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Commercial Code Enhancement Audience Research

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Executive Summary: Commercial Code Enhancement Audience Research Study

Overview

The Northwest Energy Efficiency Alliance (NEEA) contracted NMR Group, Inc. to study the perspectives of actors in the commercial new construction market on energy codes. NMR conducted surveys, in-depth interviews, and focus groups with market actors in Washington, Oregon, Idaho, and Montana from February 2019 to June 2019. The study informs NEEA's Commercial Code Enhancement efforts to support the adoption of more stringent energy codes and to help codes be readily implemented once adopted.

Perspective Gathering

The survey targeted architects and engineers and was completed by 98 respondents online or over the phone. The in-depth interviews targeted builders, developers, engineers, and commissioning agents. These interviews were completed by six respondents over the phone. The focus groups targeted architects and engineers and included 27 respondents across five sessions in Washington, Oregon, and Montana.

Market Segments

The market can be split into two environments: an *above code* environment, where clients are motivated to build more efficiently than code and market actors are inspired to push for energy efficiency; and a *meet code* environment, where clients have little motivation to build efficiently and market actors only seek to comply with code. In both environments, architects are generalists and goal setters, engineers are specialists who determine how goals are met, and builders are plan implementers.

Pre-code Engagement

Only a small group of passionate engineers have an interest in participating in code development. Architects do not want to commit the time and, as generalists, do not believe they have the specific knowledge to support code development. Builders are also not interested in participating, feeling that energy-efficiency levels are dictated by design teams.

NEEA could cultivate a small group of passionate specialists to provide comments on developing proposals early in the process who can then champion those proposals.

Post-code Engagement

All market actors engage with code once it's been adopted, but with different roles. Architects, based on clients' values, set goals for meeting or exceeding code. Engineers advise architects on specific technical options and how to comply with code. Builders implement the design plans. Respondents wanted materials to aid in compliance throughout construction, as well as explanations for the logic behind codes.

NEEA could create resources tailored to each role in construction that help keep projects on track to comply with or exceed code and resources that explain codes that can be shared with clients.

Training

Less than half of respondents had attended an energy training in the last three years. Respondents prefer in-person trainings, away from their place of work, that have a variety of experts and offer continuing education credits and networking opportunities.

NEEA could partner with existing conference and organizations to increase the visibility of energy-efficiency content at events that already attract attendees. Trainings should be in person and be tailored to the different roles in the construction process.

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Introduction

NEEA is an alliance of more than 140 utilities and energy-efficiency organizations working on behalf of more than 13 million energy consumers. NEEA is dedicated to accelerating both electric and gas energy efficiency, leveraging its regional partnerships to advance the adoption of energy-efficient products, services, and practices.

This report presents the results of the Commercial Code Enhancement (CCE) Audience Research study conducted by NMR Group, Inc., on behalf of the Northwest Energy Efficiency Alliance (NEEA). The CCE program bridges the gap between market practices and state policies by identifying, assessing, and validating the feasibility and affordability of the next-generation commercial technologies and practices.

The primary objective of this study was to provide insight to the CCE team on how to effectively communicate with key market actors to increase the likelihood that targeted and vetted code proposals will be adopted and, once adopted, will be easily implemented into real world building practices. NMR conducted surveys, in-depth-interviews, and focus groups with various market actors to learn their perspectives on and interest in commercial building energy codes. The recommendations in this report will support NEEA's attempts to develop communication and intervention strategies with commercial new construction market actors in Washington, Oregon, Idaho, and Montana.

METHODS

As mentioned above, the study involved three data collection modalities with key market actors: a survey, in-depth interviews, and focus groups. Table 1 shows the types of respondents for each phase of the study across all four states. NMR conducted the survey online and over the phone and leveraged a large sample size to gain high-level insights that were representative of market actors across the region. Note that while the study attempted to have equal representation of both architects and engineers in the survey, engineers were difficult to recruit. Therefore, survey respondents skewed heavily towards architects.

The in-depth interviews aimed to gain detailed perspectives from additional hard-to-reach market actor types, such as general contractors/builders, developers, commissioning agents, and building science professionals. Due to the small sample size, the in-depth interview findings are not intended to be representative of the population. Instead, they inform the findings by providing additional perspective. The focus groups also skewed toward architects and were used to elaborate on the high-level findings from the survey.

Table 1: Respondents by Study Phase

Respondents	Survey	In-depth Interviews	Focus Groups
Architects	96		22
Engineers	2	1	5
General Contractors		2	
Other		3	
Total	**98**	**6**	**27**

The remainder of the report is organized into three main sections. The first, Segments and Personas, characterizes the various market actors' motivations, priorities, and interests in energy efficiency. The second, Code Engagement, explores the opportunities for intervention by NEEA in the pre-code and post-code phases. The third, Trainings, provides insight on the market actors utilization of trainings and preferred types of trainings.

Segments and Personas

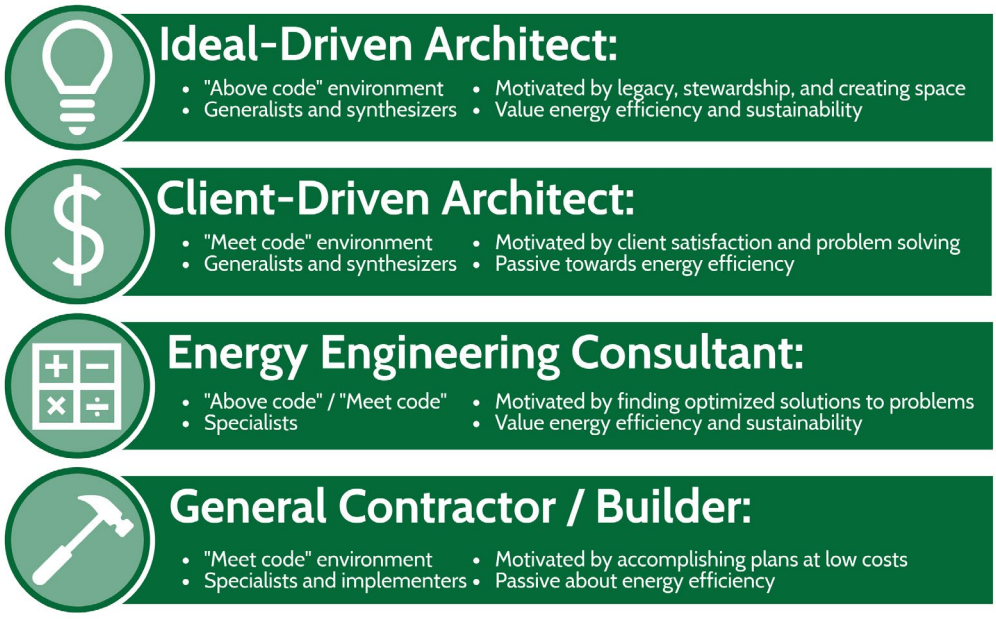
Market actors work in either an *Above Code* or *Meet Code* environment.

NMR Group drew upon findings from all three research modalities to segment the market actors in terms of their orientation toward commercial building code. In general, we identified four key segments, as shown in Figure 1. Each is characterized by their work environment, perceived roles, motivations and values, and attitudes towards energy efficiency.

Market actors can work in either an *above code* of *meet code* environment. An *above code* environment is one in which a company frequently builds projects that are more energy efficient than code requires. Often, these companies have built energy efficiency into their business model or view it as a competitive advantage. Their clients typically plan to own and maintain the buildings for at least five years or otherwise value energy efficiency.

A *meet code* environment is focused on cost and risks. These companies aim to satisfy clients by keeping costs low while using low-risk materials and methods. Their clients typically do not plan to own the buildings for a long period of time or they plan to lease out space to tenants who will pay utilities. Their clients are typically not motivated by energy efficiency.

Figure 1: Segments and Personas



IDEAL-DRIVEN ARCHITECTS

"My company has a triple bottom line ethos about the environment. We are out ahead of our clients on energy. We try to gently push them to go above code."

Ideal-driven architects are estimated to constitute approximately 20% of architects that participated in the study.[1] The focus group results revealed that they typically work in an *above code* environment, spanning an entire company or a select group within a larger company. Some clients come to them specifically looking for energy-efficient buildings. Other times, ideal-driven architects seek to convince clients to build beyond code. They highlight reduced operating costs due to energy efficiency for clients who plan to own buildings for a long time. For short-hold clients, ideal-driven architects can usually only increase the energy efficiency of a project as a byproduct of some other consideration. For example, an architect in one of the focus groups described upgrading to a higher efficiency heating and cooling system to improve the building exterior's appearance. Results of these attempts are highly dependent on the client's own motivations and budget constraints.

Ideal-driven architects often feel that code updates are "*catching up to what [they're] already doing*" and appreciate that stringent code allows them to build more efficient buildings than some clients would otherwise request.

Like other architects, ideal-driven architects often view themselves as generalists or synthesizers of a lot of information supplied by their engineering partners. They must understand their clients' values and find creative solutions for their clients' goals. They rely on their engineering partners and contractors to inform their technology options and compliance with code. As one architect said, "*it feels like I'm getting mountains of information from hundreds of different people and often it falls onto the architect to be the master of everything.*"

Ideal-driven architects are motivated by concepts of legacy, stewardship, and creative framing of space. One architect said, "*I'm passionate about the built environment. It's where we spend most of our time. There is an effect spaces have on people. Well-designed spaces can be very uplifting.*" They are conscious of the lasting presence of their work and its impact on the community and world. They are most proud when their projects have a positive social impact in a community or when they can convince a client to build a project that is more energy efficient or sustainable than originally intended. These architects feel driven to push for energy-efficient and sustainable building practices in their projects out of a concern for the environment and impacts of climate change.

Client-driven Architects

"Energy efficiency is of less importance in my field because with the clients, it's all about cost."

Client-driven architects are estimated to constitute approximately 80% of architects that participated in the study. The focus group results revealed that they, unlike ideal-driven architects, work in a *meet code* environment. They do not feel there is room to push their clients to build with greater energy efficiency because their clients either have low budgets or are not motivated to pay higher upfront costs to reduce operating expenses.

Their approach to energy efficiency is generally passive. They may have a generally positive view of energy efficiency, but they do not feel compelled to push their clients to invest in energy-efficient practices. This is partially because they view their clients as inflexible in that regard. As one client-driven architect said, "*we allow the energy code to motivate us to the level that we need to achieve.*"

Client-driven architects also view themselves as generalists and synthesizers of information rather than as technical or code specialists. They are motivated by using creative problem solving to satisfy clients and complete projects on budget. They are most proud when they can facilitate a smooth project process – believing that it results in better buildings. One architect said, "*I like keeping teams together, especially in the last part of the construction. When you have a legacy with teams and people know their roles, people build better buildings. I enjoy setting up those relationships.*"

Energy Engineering Consultants

"Our company is an energy-efficiency consultancy, so energy efficiency is everything. We get projects where the owner is only looking for code compliance but we always give them options to show above code costs a bit more at first, but there are benefits in the long run, including costs and environment."

The engineers who participated in the study all worked in *above code* environments, but, at times, work for clients in the *meet code* space who seek their services as part of code compliance. Usually, they are brought onto a project as a contractor to an architectural firm or some other company that is working with the project's developer.

They often try to push clients to be more energy efficient, but they agree with architects that the developer's goals set the tone for the energy efficiency of the project. In the focus groups, engineers frequently cited challenges in convincing owners to use highly efficient mechanical systems when the owner's facility management staff were unfamiliar with the technology. Some companies offer training and one year of support to get facility staff over the learning curve.

They view themselves as specialists. Some viewed themselves as specialists on energy modeling alone, but others considered themselves specialists in the mechanical, electrical, and plumbing

fields as well. They advise architects on specific available technologies and make sure projects comply with codes. They consider themselves "wonks" (i.e., people interested in details), and are motivated by solving puzzles. One engineer said, "*I'm an engineer, so I'm a numbers guy. I like solving puzzles. I like finding the best solutions that meet all the goals in efficient ways.*"

General Contractors / Builders

"[We] always build to the specs. We're not really set up to take the liability risk of making changes during construction. We rely on the design team to figure [energy efficiency] out.

