training. Further, users stated they wanted more examples and "how-tos." The online platform could provide great resource for short videos on how to fill out specific energy code forms, how to navigate the ECA website, and how to ensure proper installations of energy efficient equipment.

3. **Improve the reach of the trainings through strategic partnerships.** The IOUs should partner with code related organizations to provide links to the ECA training website. As knowledge of the energy code spreads, the time it takes for permit applicants and issuers to fill out and process forms will decrease. One theme that emerged from web survey respondents was that the building department staff spends a

significant amount of time explaining codes and standards requirements to permit applicants. The CI programs should aim to increase their reach with strategic partnerships in industry and equipment distributors. They should also leverage partnerships with local governments and encourage them to use resources and trainings available to permit applicants. The IOUs should consider the possibility of offering trainings that qualify for continuing education credits to further broader reach.

5.1.2 ECA website

The ECA website has become widespread in use during the relatively short time it has been live. Based on our research, the evaluation team recommends the following three ways to improve user experience and optimize the website for all users:

1. **Improve functionality of the ECA website.** Our findings indicate that the ECA website is a welcomed tool and popular destination for building department members and the building community. However, users find that the website can be cumbersome to use, especially to new users and those less familiar with building energy codes. Specific suggestions included added capabilities. The CI evaluation team recommends that the IOUs conduct further qualitative research to explore what design features would meet most users and potential user's needs.

2. **Improve organization of the ECA website.** Again, our findings indicate that the ECA website is a welcome, well-used resource by the building community. However, users found the website confusing to use and not intuitive. A number of specific suggestions indicated that the website should be organized by climate zone, compliance form, building area, or project type. Website users were also mostly unaware of available resources such as hotlines and help available through info@energycodeace.com. Building industry members were least likely to be regular visitors of the ECA website, which could be an indication that the current format of the information is not meeting their needs. We recommend that the IOU CI team further explores why and how users are coming to their website and how the site organization could be improved to best meet user needs.

3. **Partner and integrate.** CI program implementers should take steps to form and strengthen parterships with professional organizations frequented by the building community (such as CABEC, the American Institute of Architects, the international code council, and CALBO) and code enforcement agencies. They should continue to build and leverage current partnerships with local jurisdictions. Information supplied by ECA could be customized for jurisdictions and added directly to building department websites. Further, the IOUs should consider further research to investigate where building industry members seek information on the energy and or other codes and develop a presence there. These partnerships could expand the reach of ECA and provide consistency in messaging about energy code requirements statewide.

4. **Track user satisfaction.** The CI program participants responded enthusiastically to our request for feedback on CI program activities. This indicates that the tools are valuable and the community is engaged. We recommend that the ECA periodically ask users for feedback to track user satisfaction, determine user needs, and to inform future updates to all IOU CI program activities.

5.1.3 ECA tools

Our research shows that the ECA tools are a valuable resource for building departments, building industry, and energy professionals. Tool users indicate high satisfaction with the tools and they draw people to the ECA website. We recommend that the IOU CI team continues to develop ECA tools. We recommend further research into building community needs and that the IOUs align tools with areas of energy code non-compliance. Based on our research and the feedback given by participants, some tools that the IOUs could consider are tools by climate type, building type, and project type.

ECA tools are also seen as a way in which the building departments communicate with the building industry as they apply for permits. This is an opportunity for the IOUs to enable building department members to effectively and consistently communicate code requirements to permit applicants, increase ECA brand awareness, and drive traffic to the ECA website and trainings. The IOUs should consider handouts that building departments can refer customers to on common project types.

5.2 Recommendations for BayREN CI program

5.2.1 PROP

The evaluation found that the BayREN PROP did identify challenges to complying with the energy code and uncovered areas of non-compliance and common discrepancies between code implementation and the code as it is written. However, the evaluators found that the participating jurisdictions did not adopt recommendations from the BayREN PROP reports tailored to their needs. The evaluators did not find any participating nor non-participating jurisdictions that had read the aggregated report.

We recommend that the BayREN refocus the PROP program. The program is resource intensive, difficult to scale, and we found no lasting impacts. The individual visits with jurisdictions are neither successful nor scalable. The tailored recommendations from the PROP were not adopted by jurisdictions and therefore the evaluators do not believe that their adoption will spread. The PROP should re-evaluate the objectives of the program and determine how to best add value to the community and build on the successes.

5.2.2 BayREN trainings

The BayREN training series was well received and participants felt that they were different from the ECA training offerings. Building departments appreciated that BayREN visited the departments, and provided an opportunity to ask questions specific to their jurisdictions. Similar to the IOUs series, the BayREN trainings should consider a process to continually target areas of non-compliance with the energy code. The IOUs and BayREN could work together to identify areas of non-compliance and develop trainings that are delivered in both formats to have the largest impact and greatest reach.

The primary objective of the BayREN forums is to disseminate best practices and lessons learned amongst local Bay Area jurisdictions. The evaluators found that the forums were well attended, the overall response was positive, and the participants indicated they learned about energy code compliance and green building code topics. However, the evaluators did not find evidence of any actions taken as a result of the forums amongst the participants we interviewed. When probed, the forum participants indicated the forums were most valuable as a place to exchange ideas and network. Therefore, we recommend that the forums be re-designed with clear objectives that focus on the stakeholder needs that can be tracked to determine outcomes. Half day forums may not be the best method to reach those objectives. One opportunity may be to add a BayREN sponsored agenda item to other industry and/or energy code related networking events.