Only two builders participated in the study – both were respondents in the in-depth interviews. However, respondents in the focus groups also provided perspectives that supported the profile of this segment developed initially from the in-depth interviews. General contractors and builders felt that energy efficiency is not a priority to their clients. One builder said, "*owners' budgets are becoming very constrained. Seismic resiliency is becoming a big deal to owners and thus more money is going to structural integrity. Not much emphasis is given to green building.*" General contractors and builders typically work in the *meet code* environment. They are brought onto a project in the construction phase after most decisions relating to energy efficiency have already been made and thus, view themselves mainly as specialists who implement the plans and are passive towards efficiency. As one builder remarked, '*we rarely make decisions about energy efficiency. It's usually figured out beforehand.*"

The occasions they get involved in decisions relating to energy efficiency are generally when something is going wrong, such as budget overruns or material limitations. In these instances, architects will ask them for ideas to cut costs and they will suggest scaling back energy-efficiency measures. They view things such as expensive mechanical systems as easily substitutable.

They are motivated by successfully implementing plans and completing projects cost-efficiently and within budget. Some architects and engineers thought that builders were motivated to cut corners in terms of energy efficiency since enforcement of energy code can be lax in the construction phase. One engineer said, "*it comes down to the contractor, some will do a good job no matter what, others know they can make so much more money by doing it cheaply and that they never get caught.*" Additionally, respondents thought that contractors can be resistant to using new energy-efficient practices, preferring to use methods with which they are familiar. Still, architects believed their own construction oversight efforts ensured that projects mostly follow the plans regardless of contractor habits and practices.

Code Engagement

All market actors engage post-code, but pre-code engagement is limited to a small passionate group of technical "wonks."

This section explores opportunities for CCE intervention in both the code development process (i.e., *pre-code*) and implementation of adopted code (i.e., *post-code*). While all market actors engage post-code, only a small group of passionate people – usually engineers – engage pre-code. Pre-code engagement includes any participation in the code development process, such as participating in state building code committees or submitting comments to these committees. Post-code engagement is focused on implementing code in projects. Table 2 summarizes the code areas in which each segment generally engages. Architects typically only participate post-code, viewing themselves as generalists who lack the specific knowledge required to contribute to code development and who do not want to commit the time. Engineers engage both pre-code and post-code; although; as noted above, the pre-code participation is limited to a small group of passionate individuals. General contractors engage exclusively post-code.

Table 2: Code Engagement by Segment

	Pre-code	Post- Code	
		Meet Code Environment	*Above Code Environment*
Ideal Driven Architect			●
Client Driven Architect		●	
Energy Engineering Consultant	●	●	●
General Contractor or Builder		●	

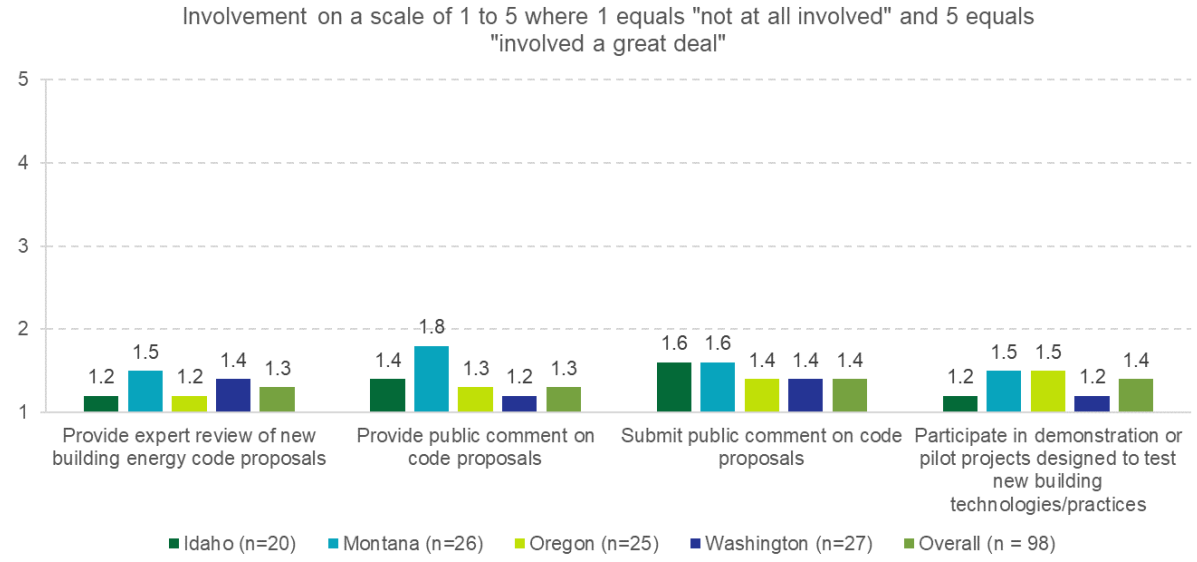
NMR Group, Inc.

PRE-CODE ENGAGEMENT

Only a small group of passionate engineers had ever participated in, or had any interest in participating in, the code development process.

In all three study data collection modalities, none of the architects reported participating in the building energy code development process. When asked in the survey to rank their involvement to-date on a 1 to 5 scale, where 1 is "not at all involved" and 5 is "involved a great deal," respondents consistently indicated that they have had little to no involvement by providing an average rating between 1.2 and 1.8 (Figure 2).

Figure 2: Involvement in Code Development to Date (from Survey)

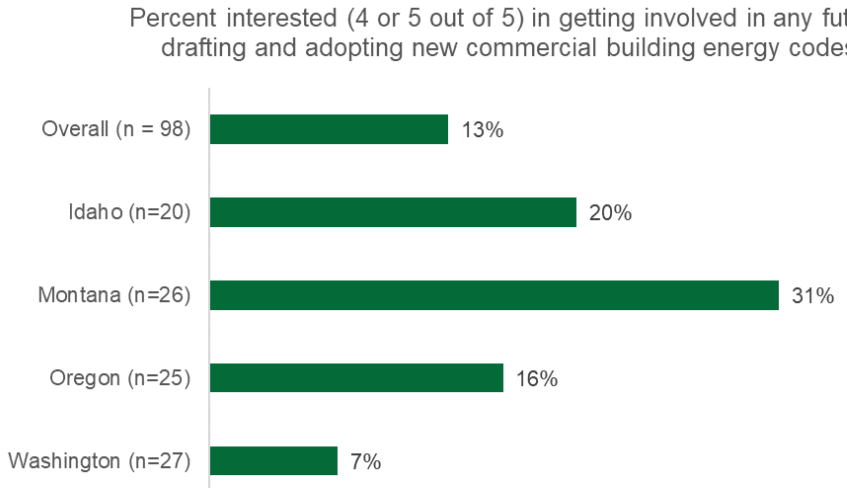


In the focus groups, only two out of five engineers reported participating in the building energy code development process – both by submitting comments. These two individuals were drawn to participate by specific interests. One had been following the codes for years and felt compelled to give perspective, while the other was helping a friend who had a passion for a specific technical aspect of code, saying, "*it was a pet project*." Three out of six interview respondents were members of Washington's Technical Advisory Groups and thus, were very active in the code development process. All three had engineering backgrounds; although, one was a commissioning agent. These three respondents dedicated significant time to the code development process and found their involvement in the code committees personally valuable. One interview respondent said, *"I definitely enjoy it. Policy is close to my heart."* Participation in code development, while relevant to market actor's work, must be done on market actors' own time and thus, is only pursued by those who consider it an avocation.

It would be challenging to convince those who are not passionate about energy code to participate in the code development process.

When asked to rank their interest in getting involved in any future process of drafting new commercial building energy code, overall, only 13% of survey respondents indicated having any interest (Figure 3). Respondents in Washington showed the least interest, perhaps because the state has a stringent existing energy code.

Figure 3: Interest in Participating in Code Development (from Survey)



When focus group participants elaborated on their lack of interest, they cited time constraints and doubts that their efforts would have an impact. One participant said, *"time is a big factor. Being able to leverage my time for change is important. I need to know it can be effective and have an impact*." Architects also questioned if their specific expertise was useful given their reliance on specialized consultants. One architect said, "*as architects, we rely on experts, so we have to go to other people for perspective*." Architects were satisfied and hoped that knowledgeable, passionate contemporaries of theirs were involved in the process. One architect stated, *"I like that there are certain groups that identify that this is their issue to take on. I like to read their comments, so I can be peripherally involved*." In both the focus groups and in-depth interviews, those who had not yet participated had little interest in participating in the future.

While awareness of the code development process was mixed, a lack of awareness did not appear to be a main driver of low participation. Time constraints, general disinterest, and doubts that their input would have an impact were the most frequently cited reasons by respondents for not participating in the code development process.

Recommendation

Identify and engage with the small group of individuals who have demonstrated a passion for energy codes rather than trying to persuade others to participate.

NEEA can identify those who are passionate about energy codes by leveraging public records of code committee proceedings and reaching out to targeted professional engineering organizations. All four states have volunteer energy code committees containing relevant market actors. While NEEA may be restricted from engaging with members of the committees themselves, committee meeting minutes list other attendees who NEEA could seek to engage with. See Appendix G for an example from Oregon. Additionally, Washington has Technical Advisory Groups that have meetings and attendees that NEEA could potentially engage with. See Appendix H for an example of notes from the Washington State Building Code Council, Energy Code Technical Advisory Group that includes names of visitors.

When conducting outreach to professional groups, NEEA should first target engineering organizations since only engineers expressed interest in participating in the code development process. One organization mentioned by a focus group participant, the International Building Performance Simulation Association (IBPSA), has a chapter in Seattle that could be a good first step. Additionally, that participant mentioned that he is part of an *informal* chapter of IBPSA in Oregon. Such informal networks could be a good resource for NEEA. The Seattle chapter of IBPSA could serve as gateway to those networks.

Recommendation

Seek input during the development of code proposals rather than attempting to build support for written proposals.

Respondents were more likely to provide comments on proposals than participate in any other part of the code development process. NEEA could create a process akin to providing comments for proposals that it is developing. Those who participate early in the process could become champions later, increasing the likelihood of proposal adoption.

POST-CODE ENGAGEMENT

All market actors participate in the post-code space, but at different levels of technical detail.

As characterized in the segment profiles, market actors have varying levels of engagement with commercial building energy code. Architects are responsible for setting project goals and making sure they are met. While ultimately dependent on the client's wishes and budget constraints, architects decide if a project will meet code or go above code. Engineers are responsible for figuring out how the goals can be met. They balance an understanding of code requirements and technical options to advise the architect on what is feasible. Contractors are responsible for implementing the plans to meet the goals. Once architects and engineers have developed plans, the contractor's understanding of building techniques and materials are essential to achieving the goals.

Respondents saw a need for resources that would help their projects stay on track to comply with code.

One respondent said, "*right now it's like, 'okay you're done. Did you [meet code]?' If you didn't, you're in trouble, but if you had checkpoints to see if you were on track or not that would help people clear the code at the end and be less upset with the code*." Additionally, respondents highlighted that different roles require different information during each phase of construction. Architects observed that in early phases, they could benefit from summaries of code changes and rules of thumb, while resources for later phases of the process could be more detail oriented and targeted towards engineers. One architect said, "*it's about tailoring the messages to each silo. If you're doing early schematic design, what are the things you should be worried about? In production, we're cutting down to the nuts and bolts, so you need to be a bit more accurate. Then you have the engineers who are the wonks. You need tailored messages for different groups to meet them where they are and with what they need.*" Table 3 summarizes each of these roles and the types of information respondents thought would help them comply with code.

Table 3: Post Code Engagement by Market Actor

	Architects	Engineers	Contractors/ Builders
Role	Goal Setter	Advises *how* to meet goal	Implements plan to meet goal
Construction Phase	Early Design	System Specification	Plan Implementation
Resource Detail	Summary of requirements, "rules of thumb"	Code details, technical options, interactions between systems	Code details, techniques and materials

Recommendation

NEEA's engagement in the post-code space can help market actors comply with code by providing resources tailored to each market actor's role.