5.2.3 BayREN tools

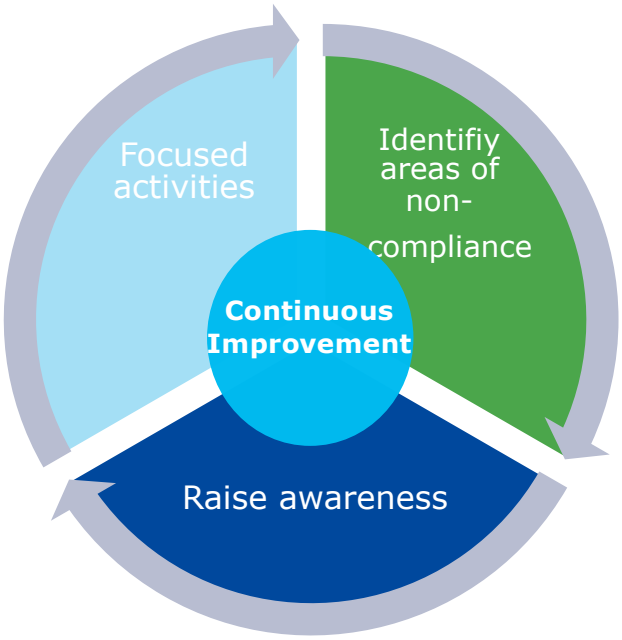
The BayREN tools are well received by the respondents that indicated they used them. However, the recommendation by BayREN to use the tools in PROP reports was not well received. Building departments cited they did not need further paperwork. They did however agree that the tools were useful for a broader audience. Thus, we recommend that going forward, the BayREN collaborate with ECA and develop tools for a more widespread audience. We urge BayREN to leverage their partnerships with building departments to encourage them to disseminate tools. Similar to the IOUs, this is an opportunity for BayREN to enable building department members to effectively and consistently communicate code requirements to permit applicants.

5.3 Considerations for compliance improvement

An overall conclusion to our research is that the California energy code is very complex due to the degree and frequency of the technical changes and updates. As such, designing efforts to try to improve and enforce compliance is a challenging job and requires an ongoing process. This finding is reinforced through comments from the building departments and energy industry respondents on how challenging it is to keep up with the changes.

To address this challenge, we recommend that the CI programs consider focusing their activities in the areas most vulnerable to non-compliance versus focusing on measuring improvement. The BayREN and IOU CI programs should work in close coordination with each program focusing on their strengths. The IOU CI program would continue to focus on delivering statewide programs for a broad reach and the BayREN CI program focus on engaging with building departments in an ongoing dialogue. The two CI programs could work together to identify key barriers to code compliance and areas of non-compliance. They can concentrate their efforts on raising awareness and developing tools and trainings to mitigate the identified barrier until it is no longer a main factor driving noncompliance and then repeat the process identifying and targeting other barriers. Figure 31 illustrates this cycle of continuous improvement.

Figure 31: Cycle of continuous improvement



A key to continuous improvement will be ongoing feedback of CI program activities and barriers to code compliance. The CI programs can use existing infrastructure to develop feedback loops. We provide the following recommendations on specific actions to help support this effort. :

a) Solicit feedback on all activities. Develop periodic surveys for website users and trainees to assess satisfaction and determine ongoing user needs.

b) Create systems for better tracking. Within the website, require that users are registered to download tools and participate in trainings. The CI programs should work with partner building departments to develop reporting guidelines and systems that enable the CI programs to determine code vulnerabilities and user needs.

To complete the feedback loop throughout the compliance chain, we recommend that the CI programs consider further developing the following communication channels:

c) Engage of the code developers and provide ongoing feedback directly. Encourage simplification where possible.

d) Develop strategic partnerships with jurisdictions, state agencies, and professional organizations. Partnerships increase reach of CI program activities and lend legitimacy to the tools, trainings, and resources, and increase the consistency of how the code is interpreted.

e) Outreach to building industry. The building industry was the least likely to have attended trainings or use tools. Building departments reported that the single most helpful thing that would help them enforce code, would be that those that apply for permits have some understanding of the energy

code. The CI programs should consider outreach strategies to help building permit applicants understand the energy code as it applies to their trade or common project type.

APPENDIX A. INTERVIEW GUIDES

Codes and Standards Compliance Improvement Process Evaluation Follow-up Interviews

California Public Utilities Commission

1 BAYREN FORUM PARTICIPANT

Program exposure: This person has attended one or more forums that BayREN conducted. They have completed the DNV GL web survey.
General Role: They could work at a building department, utility, local government, be consultants.
Objectives:

- In-depth interview to understand the participant interaction with the program
- Are the forums useful? What do they learn at them? What ideas are shared?
- What is its value as a regional forum? i.e. what does the regional aspect bring to this that isn't offered in other parts of the C&S program?

Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback; there are no wrong answers and all of your responses will be kept confidential.

Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.

Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you participated in the BayREN Codes and Standards Regional forums? [If not, add seven forums were hosted in 2013/14. Our records indicate you went to _____ and_____ (depending on records). Do you now remember participating in those forums? If NO, Thank &Terminate]

    a. How did you find out about the forums?
    b. Was the forum held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    c. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    d. Did you have sufficient notice about the forum so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    e. Why did you decide to attend?
        i. IF DK, then ask What were your goals for attending?
    f. What information, if anything, do you use from the forum?
    g. What, if anything, do you want more information on?
    h. On a scale of 1-7, how valuable was the BayREN forum?
        i. Why do you give it that rating?
    i. On a scale of 1-7, how satisfied are you with the forum?
        i. Why do you give it that rating?
    j.

3. Describe interactions with others at the forums.
    a. PROBE if necessary: Did you learn anything specific from other participants that you can tell me about?
    b. PROBE if necessary: Did you share anything specific with other participants that you can tell me about?

4. Are there any outcomes from interactions with regional counterparts from local governments or building departments?

5. What, if anything, has changed **because of** your participation in the forums? [Probe for examples of each]

    a. Understanding of current state energy code?
    b. Understanding of local reach codes (energy/green building)
    c. Understanding of green building policies?
    d. Code appropriateness to your region?

6. Based on your experience with the BayREN forum, have you provided feedback to state code designers at the CEC or to local government departments involved in reach code development?

    a. If YES, How so?

7. What recommendations do you have for ways the forums can be improved?

8. Have you heard of Energy Code Ace? (If NO- Thank and terminate)

9. Have you been to the Energy Code Ace Website?

    a. If yes, why did you go there?
    b. Was it easy to find what you were looking for?
    c. Was it easily searchable?
        i. IF NO- Why not?
    d. Was the information on the website useful to you?
        i. IF NO- Why not?
        ii. If YES- How did you use it? Or Give me an example of what you used?
    e. Was the information well organized?
        i. IF NO- Why not?
    f. Do you tell others about the website or direct them to it?
        i. IF YES- Can you tell me about a time when you directed someone to the website?
    g. Do you have any recommendations for improving the website?
    h. On a scale of 1-7, how valuable is the Energy Code Ace Website in assisting you in your job?
        i. Why do you give it that rating?
    i. On a scale of 1-7, how satisfied are you with the website?
        i. Why do you give it that rating?