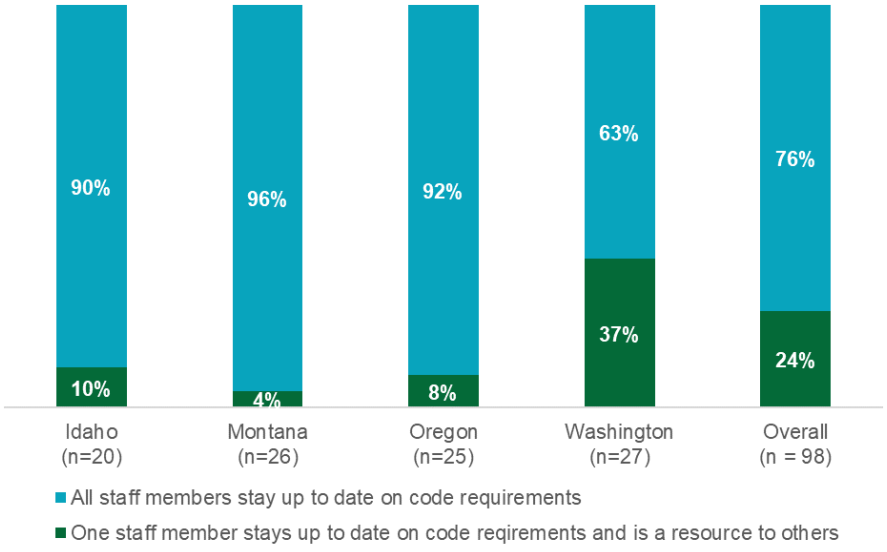
NEEA can provide resources customized to each market actor and phase of a project. For architects working early in the design phase, resources can provide simple, graphically appealing *rules of thumb*. One architect suggested focusing on issues that included such things as potential for renewable harvesting for this stage. Another set of resources could target engineers and architects working in the production phase. These resources could get more into detail about the code requirements, technical options, and interactions between systems. Finally, in the construction phase, resources for contractors could focus on techniques and materials to successfully implement design and comply with code. During an in-depth interview, one builder highlighted that one of the biggest challenges is determining accurate heating and cooling loads. This could be a topic of focus for both engineers in the system design phase and mechanical contractors. The builder said, *"the really big challenges are accurate heating and cooling loads, figuring out mechanical equipment and how it relates to the envelope. A set of assumption [is made] on the envelope and mechanicals, and then things change along the way."*

TRACKING CODE CHANGES

Only one in four companies have a formal process for tracking code changes.

The survey asked respondents whether specific staff at their company are tasked with tracking code changes or if everyone is responsible for making sure that they are aware of the code changes that they will need to comply with for their individual projects. Only 24% of respondents said their company has specific staff assigned to track code changes (Figure 4). In the focus groups, respondents provided slightly more detail. Again, only about one in four said their companies have formal staff assigned to track changes. However, out of the remaining companies, some had staff who are passionate about codes who serve as informal resources to others in the company, while the rest task individual staff to stay up to date. One architect said, *"there is a relationship between the person's interest and the quality of info you get out of it. It's about assigning someone with interest."*

Figure 4: Company Tracking of Code Changes



Larger companies were more likely to have specific staff with the formal responsibility of tracking code changes and disseminating information. Medium sized companies tended to have staff who acted as informal resources to others. Small companies typically lacked any formal tracking process and often relied on trial and error. As one architect said, "*the guinea pig project solves all the problems*." Architects in companies of all sizes mentioned relying on consultants and engineers to help projects comply with code. Again, this highlights the role of architects as generalists and goal setters and engineers as specialists who determine how a goal is met.

Respondents thought the biggest challenge regarding code changes was staying abreast of those changes.

While focus group respondents highlighted various resources for learning about code changes, such as *email blasts* from state code departments, they still felt it was challenging to stay on top of changes.

"Washington state could do a better job at passing that information out to everyone. You have to make the effort to get on the mailing list, sign up for emails, and watch for meetings. A broader brush for building contractors, operators, and mechanical contractors would get a lot more interest and support rather than people saying I didn't know about this."

In the in-depth interviews, respondents indicated relying on the following sources for staying up-to-date on changes to commercial energy code:

- Building Enclosure Council presentation
- Learning on a project after the code has changed
- LinkedIn
- Conferences
- Participation in a TAG group
- Washington State University.

Additionally, while few focus group respondents wanted to participate in the code development process, most thought it would be helpful to know the reasoning behind code changes. One architect said, "*if they could attach a rationale behind it and show the thought that went into it, that would help a lot*." Respondents also mentioned that having such resources could help them in their communications with clients. One respondent said, "*it would be great to send a one-page, pretty picture to a client.*"

Some focus group participants also envisioned potential resources tailored specifically by end-user and project phase. They cited a challenge in not knowing if a project complies until construction is finished. One respondent said, "*right now it's like, 'okay you're done. Did you hit it?' If you didn't, you're in trouble, but if you had checkpoints to see if you were on track or not that would help people clear the code at the end and be less upset with the code*."

Recommendation

NEEA should consider proactively disseminating information about code changes, including describing the logic of current code changes, and providing roadmaps that can guide and inform the evolution of code changes over multiple future code cycles.

By creating or publicizing already existing resources that simply explain code changes and the rationales behind them, NEEA can streamline the implementation of new codes. NEEA could also develop roadmaps that project code changes in future code cycles to describe how a requirement in one cycle provides the foundation for subsequent modifications to the code. Such efforts could prevent small companies from having to rely on trial and error and could help all companies communicate with their clients who may be disinterested in energy efficiency or code changes. Respondents specifically want a proactive effort, so NEEA should consider providing such resources without solicitation.

Recommendation

NEEA should investigate the opportunity to develop materials that provide guidance for complying with and exceeding code that are tailored to the needs of architects and engineers at different stages of the commercial building construction

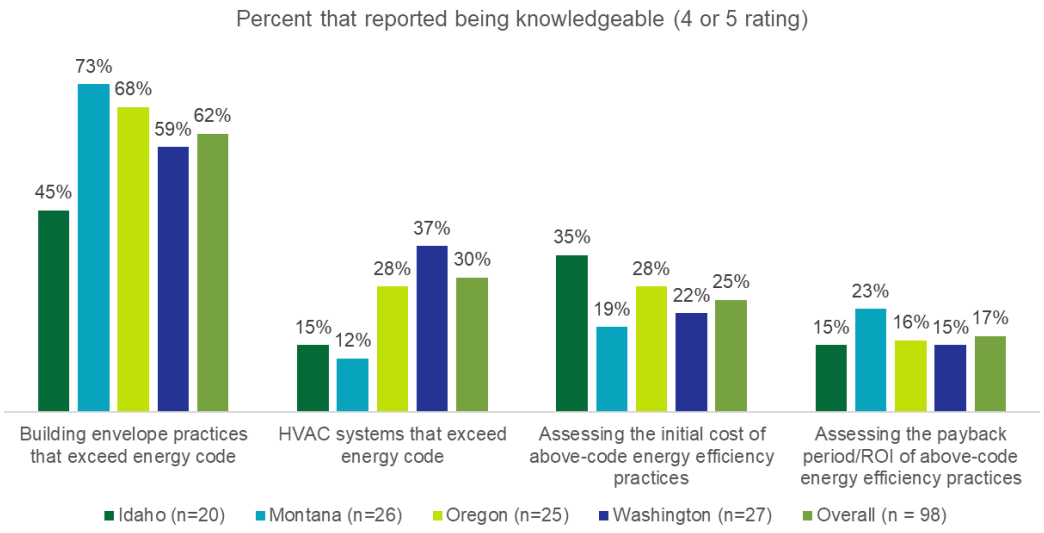
In the initial phases of a project, a designing architect could benefit from a simple, generalized, visually appealing guide with rules of thumb that, if met, will put them on track to comply with code. Then resources for *production architects* could have slightly more detailed checkpoints, followed by increasingly detailed resources tailored for each contractor or consultant of the construction process. Creating resources tailored to each *silo* of the construction process would facilitate and pave the way for eventual compliance or above code performance by the completed project.

Trainings

Market actors indicated that there is an opportunity for more visible trainings on energy codes and energy-efficient practices – particularly high-efficiency mechanical equipment and payback periods.

This section explores respondents' experiences with trainings to date, as well as their preferences for types of trainings. When asked about how knowledgeable they were about various energy-efficiency practices, survey respondents indicated that they were least knowledgeable about assessing costs and payback periods, as well as efficient mechanical systems. Figure 5 shows the percent of survey respondents said they were knowledgeable about each energy-efficient practice by providing a rating of 4 or 5 on a scale 1 to 5, where 1 is "not at all knowledgeable" and 5 is "very knowledgeable." While respondents generally gave high ratings for building envelope practices, less than a third of respondents felt knowledgeable about efficient HVAC systems or assessing costs and paybacks. As mentioned above, builders also noted the challenge of calculating accurate heating and cooling loads during the in-depth interviews.

Figure 5: Awareness of Energy-efficient Practices



Training Utilization

There is opportunity for greater participation in trainings related to energy efficiency or code.

More than half of survey respondents said they had not attended any training related to energy efficiency or codes in the last three years and, on average, respondents had attended only one energy or code training during that time. In focus groups, only a third of respondents could recall attending an energy or code training in the last three years. This lack of engagement with energy related trainings could be the result of respondents not viewing energy efficiency as a high priority compared to other potential training topics, such as health and safety. Respondents indicated that energy efficiency is often treated as an afterthought during training opportunities or is simply not a priority. Survey respondents rated energy efficiency as a "high priority" less frequently then all other aspects of code compliance (Figure 6). One focus group respondent said, "*right now energy code is kind of just 'over there.' It doesn't have the same life, health, or safety aspects [as do other topics]*."

Figure 6: Prioritization Given to Code Compliance Aspect (from Survey)

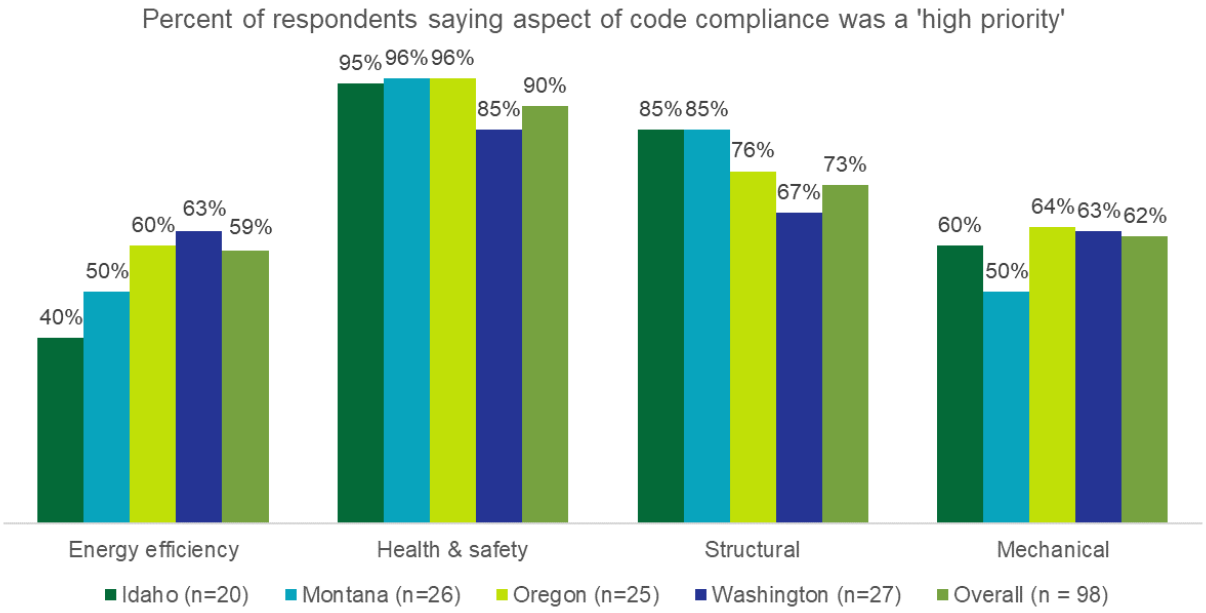


Table 4 shows the most cited trainings by state and the number of survey respondents who attended each training. In Washington, Montana, and Idaho, survey respondents most frequently highlighted events or host organizations that were not focused on energy code or energy efficiency; thus, supporting the idea that energy efficiency is not prioritized in attended trainings. In the focus groups, the trainings that were most frequently mentioned included those provided by the American Institute of Architects, Energy Trust of Oregon, Association of Energy Engineers, and Earth Advantage. During in-depth interviews, respondents mentioned trainings sponsored by the

American Institute of Architects Seattle, ASHRAE, Passive House, International Living Futures Institute, LEAN Construction Institute, and more.