Thank you so much, your feedback is very helpful!

2 BUILDING DEPARTMENT BAYREN

Program exposure: This person has attended one or more trainings from BayREN. The trainings are specifically designed for building department personnel. They took the DNV GL web survey.
General Role: They work at a building department.
Objectives:

- What do they like and not like about Energy Code Ace Website?
  - Do you go to the website often? Is it easy to find what you are looking for? Specifically, how do you use it? What do you search for?
  - How could it be better?
  - Do you direct others to it? How so?
- What do they like best about trainings? What could be better? What is best?
  - Did the training take place in your jurisdiction? Was it mandatory?
  - How often do you use the information you learned in training?
  - How do you use it? Notes? References from class? The website?
- Do you use tools? Which ones? How do you use them?
- What are the best practices from their perspective when it comes to energy code?
- What are the barriers to enforcing energy code that exist? (other than the energy code being complicated).

Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback; there are no wrong answers and all of your responses will be kept confidential.

Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.

Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you may have participated in a BayREN Training? [[If not familiar, remind interviewee of specific trainings they have participated in based on our records. If still not confirm and Thank &Terminate]

    a. Which BayREN training did you attend?
    b. How did you find out about the trainings?
    c. Was the training held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    d. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    e. Did you have sufficient notice about the training so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    f. Why did you decide to attend?
        i. IF DK, then ask, What were your goals for attending?
    g. Was the training applicable to your job?
        i. Was it at the right level of information for you?
    h. Was the training applicable to your region?
        i. How so?
    i. What information, if anything, do you use from the training?
        i. How often do you use what you learned in training?

ii. Can you tell me about how you use it? (notes, reference materials from class, the website?)

j. What, if anything, do you want more training on related to energy code?

k. On a scale of 1-7, how valuable was the BayREN training in assisting you in your job?
   i. Why do you give it that rating?

l. On a scale of 1-7, how satisfied are you with the training?
   i. Why do you give it that rating?

m. How can the trainings be improved?

3. What, if anything, has changed **because of** your experience with the trainings? Specifically related to: (fill in or probe specifically)

   a. Understanding of current code?
   b. Time to complete code paperwork?
   c. Ability to comply with code?
   d. Code appropriateness to your region?

4. Have you been to the Energy Code Ace Website? (If NO- Go to #6)
   a. If yes, why did you go there?
   b. Was it easy to find what you were looking for?
   c. Was it easily searchable?
      i. IF NO- Why not?
   d. Was the information on the website useful to you?
      i. IF NO- Why not?
      ii. If YES- How did you use it? Or Give me an example of what you used?
   e. Was the information well organized?
      i. IF NO- Why not?
   f. Do you tell others about the website or direct them to it?
      i. IF YES- Can you tell me about a time when you directed someone to the website?
   g. Do you have any recommendations for improving the website?
   h. On a scale of 1-7, how valuable is the Energy Code Ace Website in assisting you in your job?
      i. Why do you give it that rating?
   i. On a scale of 1-7, how satisfied are you with the website?
      i. Why do you give it that rating?

5. Have you used any of the BayREN tools? I have a list to read if it helps. Please let me know which ones you have used (If NO- go to #9):

Tool	6a. For those you use, we are interested to know how often you use them and how do you use them?	
	Use? (Never, rarely, often)	How do you use them?
BayREN Quick Reference Guides		
BayREN Permit Guides		
BayREN Building Science Guides		

BayREN What to inspect guides		
Anything else?		

6. On a scale of 1-7, how valuable are the BayREN tools in assisting you in your job?
    a. Why do you give it that rating?
7.
8. On a scale of 1-7, how satisfied are you with the tools?
    a. Why do you give it that rating?

9. How could the BayREN tools be easier to use?

10. Does your department use other tools that are paper based? If Yes probe:
    a. For general permitting or applications?
    b. For plan review?
    c. For building inspections?
    d. How could the tools that your department uses be easier to use?
11. Does your department use tools that are web or electronic based? If yes probe:
    a. For general permitting or applications?
    b. For plan review?
    c. For building inspections?
    d. How could the tools that your department uses be easier to use?

12. You may have already mentioned some, but what barriers prevent code compliance, in your opinion?

13. What are some of the things your department does that works well for enforcing energy code?

    a. Anything that helps the Plans Examiners?
    b. Anything that helps the Building Inspectors?
    c. Anything that helps Permit Technicians?
    d. Is there one person in your department that is considered the "go-to" for energy code?

On a scale of 1-7, how useful are/would the following be for improving energy code enforcement: (PROBE for responses that are 1 and 7: Why do you say that?)**Topic**	**Importance/usefulness 1-7**
Online forms and submittal	
More Prescriptive Alternatives	
Standardization across jurisdictions of over the counter permits	
Accreditation programs in the industry, such as the CEA (for contractors, designers)	
Self-certification (of over the counter permits, other permits?) Permit applicants were knowledgeable of the energy code Hotline to call, or live person to go to for questions Integrate energy code into electronic permitting process	

Thank you so much, your feedback is very helpful!

3 BUILDING DEPARTMENT IOU

Program exposure: This person has attended one or more trainings from IOUs. The trainings are specifically designed for building department personnel. They took the DNV GL web survey.
General Role: They work at a building department. They have NOT been visited by BayREN or the IOUs.
Objectives:

- What do they like and not like about Energy Code Ace Website?
  - Do you go to the website often? Is it easy to find what you are looking for? Specifically, how do you use it? What do you search for?
  - How could it be better?
  - Do you direct others to it? How so?
- What do they like best about trainings? What could be better? What is best?
  - Did the training take place in your jurisdiction? Was it mandatory?
  - How often do you use the information you learned in training?
  - How do you use it? Notes? References from class? The website?
- What is the overall satisfaction with the trainings?
- Do you use tools? Which ones? How do you use them?
- What are the best practices from their perspective when it comes to energy code?
- What are the barriers to enforcing energy code that exist? (other than the energy code being complicated).

Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback; there are no wrong answers and all of your responses will be kept confidential.

Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.

Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you may have participated in an IOU or Energy Code Ace training? [[If not familiar, confirm and Thank &Terminate]

    a. Which training(s) did you attend?
    b. How did you find out about the trainings?
    c. Was the training held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    d. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    e. Did you have sufficient notice about the training so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    f. Why did you decide to attend?
        i. IF DK, then ask, What were your goals for attending?
    g. Was the training applicable to your job?
        i. Was it at the right level of information for you?
    h. Was the training applicable to your region?
        i. How so?
    i. What information, if anything, do you use from the training?
        i. How often do you use what you learned in training?

ii. Can you tell me about how you use it? (notes, reference materials from class, the website?)

j. What, if anything, do you want more training on?

k. On a scale of 1-7, how valuable has the training been in assisting you in your job?
   i. Why do you give it that rating?

l. On a scale of 1-7, how satisfied are you with the training?
   i. Why do you give it that rating

m. How can the trainings be improved?

3. What, if anything, has changed **because of** your experience with the trainings? Specifically related to: (fill in or probe specifically)

   a. Understanding of current code?
   b. Time to complete code paperwork?
   c. Ability to comply with code?
   d. Code appropriateness to your region?

4. Have you been to the Energy Code Ace Website? (If NO- Go to #6)
   a. If yes, why did you go there?
   b. Was it easy to find what you were looking for?
   c. Was it easily searchable?
      i. IF NO- Why not?
   d. Was the information on the website useful to you?
      i. IF NO- Why not?
      ii. If YES- How did you use it? Or Give me an example of what you used?
   e. Was the information well organized?
      i. IF NO- Why not?
   f. Do you tell others about the website or direct them to it?
      i. IF YES- Can you tell me about a time when you directed someone to the website?
   g. Do you have any recommendations for improving the website?
   h. On a scale of 1-7, how valuable is the website?
      i. Why do you give it that rating
   i. On a scale of 1-7, how satisfied are you with the website?
      i. Why do you give it that rating?
      ii.

5. Have you used any of the Energy Code Ace tools? I have a list to read if it helps. Please let me know which ones you have used (If NO- go to #8):

Tool	5a. For those you use, we are interested to know how often you use them and how do you use them?	
	Use? (Never, rarely, often)	How do you use them?
Energy Code Ace Checklists		
Energy Code Ace Fact Sheets		
Energy Code Ace Trigger Sheets		

Energy Code Reference Ace		
Energy Code Installation Ace		
Energy Code Forms Ace		
Anything else?		

6. On a scale of 1-7, how satisfied are you with the tools?
    i. Why do you give it that rating?

7. On a scale of 1-7, how valuable are the Energy Code Ace Tools in assisting you in your job?
    i. Why do you give it that rating?

8. How could the Energy Code Ace tools be easier to use?

9. Does your department use other tools that are paper based? If Yes probe:
    a. For general permitting or applications?
    b. For plan review?
    c. For building inspections?
    d. How could the tools that your department uses be easier to use?

10. Does your department use tools that are web or electronic based? If yes probe:
    a. For general permitting or applications?
    b. For plan review?
    c. For building inspections?
    d. How could the tools that your department uses be easier to use?

11. You may have already mentioned some, but what barriers prevent code compliance, in your opinion?

12. What are some of the things your department does that works well for enforcing energy code?
    a. Anything that helps the Plans Examiners?
    b. Anything that helps the Building Inspectors?
    c. Anything that helps Permit Technicians?
    d. Is there one person in your department that is considered the "go-to" for energy code?

On a scale of 1-7, how useful are/would the following be for improving energy code enforcement: (PROBE for responses that are 1 and 7: Why do you say that?)**Topic**	**Importance/usefulness 1-7**
Online forms and submittal	
More Prescriptive Alternatives	
Standardization across jurisdictions of over the counter permits	
Accreditation programs in the industry, such as the CEA (for contractors, designers)	
Self-certification (of over the counter permits, other permits?)	
Permit applicants were knowledgeable of the energy code	
Hotline to call, or live person to go to for questions	
Integrate energy code into electronic permitting process	

Thank you so much, your feedback is very helpful!

4 BUILDING INDUSTRY PARTICIPANT

Program exposure: This person has been to IOU trainings and website. They have listed their occupation as builder, architect, designer, contractor etc. They have taken the DNV GL web survey.
General Role: Builder industry member who visits building departments (probably more than one) to obtain permits and/or has to comply with the energy code as part of their job responsibilities.
Objectives:

- What do they like and not like about Energy Code Ace Website?
  - Do you go to the website often? Is it easy to find what you are looking for? Specifically, how do you use it? What do you search for?
  - How could it be better?
  - Do you direct others to it? How so?
- What do they like best about trainings? What could be better? What is best?
  - How often do you use the information you learned in training?
  - How do you use it? Notes? References from class? The website?
- Do you use tools? Which ones? How do you use them?
- Inform about the interaction with the building departments. What are their best practices when it comes to energy code?
  - Are building departments enforcing consistently
  - Are they helpful in pointing out the triggers for energy code
  - What do they wish was better for complying with energy code across departments?

Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback, there are no wrong answers and all of your responses will be kept confidential.
Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.
Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you participated in[ENTER WHAT THEY PARTICIPATED IN]? [*If necessary describe: "These are code compliance improvement programs that offer a wide range of Energy ACE tools to help key individuals like you address codes and standards in the permitting process. Those programs offer training, online resources, forums, and other forms of support. If you haven't heard of it, is there any code compliance program you have worked with?*]

3. Is that correct? Can you tell me what you have participated in?

4. Have you been to the Energy Code Ace Website? (If NO- Go to #5)
   a. If yes, why did you go there?
   b. Was it easy to find what you were looking for?
   c. Was it easily searchable?
      i. IF NO- Why not?
   d. Was the information on the website useful to you?
      i. IF NO- Why not?
      ii. If YES- How did you use it? Or Give me an example of what you used?
   e. Was the information well organized?
      i. IF NO- Why not?

f. Do you tell others about the website or direct them to it?
    i. IF YES- Can you tell me about a time when you directed someone to the website?
g. Do you have any recommendations for improving the website?
h. On a scale of 1-7, how satisfied are you with the website?
    i. Why do you give it that rating?

5. Have you used any of the Energy Code Ace tools? I have a list to read if it helps. Please let me know which ones you have used (If NO- go to #8):

Tool	5a. For those you use, we are interested to know how often you use them and how do you use them?	
	Use? (Never, rarely, often)	How do you use them?
Energy Code Ace Checklists		
Energy Code Ace Fact Sheets		
Energy Code Ace Trigger Sheets		
Energy Code Reference Ace		
Energy Code Installation Ace		
Energy Code Forms Ace		
Anything else?		

6. On a scale of 1-7, how satisfied are you with the tools?

    i. Why do you give it that rating?

7. How could these tools be easier to use?

8. Did you participate in any energy code training?
    a. How did you find out about the trainings?
    b. Was the training held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    c. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    d. Did you have sufficient notice about the training so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    e. Why did you decide to attend?
        i. IF DK, then ask, What were your goals for attending?
    f. Was the training applicable to your job?
        i. Was it at the right level of information for you?
    g. Was the training applicable to your region?
        i. How so?
    h. What information, if anything, do you use from the training?
        i. How often do you use what you learned in training?

ii. Can you tell me about how you use it? (notes, reference materials from class, the website?)

i. What, if anything, do you want more training on?

j. On a scale of 1-7, how satisfied are you with the training?
   i. Why do you give it that rating?

k. How can the trainings be improved?

9. What, if anything, has changed **because of** your experience with the trainings? Specifically related to: (fill in or probe specifically)

   a. Understanding of current code?
   b. Time to complete code paperwork?
   c. Ability to comply with code?
   d. Code appropriateness to your region?

10. You may have already mentioned some, but what barriers prevent code compliance?

11. On a scale of 1-7, how useful are/would the following be for improving energy code enforcement: (PROBE for responses that are 1 and 7: Why do you say that?)**Topic**	**Importance/usefulness 1-7**
Online forms	
More Prescriptive Alternatives	
Standardization across jurisdictions of over the counter permits	
Accreditation programs in the industry (contractors, designers)	
Self-certification (of over the counter permits, other permits?)	
Incentives ($ for pulling permits and completing permit requirements)	
Hotline to call for questions	

12. What recommendations do you have to increase the number of permits for energy efficiency buildings right- not just permits in general?

Thank you so much, your feedback is very helpful!

5 CEA EXAMINEE

Program exposure: This person has attended one or more trainings from Energy Code Ace and taken the CEA Exam.
General Role: As part of their professional role, they ensure building projects comply with energy code.

Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback, there are no wrong answers and all of your responses will be kept confidential.
Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.
Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you may have taken or are going to take the CEA exam?
   [If not familiar, confirm and Thank &Terminate]

3. Can you tell me about why you decided to take the exam and get the qualification?

    a. PROBE: What were your goals in deciding to take the exam?
    b. How did you hear about it?

4. IF they passed exam: Can you tell me about how the CEA credential has helped or benefitted you?
    a. Gained responsibility?
    b. Salary increase?
    c. Other
5. How satisfied are you with the CEA exam on a scale of 1-7?
    a. Why do you give it that rating?
    b. How could the exam be better?

6. What did you do to prepare for the exam?

    a. Did you take the Energy Code Ace trainings to prepare? IF YES:
        i. How did you find out about the trainings?
        ii. Was the training held at a convenient time?
            1. IF NO, Probe to determine what would have been better
        iii. Was the location convenient?
            1. IF NO, Probe to determine what would have been better
        iv. Did you have sufficient notice about the training so you could plan to attend?
            1. IF NO, Probe to determine what would have been better?
        v. Why did you decide to attend?
            1. IF DK, then ask, What were your goals for attending?
        vi. Was it at the right level of information for you?
        vii. What information, if anything, do you use from the training?
        viii. How often do you use what you learned in training?
        ix. Can you tell me about how you use it? (notes, reference materials from class, the website?)
        x. What, if anything, do you want more training on?

        xi. On a scale of 1-7, how satisfied are you with the training?

xii. Why do you give it that rating?
xiii. How can the trainings be improved?

7. Have you been to the Energy Code Ace Website? (If NO- Go to #5)
    a. If yes, why did you go there?
    b. Was it easy to find what you were looking for?
    c. Was it easily searchable?
        i. IF NO- Why not?
    d. Was the information on the website useful to you?
        i. IF NO- Why not?
        ii. If YES- How did you use it? Or Give me an example of what you used?
    e. Was the information well organized?
        i. IF NO- Why not?
    f. Do you tell others about the website or direct them to it?
        i. IF YES- Can you tell me about a time when you directed someone to the website?
    g. Do you have any recommendations for improving the website?
    h. On a scale of 1-7, how satisfied are you with the website?
        i. Why do you give it that rating?

8. You may have already mentioned some, but what barriers prevent code compliance, in your opinion?

9. You may have already mentioned some, but what are some of the best practices you've seen in complying with and/or enforcing codes?

Thank you so much, your feedback is very helpful!

6 BAYREN AND IOU PARTICIPANT

Program exposure: This person has been to IOU and BayREN trainings and website. They have taken the DNV GL web survey.
General Role: Building department member
Objectives:
1. How the trainings and tools help them.
2. How the BayREN and ECA trainings and tools compare, complement, and/or overlap.
Thanks for talking with me today. We are evaluating different programs that try to improve code compliance in the state of California. We are interested in your experience and thoughtful feedback, there are no wrong answers and all of your responses will be kept confidential.
Do you mind if we record today's interview? It will help me take better notes and ensure we don't miss anything.
Great Thanks/No problem

1. To begin, can you tell me a little about your job?

2. According to our records, you participated in the IOU Energy code Ace and BayREN energy code trainings? [If unfamiliar- remind them of the titles we have them attending based on our records?] IF NO- Thank and Terminate.

3. Can you tell me what you have participated in?

4. Have you used any of the Energy Code Ace or BayREN tools? I have a list to read if it helps. Please let me know which ones you have used (If NO- go to #11):

Tool	3a. For those you use, we are interested to know how often you use them and how do you use them?	
	Use? (Never, rarely, often)	How do you use them?
Energy Code Ace Checklists		
Energy Code Ace Fact Sheets		
Energy Code Ace Trigger Sheets		
Energy Code Reference Ace		
Energy Code Installation Ace		
Energy Code Forms Ace		
BayREN Quick Reference Guides		
BayREN Permit Guides		
BayREN Building Science Guides		
BayREN What to inspect guides		

5. What is the difference between the BayREN and ECA tools you've used?

6. In your opinion, do the BayREN and ECA tools complement one another? Or do they overlap?

7. On a scale of 1-7, how satisfied are you with the ECAtools?

    i. Why do you give it that rating?