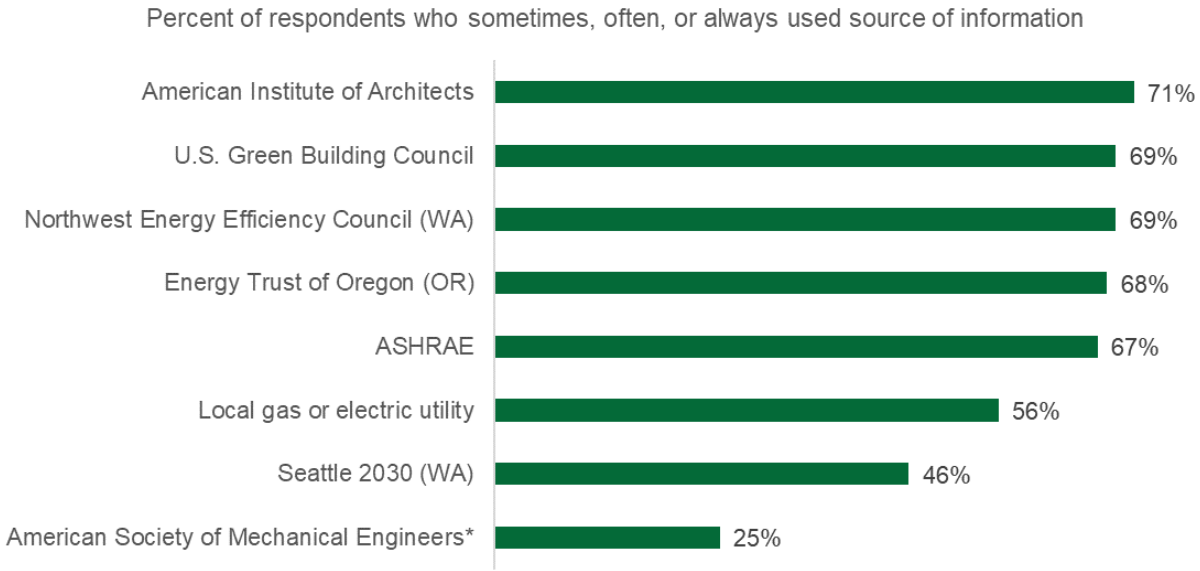
Table 4: Most Attended Training by State (from Survey)

State	Most Attended Training	Number of Respondents	Percent of Respondents from State
Idaho	Idaho Association of Building Officials	11	55%
Montana	Annual Montana Building Codes Conference	16	62%
Oregon	Oregon Department of Energy	12	44%
Washington	Northwest Regional Industrial Training	7	26%

Respondents rely mostly on local building departments, colleagues, internet searches, and the American Institute of Architects for information on energy codes.

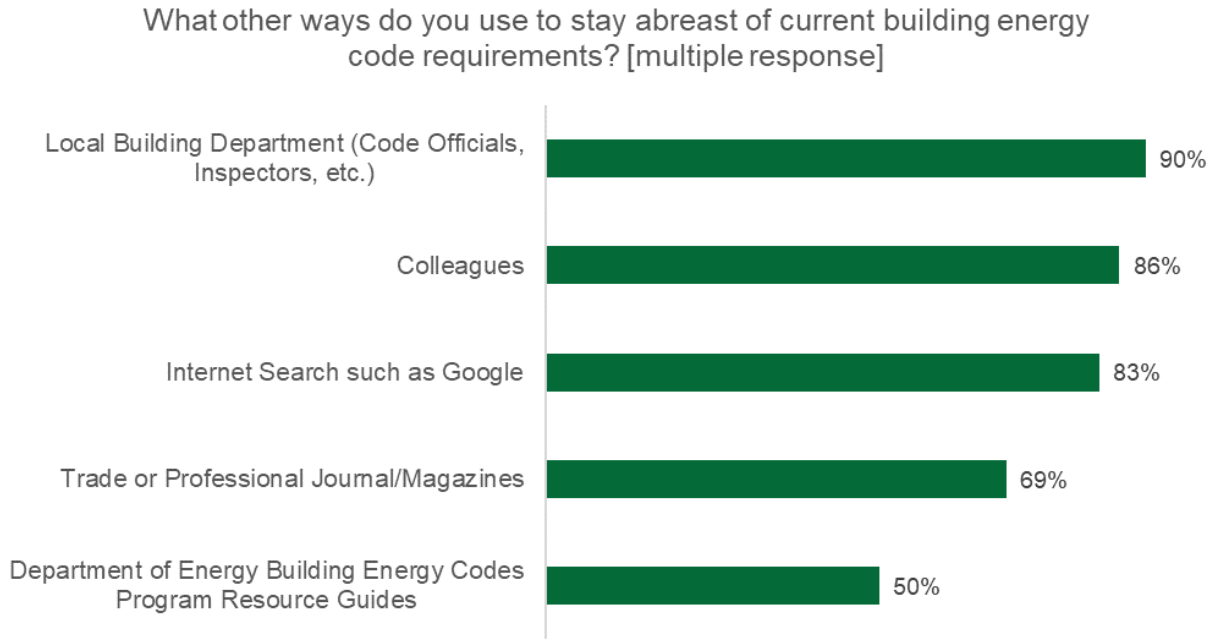
Survey respondents were provided a list of sources they may rely on for information about energy code changes and updates. They were asked if they used each source "never," "rarely," "sometimes," or "often." Figure 7 shows the eight sources that were most frequently used by respondents. Nearly three-fourths of respondents (74%) said they at least sometimes rely on the American Institute of Architects. Note that the rating for the American Society of Mechanical Engineers may be an underestimate since only two engineers participated in the survey.

Figure 7: Institutional Sources of Information About Energy Code



Survey respondents also indicated additional sources they rely on to stay abreast of building energy codes. The majority mentioned relying on local building departments (90%), colleagues (86%), internet searches (83%), or professional journals or magazines (69%) (Figure 8).

Figure 8: Additional Sources for Information About Energy Code



Recommendation

NEEA should partner with events and organizations that already attract attendees.

Given how few trainings respondents had attended it the last three years, convincing respondents to attend new events seems like an arduous task. Instead, NEEA should partner with conferences and organizations that already attract attendees, such as building code conferences and the American Institute of Architects, to increase the visibility and amount of energy code related content at their existing events.

TRAINING PREFERENCES

Market actors attend trainings that both interest them and give them required continuing education credits.

Market actors have various continuing education requirements to maintain for licensure, and they have limited time to attend trainings. Therefore, respondents said they look for trainings that will

offer credits and then pick ones that interest them. For the most part, their interest is determined by the topic; however, interest can also be piqued by a known presenter, such as a passionate peer. As one focus group respondent said, "*if I'm at a conference, sometimes I just go to a presentation without looking at the topic because I know the presenter is good*." Finally, market actors are motivated to attend trainings if they provide formal and informal networking opportunities and thus, make conferences an opportunity to socialize with their peers.

Additionally, in the in-depth interviews, builders indicated that detailed case studies, rather than brief overviews, were the most helpful when learning about new and emerging technologies in their field.

Recent commercial new construction trainings attended by market actors included those from regional organizations such as NEEA, industry organizations such as AIA and ASHRAE, and organizations with a specialized focus such as Passive House and WoodWorks.

In the in-depth interviews, most respondents reported attending several trainings on commercial new construction in the past three years. These included trainings from the following organizations:

- Passive House
- Westford Symposium on Building Science
- WoodWorks
- International Living Futures Institute
- LEAN Construction Institute
- World of Concrete
- Design-Build Conference & Expo
- ASHRAE
- Green Building Initiative
- Pacific Energy Center
- Northeast Energy Efficiency Council
- AIA Seattle
- A4LE
- Smart Buildings Center

In-depth interview respondents also indicated staying up-to-date on overall industry trends using the following methods:

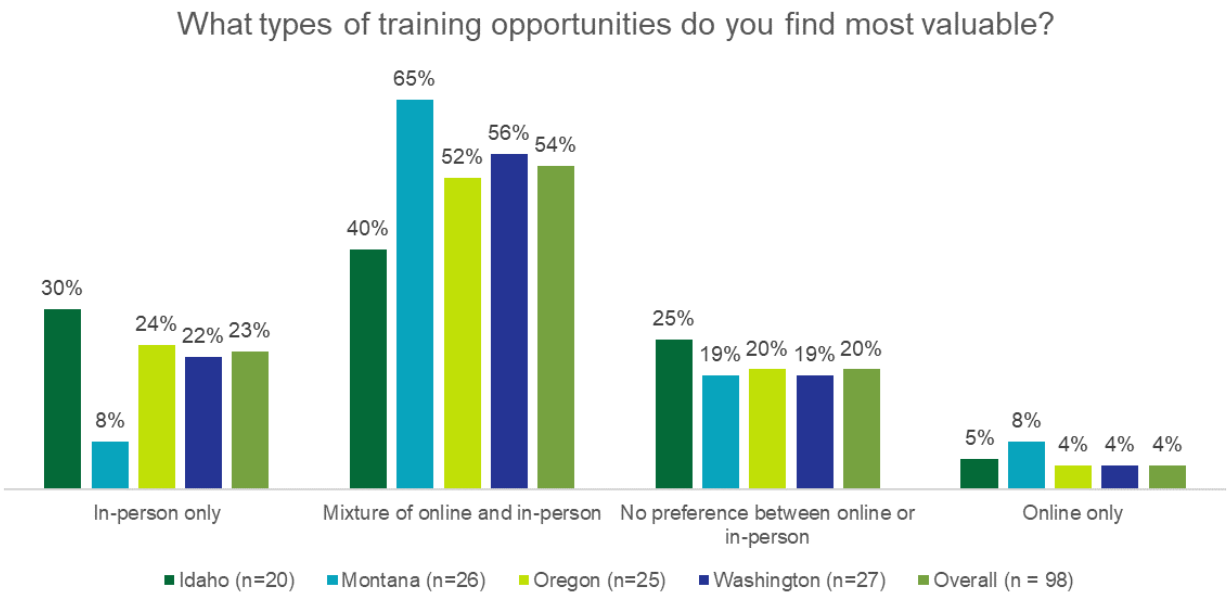
- Emails lists
- Conferences
- Journals (e.g., Journal of Light Construction, National Institute of Building Science journal, ASHRAE journal)
- Colleagues/networking.

Respondents prefer in-person trainings over online trainings.

When asked about the types of trainings they find most valuable, 77% of survey respondents said they prefer trainings that have at least some in-person components (Figure 9). Focus group participants and in-depth interview participants also all generally preferred in-person trainings over

online trainings. Respondents value the ability to ask questions of various types of experts at in-person trainings and felt that in-person trainings put them in a headspace to learn. One respondent said, "*it's easy to work on other projects during webinars. You lose attention... self-directed e-courses can be helpful because you can target what you don't know, but the conferences are great because of the interactions. You can learn from each other. That's more useful than the actual hand out*." In the interviews, respondents also highlighted the hands-on experience that in-person trainings allow. One said, *"watching and doing is important,"* and another said, *"demonstrations are awesome as are tours."*

Figure 9: Preferred Types of Trainings (from Survey)



Recommendation

NEEA should consider, as part of a portfolio of training approaches, sponsoring or facilitating in-person trainings that offer continuing education credits at existing events.