8. On a scale of 1-7, how satisfied are you with the BayREN tools?

    i. Why do you give it that rating?

9. How could the ECA tools be easier to use?

10. How could the BayREN tools be easier to use?

13. Did you participate in any IOU (also known as Energy Code Ace) code training?
    a. How did you find out about the trainings?
    b. Was the training held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    c. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    d. Did you have sufficient notice about the training so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    e. Why did you decide to attend?
        i. IF DK, then ask, What were your goals for attending?
    f. Was the training applicable to your job?
        i. Was it at the right level of information for you?
    g. Was the training applicable to your region?
        i. How so?
    h. What information, if anything, do you use from the training?
        i. How often do you use what you learned in training?
        ii. Can you tell me about how you use it? (notes, reference materials from class, the website?)
    i. On a scale of 1-7, how satisfied are you with the training?
        i. Why do you give it that rating?
    j. How can the IOU trainings be improved?

14. Did you participate in BayREN training?(PROBE: A brownbag or work shop?)
    a. How did you find out about the trainings?
    b. Was the training held at a convenient time?
        i. IF NO, Probe to determine what would have been better
    c. Was the location convenient?
        i. IF NO, Probe to determine what would have been better
    d. Did you have sufficient notice about the training so you could plan to attend?
        i. IF NO, Probe to determine what would have been better?
    e. Why did you decide to attend?
        i. IF DK, then ask, What were your goals for attending?
    f. Was the training applicable to your job?
        i. Was it at the right level of information for you?
    g. Was the training applicable to your region?
        i. How so?
    h. What information, if anything, do you use from the training?

        i. How often do you use what you learned in training?
        ii. Can you tell me about how you use it? (notes, reference materials from class, the website?)
    i. On a scale of 1-7, how satisfied are you with the training?
        i. Why do you give it that rating?
    j. How can the BayREN trainings be improved?

11. What is the difference between the BayREN and utility trainings you have taken?

12. In your opinion, do the BayREN and utility trainings complement one another? Or do they overlap?

13. What, if anything, do you want more training on?

14. What, if anything, has changed because of your experience with the trainings? Specifically related to: (fill in or probe specifically)

    a. Understanding of current code?
    b. Time to complete code paperwork?
    c. Ability to ENFORCE with code?
    d. Code appropriateness to your region?

15. You may have already mentioned some, but what barriers prevent code compliance, in your opinion?

Thank you so much, your feedback is very helpful!

APPENDIX B. WEB SURVEY

Codes and Standards Compliance Improvement Process Evaluation Web Survey

California Public Utilities Commission

Table of contents

Please note, the questions for the web survey are presented in a Word document for ease of revision and commenting. We have included skip logic when necessary, but have not entered all of the programming required for online administration. We will program and fully test the survey on our internal software.

1 INTRODUCTION PAGE

1. Thanks for taking the California Public Utility Commission building energy codes and appliance standards survey! We are interested in your experience with energy codes and standards programs sponsored by the utilities (PG&E, SCE, SDG&E, and SCG), the Bay Area Regional Energy Network (BayREN), and Energy Code Ace.
2. All of the questions pertain to California Building Code Title 24 Part 6 – the energy code.

   There are no wrong answers, and all of your responses will be kept confidential. Thank you.

2 SCREENER

3. What best describes your job…?

1	I work in a Building Department
2	I work in the building industry
3	I work in local government, but not in the Building department
77	Other, PLEASE SPECIFY_____

1 [IF Q2=A3 Local Government]Please tell us your job title?

2 [IF Q2=A1] What is your job title?

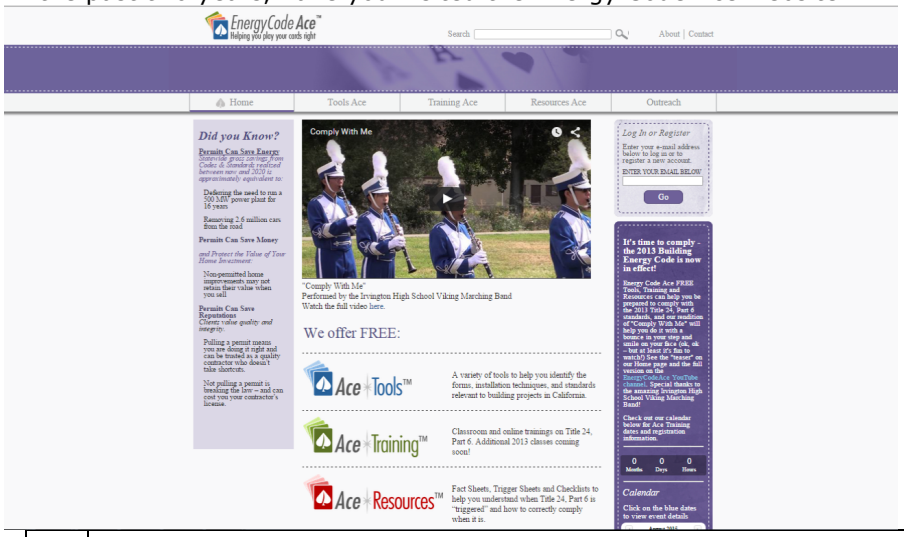
1	Building inspector
2	Counter technician
3	Chief Building Official
4	Energy Consultant
5	Plans examiner
77	Other, PLEASE SPECIFY_____

[IF Q2=A2]

1	Architect
2	Lighting designer
3	Mechanical engineer/systems designer
4	General contractor
5	Developer
6	Energy Consultant
7	HERS rater
8	Trade professional
77	Other, PLEASE SPECIFY_____

3 How many years of experience related to codes and standards do you have? [enter #]

4 In the past two years, have you visited the Energy Code Ace website?



1	Yes
2	No

5 Have you heard of any of the following tools?

1	Yes
2	No

6 Which tools? (Mark all that apply)

Tools	Description
BayREN Permit Guides	Presents key requirements for permit applicants with projects that do not require plan check
BayREN Quick Reference Guides	Summarize required efficiency minimums for building inspector and contractor use in the field
BayREN Building Science Guides	Detail building science principles for specific energy code requirements
BayREN What to Inspect Guides	Highlights sections of Compliance Forms that will have the most significant impact on compliance and energy use
Energy Code Ace Forms Ace	Tells you what forms are needed based on project scope
Energy Code Ace Reference Ace	Allows you to navigate the standards electronically
Energy Code Ace Installation Ace	Shows pictures of correct energy code installations
Energy Code Ace Trigger Sheets	Indicate which standard sections are applicable based on scope
Energy Code Ace Fact Sheets	Summarize technical requirements and references
Energy Code Ace Checklists	Lead plans examiners and building inspectors through energy code compliance checks
Energy Code Ace Crack the Code	Training package that can be used to conduct technical training