Market actors are most likely to choose to attend a training that interests them and offers them continuing education credits. They find in-person events the most rewarding due to the educational atmosphere, variety of perspectives, and networking opportunities. Respondents indicated that there could be more trainings related to energy efficiency or code at existing conferences and events. NEEA could leverage these events or organizations that already attract attendees to offer energy related trainings.

Recommendation

Trainings and take-home materials should be tailored to the intended audience.

As with the resources discussed above, trainings and materials should vary in complexity depending on the target audience. Some trainings might be intended for a broad audience and should thus focus on code changes, implications, and reasonings. Others, especially trainings for engineers and builders, should be more technical and perhaps include hands-on experiences.

Recommendation

Develop "trainings for trainers" at large firms.

Large firms indicated that they have staff with the formal responsibility of making sure projects comply with code. Medium sized firms have staff who informally take on this role and educate their peers as needed. Both types of staff could benefit from resources that makes it easier for them to train their colleagues and disseminate information. NEEA could develop trainings to help these individuals train their peers. It could potentially create champions of code in the post-code space.

Appendix A Detailed Survey Findings

A.1 Survey Methodology

NMR conducted an online and phone survey of architects and engineers in Washington, Oregon, Idaho, and Montana. NMR developed the survey sample with input from NEEA staff and also drew on publicly available sources, such as InfoUSA, and websites of regional chapters of industry associations. The survey was initially administered online through the Qualtrics survey platform. Participants for whom we had email addresses received an email invitation with a link to the survey URL. To enhance the legitimacy of the study, we mailed advance letters that included contact information for NEEA staff. Respondents were offered a $25 incentive for completing the survey. The online survey did not produce enough responses; therefore, we switched to a phone survey modality that was more productive.

The survey took an average of 19 minutes to complete. We targeted a total of 100 completed interviews (25 per state) to allow for adequate representation and diversity of perspectives from all four states. As Table 5 shows, we completed a total of 98 interviews and came close to achieving the state level target completed interviews, falling slightly short of target only in Montana. The total sample size of 98 completed interviews yields data that carry a margin of error of ±8.3% at the 90% confidence level.

Table 5: Survey Disposition

State	Phone	Web	Total
Idaho	18	2	20
Montana	19	7	26
Oregon	18	7	25
Washington	13	14	27
Total	68	30	98

A.2 Sample Characteristics

Nearly all of respondents (98%) were architects, while the rest were engineers. The most common job titles were “senior principal/partner” (56%), “project manager” (16%), and “architect/designer” (15%).

Respondents qualified to participated in the survey if at least 20% of their work was commercial new construction.[2] On average, respondents said that 57% of their work was commercial new construction, 22% was commercial retrofits, and 15% was residential new construction (Figure

[2] When the survey was initially fielded, it required that at least 50% of a respondent’s work be commercial new construction. This was later decreased to 20% to increase the response rate and respondents who had been rejected originally were notified if they met the more lenient requirement.

10). On average, respondents had completed 15 new commercial new construction projects in 2018. Eighteen percent were LEED certified and 11% were ENERGY STAR certified (Table 6).

Figure 10: Respondents' Mix of Work

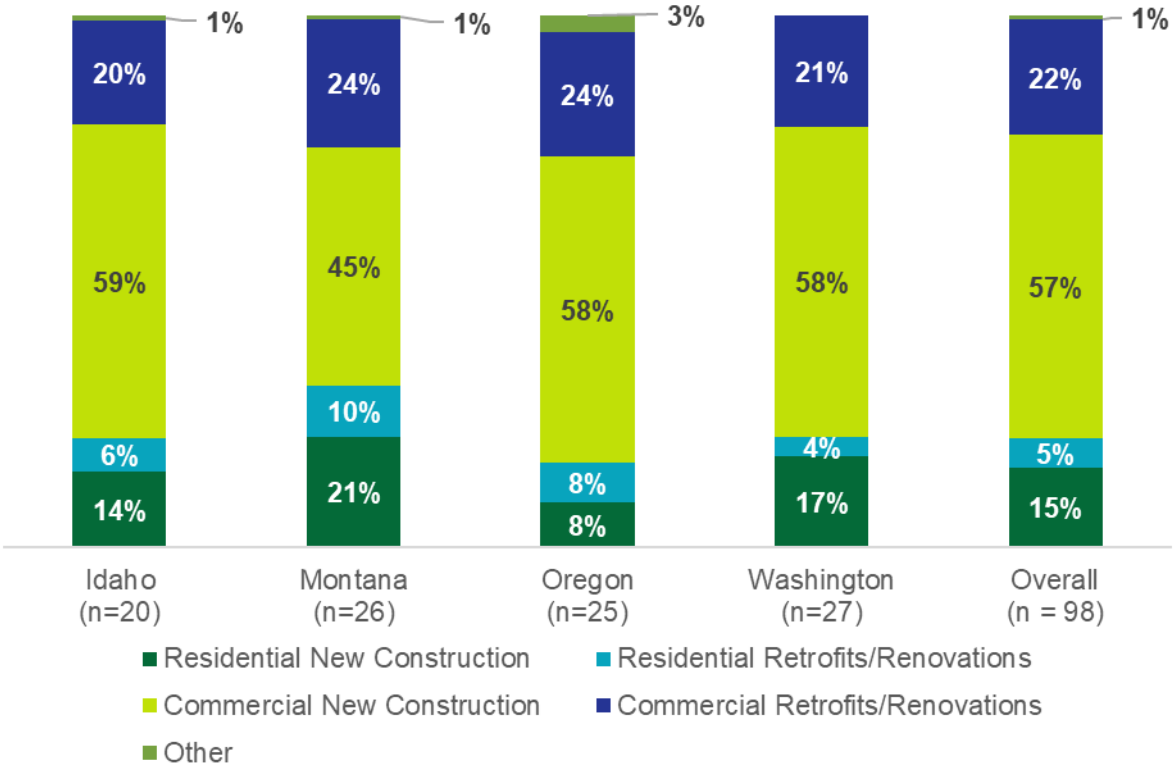


Table 6: Mean Counts of Respondents' Projects

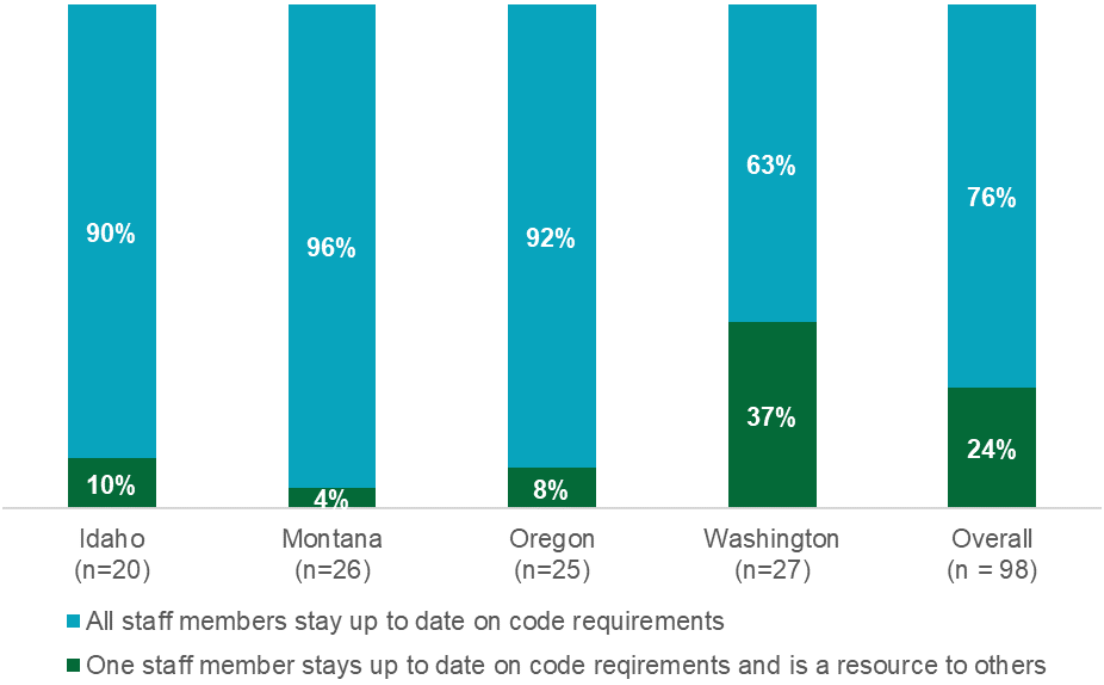
	Idaho	Montana	Oregon	Washington	Overall
Total commercial new construction	31.2	21.7	11.6	11.8	15.3
LEED certified	1.7	1.8	3.7	2.7	2.7
ENERGY STAR certified	2.8	1.2	3.3	1.1	1.7

A.3 TRACKING OF CODE CHANGES

- One-fourth (24%) of companies have key staff assigned to keep track of code changes.

Respondents were asked if their companies assign specific staff to keep track of code changes or if individual staff are required to keep track of the code requirements for their own projects. On average, only about one-fourth of respondents said their company has key staff who keep track of code changes and then disseminate the information, while the three-fourths (76%) said individual staff are expected to keep track of their projects' requirements. Washington respondents were significantly more likely to have assigned such key staff (37%) than respondents from the other three states (Figure 11).

Figure 11: Tracking of Code Changes

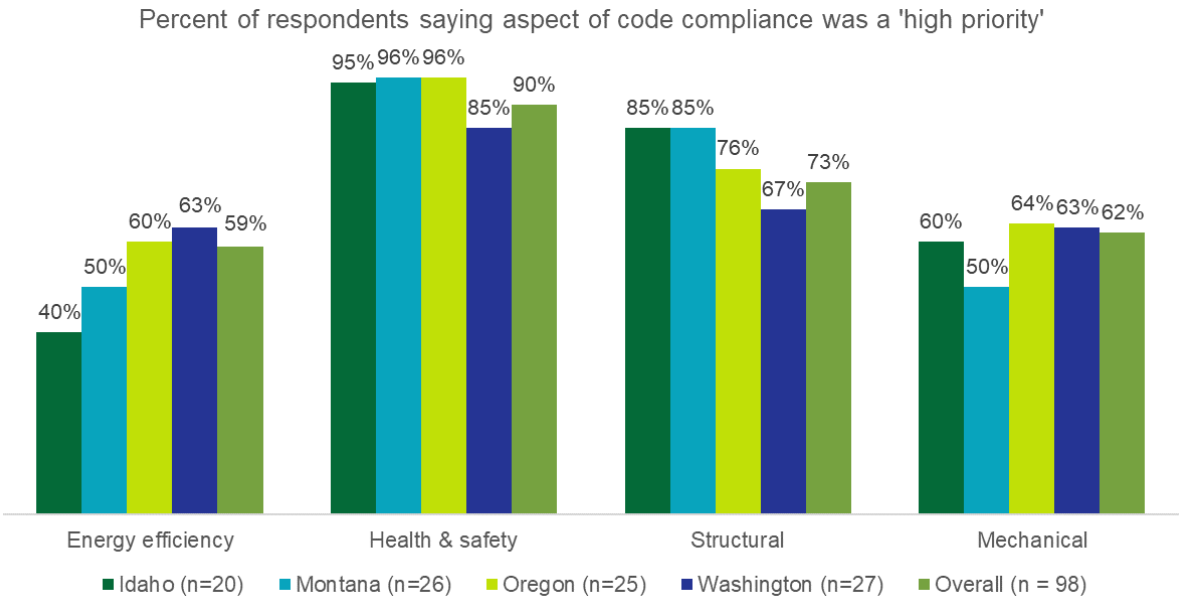


A.4 IMPORTANCE OF ENERGY EFFICIENCY TO PARTICIPANTS

- Building energy code is given a relatively lower priority compared to other aspects of building code; however, 59% of respondents still gave a high priority.