7 In the past two years, did you participate in any of the following trainings?

1	Yes
2	No

8 Which training?

Training	Description
BayREN Training	All Workshop titles (classroom style, 4 hours) and all Brown Bag titles (classroom style, 1 hour)
BayREN Regional Forums	Forums bring together building department officials and the building community within the Bay Area and for a topic-based, half-day session
Energy Code Ace/ Statewide Codes and Standards Classroom Training	All titles in the Title 24 Part 6 Essentials classroom series, Energy Pro and other compliance software training
Energy Code Ace Online Training	Decoding talks (online discussion forums), Virtual Classroom series (online with real-time instructor), and Online Self-Study series

3 ENERGY CODE ACE WEBSITE

[IF Q5= A1]

9 How did you hear about the Energy Code Ace website? (Mark all that apply)

1	Energy Code Ace or utility representative
2	Email from Energy Code Ace or utility(group email)
3	BayREN representative
4	BayREN website
5	Building Department representative
6	CABEC
7	CEC
8	Energy Code Ace or utility training
9	Other website
10	Word of mouth
11	Poster/hand-out
77	Other, SPECIFY_____
89	DK

10 How many times have you visited the site?

1	1
2	2-5
3	5-10
4	10+

11 What did you expect to accomplish from your visit to the Energy Code Ace website?

1	Download tools	
2	Find information on trainings or forums	
3	Find information about CA building codes	
4	Read about codes and standards updates	
77	Other, SPECIFY____	
89	DK	SKIP to 18

12 How helpful was the Energy Code Ace website with the following:

[responses to WEB2]	1 Not at all helpful – 7 Very helpful

13 How easy was it to find what you were looking for?

Very Difficult	1	2	3	4	5	6	7	Very Easy

14 How useful was the information on the website?

Not at all useful	1	2	3	4	5	6	7	Very useful

15 How satisfied are you with the website overall?

Very Dissatisfied	1	2	3	4	5	6	7	Very satisfied

16 **[ASK IF 17 = 1 OR 2]**: Why are you dissatisfied? _____

17 [IF Q2=A1] do you ever direct others to the Energy Code Ace website?

1	Never

2	Rarely
3	Occasionally
4	Frequently

18 What suggestions do you have to make the Energy Ace website more effective? [text box]

4 TOOLS (FORMS ACE, REFERENCE ACE, INSTALLATION ACE, TRIGGER SHEETS, FACT SHEETS, CHECKLISTS, CRACK THE CODE WORKSHOPS, BAYREN GUIDES)

19 Which, if any, did you download?

20 Think about the codes and standards tools you have heard of. How did you hear about them? (Mark all that apply)

1	Energy Code Ace or utility representative
2	Energy Code Ace or utility website
3	Email from Energy Code Ace or utility (group email)
4	BayREN representative
5	BayREN website
6	Building Department representative
7	CABEC
8	CEC
9	Energy Code Ace or utility training
10	Other website
11	Word of mouth
77	Other, SPECIFY_____
88	DK

21 **[IF YES]** Why did you download **<LIST TOOLS FROM 22>**? (Mark all that apply)

a. To help do my job more efficiently
b. To share with colleagues
c. To understand energy code better
d. To learn about energy code changes
e. To have a handy energy code reference
f. OTHER, Specify

22 How often have you used the following tools?
[BASE: LIST TOOLS FROM 22]

		Never 1	Rarely 2	Occasionally 3	Frequently 4
1	BayREN Permit Guides				
2	BayREN Quick Reference Guides				
3	BayREN Building Science Guides				
4	BayREN What to Inspect Guide				
5	Forms Ace				
6	Reference Ace				
7	Installation Ace				
8	Trigger Sheets				
9	Fact Sheets				
10	Checklists				
11	Crack the Code				

23 How useful are …..?
[BASE: LIST TOOLS FROM 22]

		1 Not at all useful	2	3	4	5	6	7 Very useful
1	Forms Ace							
2	Reference Ace							
3	Installation Ace							
4	Trigger Sheets							
5	Fact Sheets							
6	Checklists							
7	Crack the Code							
8	BayREN Permit Guides							
9	BayREN Quick Reference Guides							
10	BayREN Building Science Guides							
11	BayREN What to Inspect Guide							

24 How satisfied are you with **< BASE: LIST TOOLS FROM 22>** ?

Very dissatisfied	1	2	3	4	5	6	7	Very satisfied

25 **[ASK IF 26 = 1 OR 2]**: Why are you dissatisfied? _____

26 What suggestions do you have to make the tools more effective? [text box]

5 TRAINING

27 Think about the codes and standards trainings you have attended. How did you hear about them? (Mark all that apply)

1	Energy Code Ace or utility representative
2	Email from Energy Code Ace or utility (group email)
	Energy Code Ace or utility website
	BayREN representative
	BayREN website
	Building Department representative
	CABEC
	CEC
	Other website
	Word of mouth
	Poster/handout
77	Other, SPECIFY_____

28 Why did you choose to attend the training?
Energy Code Ace/Utility -Sponsored Classroom Training?
Energy Code Ace Online Training?
BayREN Training?
BayREN Regional Forums?

1	Learn how to apply the energy code
2	Learn a new skill
3	Further my career
	Learn about industry best practices
4	Curious
77	Participation was mandatory (
	Other , specify

29 How useful was the information presented [rate for each training'

Not useful for my job	1	2	3	4	5	6	7 Extremely useful for my job

30 How often have you used the information presented at the training?

1	Never
2	Rarely
3	Occasionally
4	Frequently

31 Please rate your satisfaction with the following aspects of Energy Code Ace Utility sponsored Classroom Training?
32 Please rate your satisfaction with the following aspects of Energy Code Ace Online Training?
33 Please rate your satisfaction with the following aspects of BayREN Training?
34 Please rate your satisfaction with the following aspects of BayREN Regional Forums?