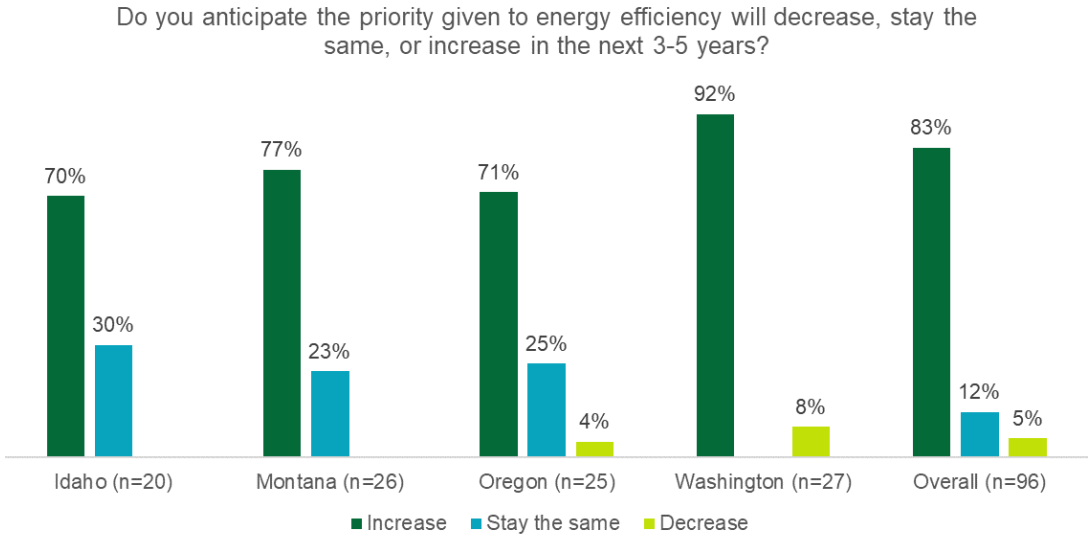
Respondents were asked how much of a priority is given to each of the following aspects of code compliance in their firm's commercial new construction projects: energy, health and safety, structural, and mechanical. Respondents could give a low, medium, or high priority rating to each aspect. Figure 12 shows the percent of respondents in each state that rated each aspect a "high priority." Respondents most frequently said that health and safety was a high priority (90%). In comparison, only 59% of respondents said energy efficiency was given a "high priority" – the lowest of any aspect.

Figure 12: Importance Given to Building Code Aspects



While respondents reported that they gave lower priority to energy code than to other codes, the majority (83%) felt that they will give more priority to energy efficiency in the future (Figure 13).

Figure 13: Future Importance of Energy Efficiency



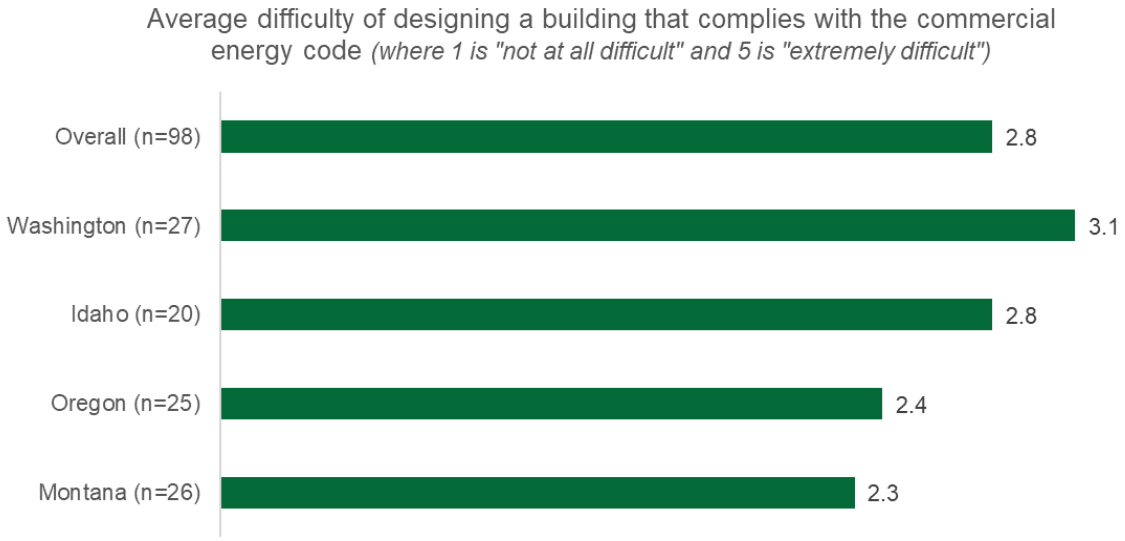
A.5 EASE OF ENERGY CODE COMPLIANCE

- Respondents felt it was not difficult to comply with energy code

Respondents were asked to rate the difficulty in constructing a building that complied with their state energy code, where a rating of 1 is “not at all difficult” and 5 is “extremely difficult.” Overall, respondents felt it was not difficult to comply with code – providing an average rating of 2.8 (Figure 14). Respondents from Washington reported the highest difficulty, 3.1, perhaps because the

energy codes in Washington, and specifically in Seattle, are more stringent than in the other areas.

Figure 14: Importance Given to Building Aspects

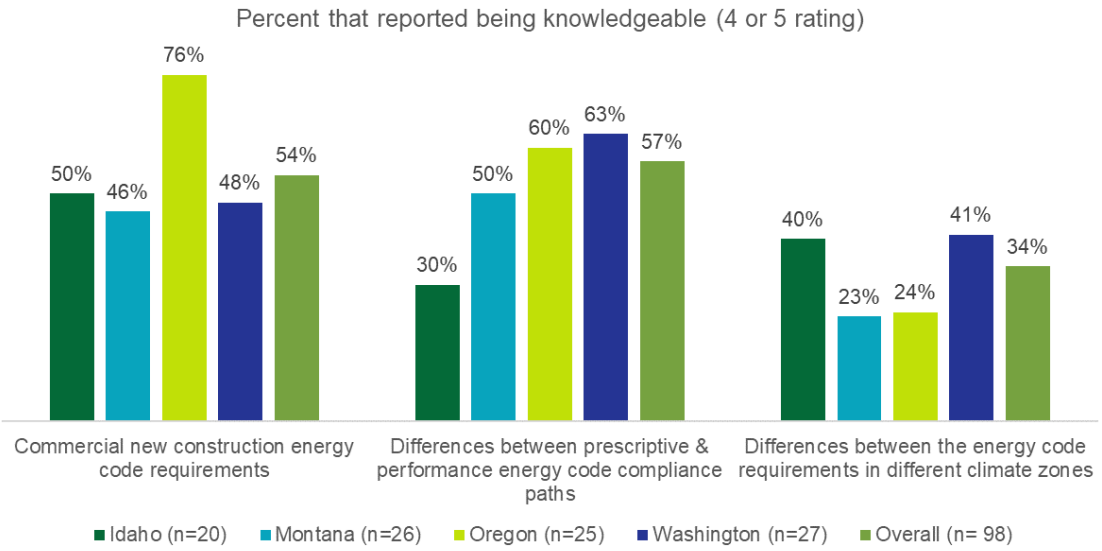


A.6 Awareness of Energy Codes

- Only about half of respondents (54%) felt knowledgeable about the commercial building energy code requirements.

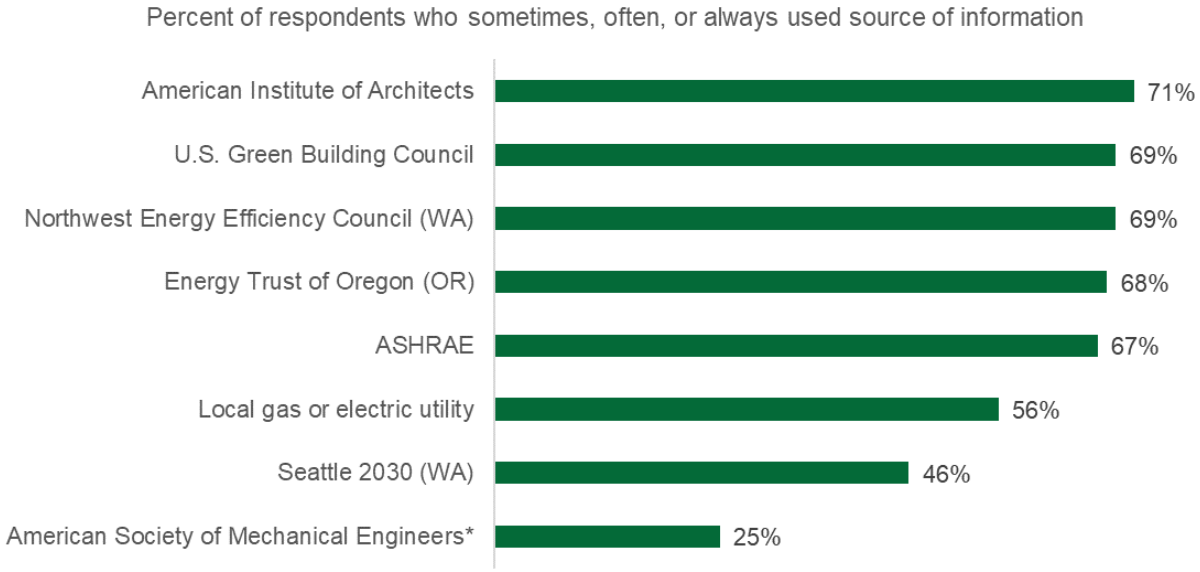
Respondents were asked to rate their level of awareness of different aspects of the energy code, where 1 is “not at all knowledgeable” and 5 is “very knowledgeable.” Figure 15 shows the percent of respondents that indicated feeling knowledgeable (by providing ratings of 4 or 5) for each aspect of the energy code. Overall, only half of respondents (54%) reported feeling knowledgeable about the commercial new construction energy code requirements. Oregon respondents were significantly more likely to report feeling knowledgeable about energy code requirements than respondents form other states. Fifty-seven percent of respondents felt knowledgeable about the differences between the performance and prescriptive paths. Only a third (34%) of respondents felt knowledgeable about the differences in requirements between climate zones.

Figure 15: Awareness of Energy Code



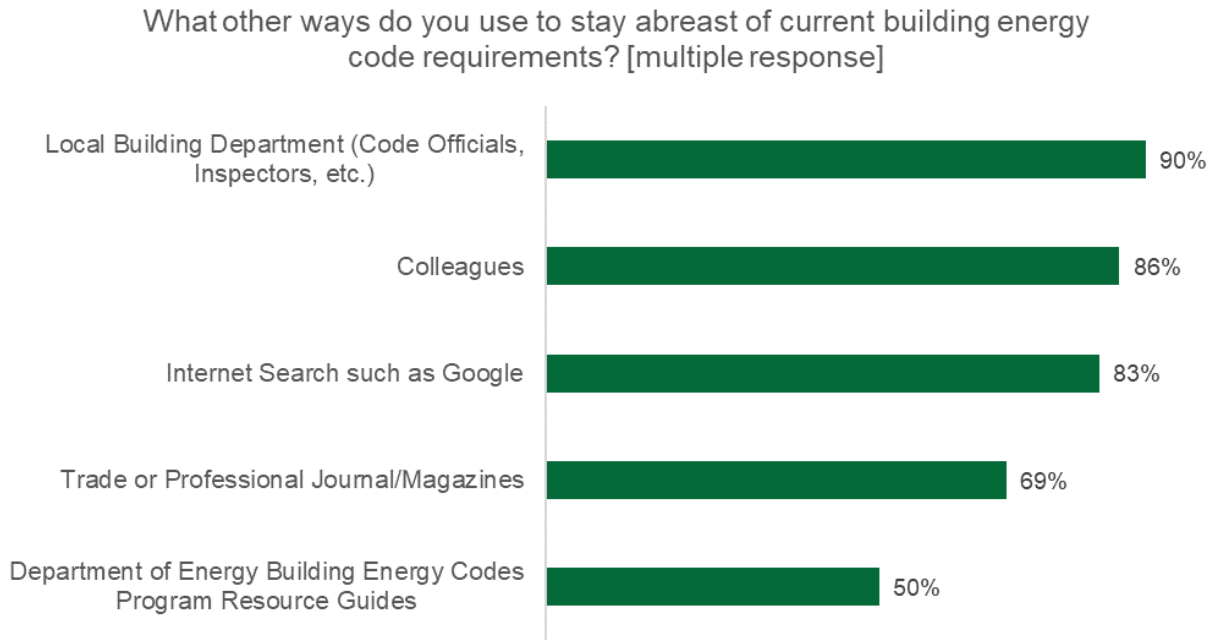
Respondents were provided a list of sources they may rely on for information about energy code changes and updates. They were asked if they used each source "never," "rarely," "sometimes," or "often." shows the eight sources that were most frequently used by respondents. Nearly three-fourths of respondents (74%) said they at least sometimes rely on the American Institute of Architects. Note that the rating for the American Society of Mechanical Engineers may be deflated since only two engineers participated in the survey.

Figure 16: Institutional Sources of Information About Energy Code



Respondents indicated additional sources the rely on to stay abreast of building energy codes. The majority mentioned relying on local building departments (90%), colleagues (86%), internet searches (83%), or professional journals or magazines (69%) ().

Figure 17: Additional Sources for Information About Energy Code

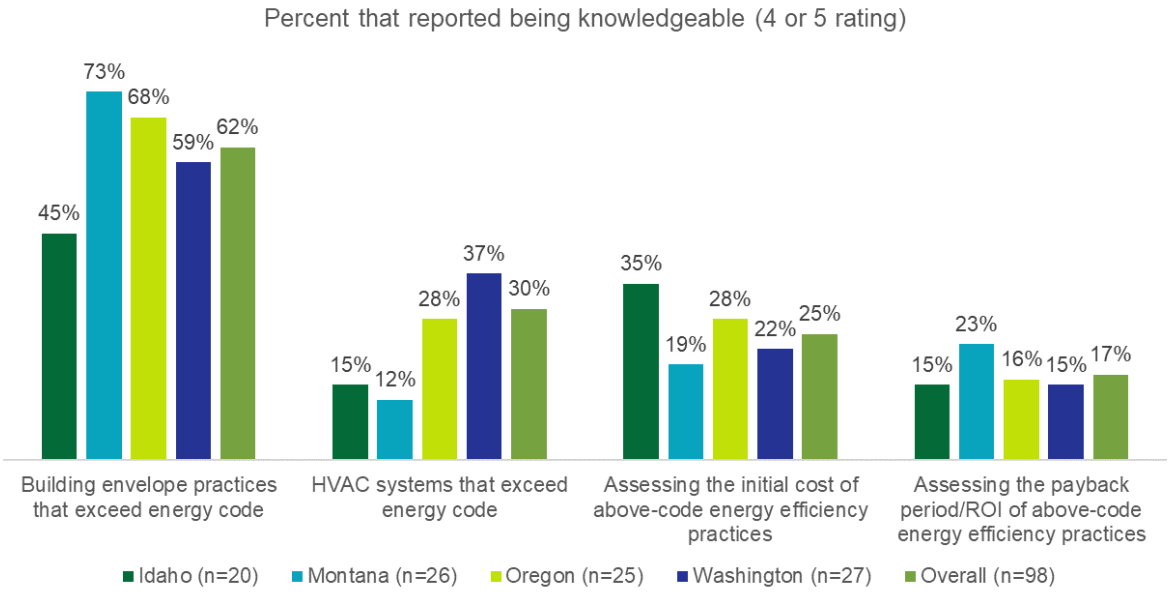


A.7 Awareness of Energy Efficient Practices

- Respondents felt knowledgeable about efficient building envelope practices but not about assessing costs or pay back periods associated with energy-efficient practices.

Respondents were asked to rate how knowledgeable they felt about energy-efficient practices on the same 1 to 5 scale, where 1 is "not at all knowledgeable" and 5 is "very knowledgeable." Figure 18 shows the percent of respondents that expressed feeling knowledgeable (by providing a rating of 4 or 5) for each of the energy-efficiency practices. Nearly two-thirds (62%) felt knowledgeable about building envelope practices that exceed code. Only one-third felt knowledgeable about heating and cooling systems that exceed code, perhaps because they rely on their subcontractors to implement heating and cooling systems. Only one-fourth (25%) felt knowledgeable about assessing the initial costs of above-code energy-efficient practices. Finally, less than one-fifth (17%) felt knowledgeable about assessing the pay-back periods for above code practices.

Figure 18: Awareness of Energy-efficient Practices



A.8 TRAININGS

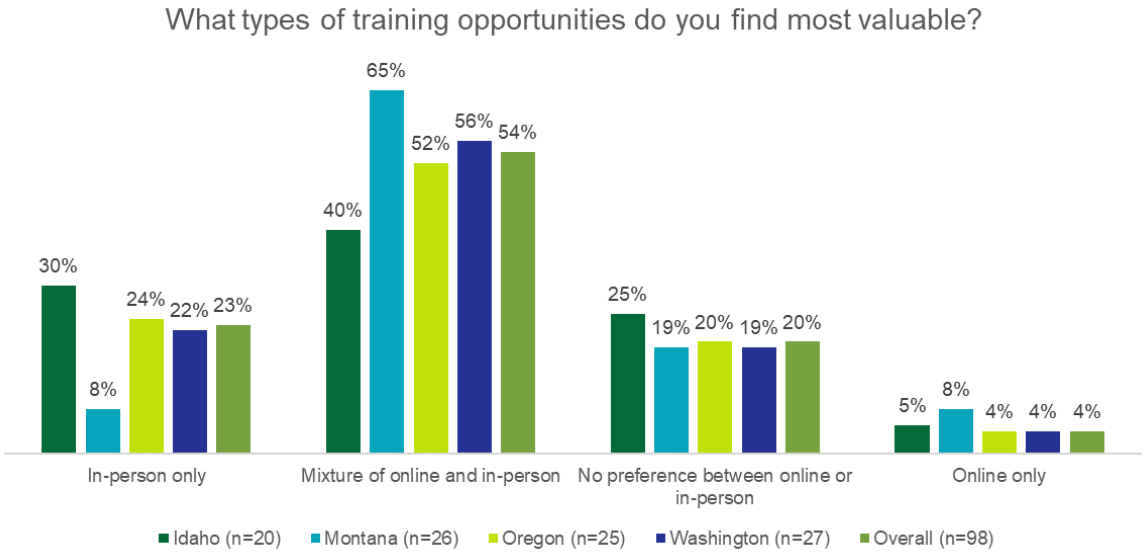
Respondents were asked about trainings they attended in the last three years related to code, energy code, or energy efficiency. In the past three years, respondents had attended an average of 1.1 trainings, yet more than half had not gone to any trainings. Table 7 shows the most cited trainings by state and the number of respondents who attended on each training.

Table 7: Most Attended Training by State

	Most Attended Training	Number of Respondents	Percent of Respondents from State
Idaho	Idaho Association of Building Officials (IDABO)	11	55%
Montana	Annual Montana Building Codes Conference	16	62%
Oregon	Oregon Department of Energy (ODOE)	12	44%
Washington	Northwest Regional Industrial Trainings	7	26%

Respondents were asked which types of trainings they prefer. More than half (54%) said they prefer trainings that have a mixture of online and in-person experiences. Very few respondents (4%) preferred trainings that were online only (Figure 19).

Figure 19: Preferred Types of Trainings

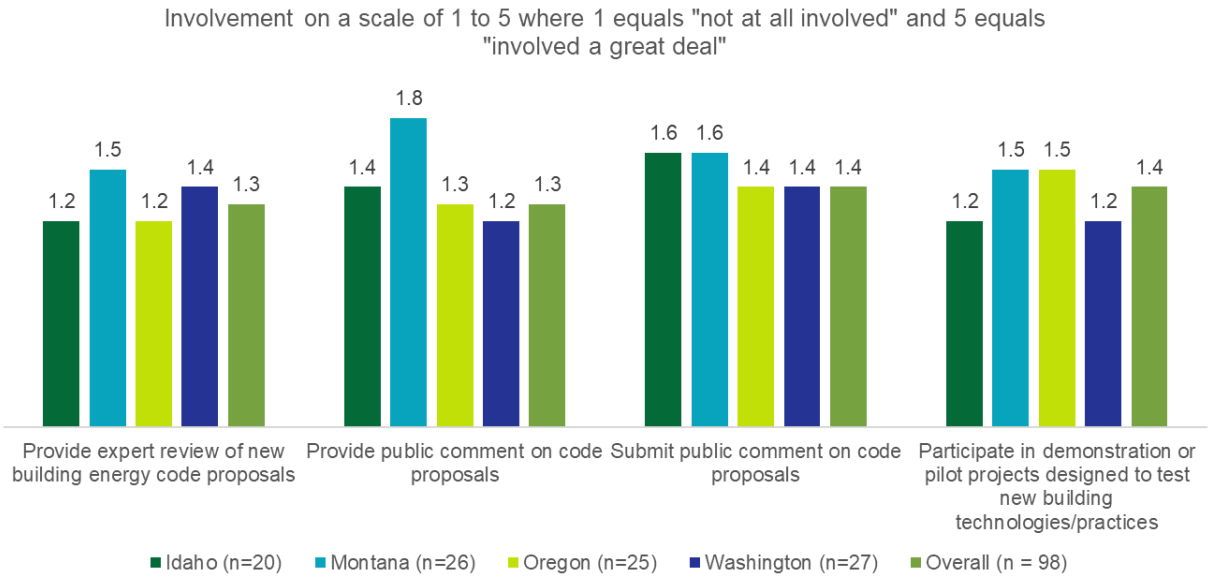


A.9 Code Development Process

- Respondents have little interest, and have had little to no involvement to date, in all aspects of the code development process.

Respondents were asked to rate their level of involvement to date in various aspects of the code development process on a scale of 1 to 5, where 1 is "not at all involved" and 5 is "involved a great deal." Figure 20 shows the mean ratings from all respondents and by state. Respondents reported little to no involvement in all aspects, never providing an average rating greater than 1.8.

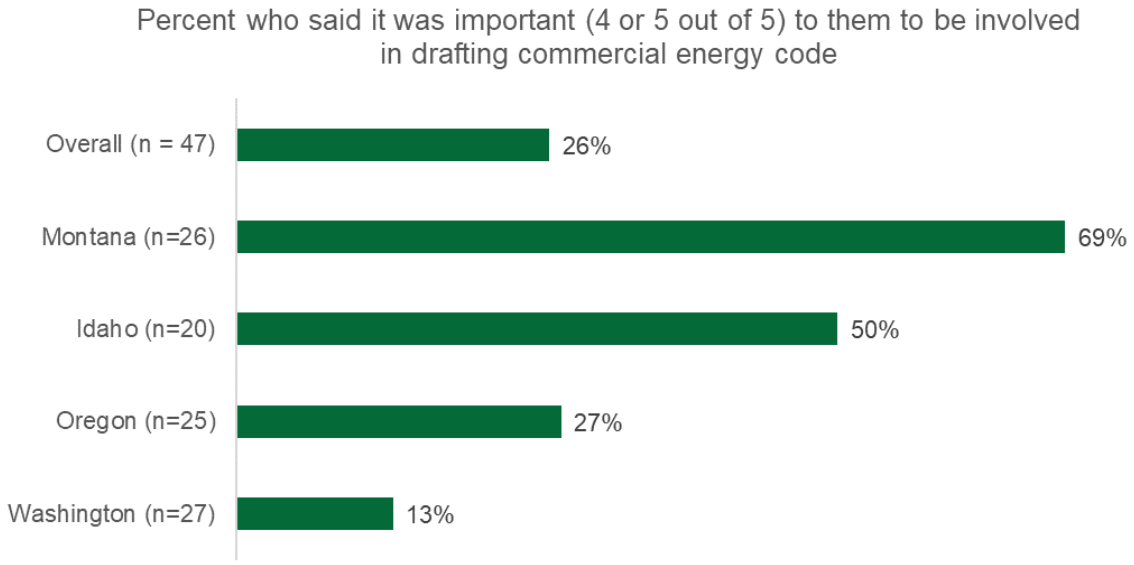
Figure 20: Involvement in Code Development Process to Date



Respondents rated how important it was for them, as architects and engineers, to be involved in the code development process on a 1 to 5 scale, where 1 is "not at all important" and 5 is "very important." Unsurprisingly, given the little involvement reported to date, only one fourth (26%) of respondents said it was important for them to participate by providing a rating of 4 or 5 (Figure 21). In Washington, the state with the most stringent energy codes, the fewest respondents (only 13%) thought their participation was important.