	1 Very dissatisfied	2	3	4	5	6	7 Very Satisfied

1. Convenience							
2. Length of training							
3. Level of detail							
4. Applicability to my area							
5. Satisfaction overall							

35 For each of the statements below, please rate your level of agreement. Because of training:

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree	DK/NA
a My job is easier								
b. Time to complete code paperwork or review code paperwork has decreased								
c. My ability to comply with code or enforce code has increased								
d. I learned what others in my region were doing to increase code compliance								
e. I have/plan to implement a new practice based on the training								
f. I provided feedback on code to code designers								
g.[IF FORUM] I interacted with regional counterparts at the forum								
h.[IF FORUM] I learned from regional counterparts at the forum								
i. [IF FORUM] I have/plan to communicate after the forum with other regional counterparts								

36 What suggestions do you have to make the trainings more effective?

6 PROFESSIONAL EXPERIENCE

37 Please answer a few questions about your professional experience related to codes and standards.

Building Officials (ALL SCR1 = 1)

38 Have you heard of the new energy accreditation, the Certified Energy Analyst or CEA?

1	Yes
2	No

39 [IF 40=1] How would you rate the value of certification?

1	Not at all valuable
2	Slightly valuable
3	Valuable
4	Very valuable

40 Which of the following, if any, are challenges for your building department with Title 24 energy code?

		Not a challenge	Slight challenge	Sometimes a challenge	Major challenge
1	Availability of in-depth energy code training				
2	Workload of Building Department				
3	Frequent changes to energy code				
4	Complexity of energy code forms				
5	Understanding energy code language				
	Other, SPECIFY				

41 Would the following changes to **your department** help improve code compliance?

		1 Not at all helpful	2	3	4	5	6	7 Very helpful
BP1	Energy code training provided at your facility							
BP2	Support for in-house energy code Expert/Champion							
BP3	Invest in stronger relationship with Building Industry community							
BP4/PROP 3	**[IF Q3.A4]** Provide Plans Examiner Priority Sheet to help Plan Examiners prioritize energy code							
BP5/PROP 2	Integrate energy code into computer software that tracks permit process							
BP5	Provide compliance tracking software for Building Inspectors to use onsite							
G5	Streamline overall permitting process							
G4	Rewrite energy code to integrate into local code more easily							
CIAG 2	Expand the prescriptive approach options							
PROP 4	Standardize building department energy code enforcement practices across jurisdictions							
CIAG 8	Standardize over the counter permits across jurisdictions							
CIAG 4	More time to prepare to enforce energy code updates							

42 Please rate how helpful the following would be to your department if:

		1 Not at all helpful	2	3	4	5	6	7 Very helpful
CIAG 3	Permit applicants were provided an incentive to comply with energy code							
CIAG 7/PROP 1	Permit applicants were knowledgeable of energy code							
CIAG 6	Permit applicants were aware of the value of complying with the energy code							
CIAG 10	Contractors could be pre-qualified to self-certify their work for energy code							
CIAG 9	Design professionals could receive accreditation of expertise in energy code compliance							

42.1.1 Chief Building Official [IF SCR1a = 3]

43 Did your jurisdiction participate in the BayREN codes and standards Permit Resource Opportunity Program (PROP)?
The PROP visits were conducted in 2014 by Bay Area local government partners and and/or their consultant team and interviewed and surveyed building department staff on the challenges of implementing the Energy Code as well as providing the opportunity to help improve internal processes .

1	Yes
2	No
89	DK/NA

44 Did your department obtain (download or receive) the Final Report and Energy Code Resource Guide for the 2014 PROP?

1	Obtained and reviewed
2	Obtained, but not reviewed
3	Have not obtained
89	DK/NA

45 According to our records, your department received a Title 24 Energy Code Best Practice Report in December 2013. Has your department…

1	Received and reviewed
2	Received, not reviewed
3	Have not received

45.1.1 Energy Consultant [IF SCR1a = 4]

46 Are you a Certified Energy Analyst?

1	Yes
2	No
89	DK/NA

47 [IF EC1 = 2] Have you considered it?

1	Yes
2	No, WHY NOT?
89	DK/NA

Building Industry (ALL SCR1 = 2)

48 Please rate how helpful the following would be to your work:

	1 Not at all helpful	2	3	4	5	6	7 Not at helpful
More training on Lighting code							
More training on Envelope measures							
More training on Mechanical systems							
More in-depth training on other topics							
Permit-specific guides and checklist							
Integrate energy code information into electronic permitting systems							
Integrate HERS registry information into electronic permitting systems							
Increase consistency in how code is enforced across jurisdictions							
Expand prescriptive approach options							
Standardize over the counter permits across jurisdictions							
Establish energy code accreditation programs in the industry (ex: contractors, designers)							
Establish pre-qualification for accredited professionals to self-certify their work							
Simplify the compliance process							
Simplify the building energy code							
OTHER, Specify							

49 Which of the following are challenges for you in complying with the energy code?

	Not a challenge	Slight challenge	Sometimes a challenge	A Major challenge
It is unclear what is required to comply with energy code				
Proper installation not addressed within energy code				
Inspection items for energy code are not clear				
There is a lack of incentive for permit compliance				
The energy code forms are complex				
The energy code compliance process overall has too many steps				
OTHER, Specify				

50 In order to gain additional details about codes and standards experiences, we would like to interview some key individuals.

Please enter your email below if you are available for a short interview in the future.

7 T&T – COMPLETED

52. This concludes our survey. Thank you for your feedback!

APPENDIX C. PROGRAM BUDGET SUMMARIES

Source	Year	Yearly Total	Territory Sum	Total Sum	Participants	$/Participant
BayRen	2013	$ 454,117				
BayRen	2014	$ 1,861,089	$ 2,315,206			
SCE	2013	$ 955,236				
SCE	2014	$ 663,943	$ 1,619,179			
SDGE	2013	$ 105,384				
SDGE	2014	$ 269,203	$ 374,588			
PGE	2013	$ 1,064,399				
PGE	2014	$ 3,552,710	$ 4,617,109			
BayREN Total				$ 2,315,206	726	$ 3,189
IOU Total				$ 6,610,876	8,440	$ 783

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.