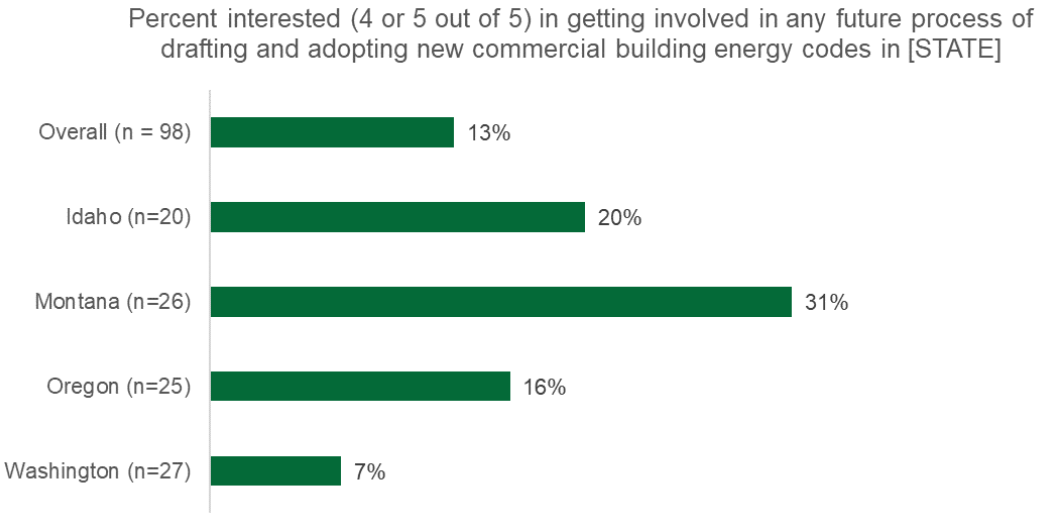
Respondents in Montana and Idaho were the most likely to say it was important for them to participate in the drafting of commercial energy code (69% and 50% respectively). This could be because Montana and Idaho have less stringent codes than Washington and Oregon and thus architects there may feel their input is more necessary to improve the code. Indeed, one focus group respondent in Montana said, "*I feel the code should be higher*" and another said, "*I want to see better quality buildings in Montana*."

Figure 21: Importance of Participating in Code Development Process



Respondents were then asked to rate how interested they were in participating in the code development process in any way on a scale from 1 to 5, where 1 is "not at all interested" and 5 is "very interested." Figure 22 shows the percent of respondents that said they had interest in participating by providing a rating of 4 or 5. Overall, only 13% of respondents had interest in participating in the code development process. When asked why they did not have an interest in participating, respondents cited lack of expertise, lack of time, frustrating bureaucratic processes, and contentment to simply comply with the code.

Figure 22: Interest in Participating in the Code Development Process



Appendix B Detailed In-depth Interview Findings

B.1 Recruitment and Methods

Building owners, contractors, builders, and engineers were recruited for in-depth interviews on a variety of topics related to the energy code via phone and email. All completed interviews were recruited via email. The sample for recruitment came from InfoUSA and internet searches. Respondents who completed the survey received a $100 Amazon gift card.

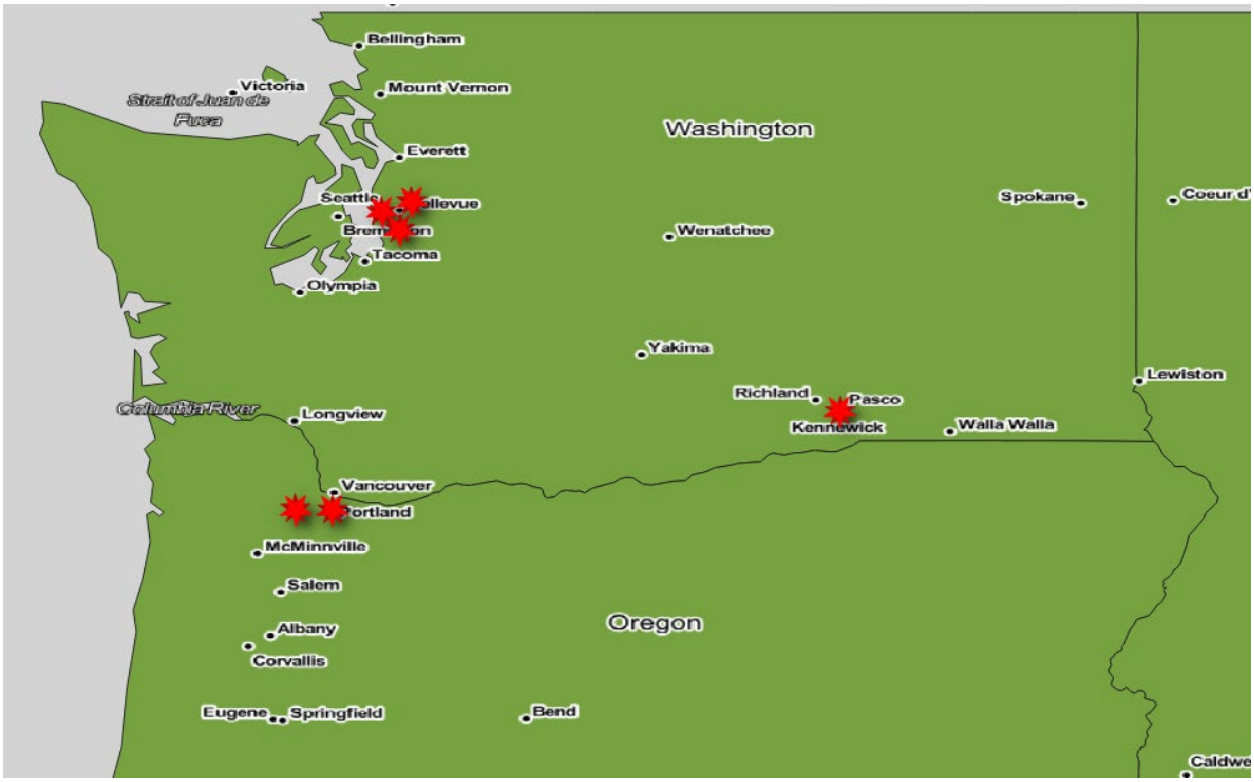
Two interviewees were from OR (both builders) and four were from WA (a commissioning agent, building owner, engineer, and building science professional). To qualify, interviewees had to have worked on a commercial new construction project in the past three years and to have implemented building plans affecting energy usage on at least one of those projects. Additionally, the projects had to be located in Washington, Oregon, Idaho, or Montana.

B.2 Respondent Background

Respondents were asked to describe the largest commercial new construction project they had worked on in the last three years. These projects ranged in size from one 25,000 ft^2 building to a 3,000,000 ft^2 office campus. Two projects were office buildings, two were multifamily buildings, one was a bus maintenance facility, and one was an elementary school. The two OR projects were built under the 2014 Oregon Energy Code, three of the WA projects were built under the 2015 WA State Energy Code, and the other WA project was built under the 2015 Seattle Energy Code.

These projects were within the city or suburbs of Seattle and Portland, with the exception of the project located in Kennewick, WA (Figure 23).

Figure 23. Location of Respondent's Largest Project



B.3 Energy Efficient Practices

B.3.1 Importance of Energy Efficiency to Building Owners

- Respondents said that owners who planned to occupy their buildings were more likely to care about energy efficiency during the planning process.

One respondent said, *"…a lot of our clients are owners, not developers. Energy efficiency is tied to their operating budget because they'll be residents of the building. These clients are often very concerned with their bottom lines, so every little bit helps*." On the other hand, another respondent that worked with multifamily developers said, "*Owners care about their tenants' and occupants' comfort and safety. Energy efficiency comes into it, it's part of the conversation, but really, it's from a marketing standpoint. They can advertise that they are energy efficient to draw in tenants. They don't necessarily care about it for the real benefits*."

One respondent noted that his clients were more concerned with seismic resiliency recently, and that tariffs and high labor costs in the Northwest left little in the budget for increased energy efficiency. The respondent that worked for a WA school district noted that districts are often willing to pay more for efficiency. The district expects the school to be occupied for decades and aims to choose equipment that uses less energy while being easy to maintain, with the expectation that annual operation and maintenance budgets will be small.

B.3.2 Plan Review

- Most respondents were actively involved in reviewing plans to ensure that they meet code. They felt comfortable working with the current energy code, but prized the flexibility of the performance pathway over the rigidity of the prescriptive pathway.

Respondents were asked to describe their plan review process. The two builders left plan review to others on their design team, but the other four respondents participated in plan review in some way. The commissioning agent said that she reviewed plans as part of her role in confirming that the building owner's project requirements are being met. The school district employee was also a registered architect, which he said informed his current plan review. He was heavily involved in the pre-design and programming stages of each project and met with end users (like teachers and maintenance staff) to make sure that the systems they needed were included in the plans. There are many design meetings for any school project, where school district employees meet with the architect, engineer, and school board. The engineer said that each designer at his firm is responsible for knowing the code and reviewing plans for compliance. The building science professional said that he reviewed plans with his clients when they needed assistance meeting code in the field.

Respondents discussed how they dealt with issues that came up during plan review and if they offered alternatives to what was originally in the plans. Multiple respondents discussed using tradeoffs to avoid certain prescriptive requirements. For example, in Oregon there's a requirement for exterior wall insulation based on a threshold U-value of the windows in that wall. The respondent had suggested using blown fiberglass to increase the R-value of the wall in conjunction with using lower U-value windows to avoid the exterior insulation requirement. Other examples included using low wattage exemptions for heating systems (so that a new car repair shop did not need to pass an air barrier test) and avoiding a requirement that kicked in at 2,000 cfm by installing a 1,950 cfm unit.

Respondents generally had a positive experience implementing the code as part of their work, though there was likely a selection bias with those who responded to the interview request. Most believed that further efficiency improvements were possible if designers were allowed flexibility in meeting these requirements and an emphasis was put on building performance rather than prescriptive requirements.

Still, challenges remain, and commissioning increasingly complex HVAC systems was an example given by one builder. Another respondent pointed out that changes from code cycle to code cycle can be hard for some to keep up with and are a part of the ever-increasing cost of new construction. Finally, meeting the code was harder with less common commercial building types, especially those that need to open and close large doors on a regular basis. The building owner agreed that flexibility will be key if the code continues to get more stringent and added that there could be additional research done on the highest performing systems, with brief information sheets provided to building owners, similar to a UL stamp of approval. He also noted that *"it's hard to renovate when major renovations trigger the need to bring the building up to the current energy or seismic code requirements. This prevents major remodels since there's not enough budget*."

When asked whether they saw differences between what was specified in the building plans and what was implemented in the field, the respondents were split. Some said that all decisions about product and practices on their projects were specified ahead of time. Others felt that changes often happened in the field, either as a reaction to problems or due to a lack of detail in the plans. The most common situation mentioned was continuous insulation requirements not being followed by the contractors, either due to lack of knowledge on the contractor's part or because the plans were not clear.

When asked, respondents said that it was common to see above-code mechanical systems, insulation, and lighting installed in the field. However, sometimes these above-code items were used as a tradeoff with a below-code part of the building, such as a glass wall.

B.4 Building Certification

When considering both the commercial and the residential sector, all respondents had worked on at least one certified building in the past. Multiple participants noted that it was easy to achieve LEED Silver certification when building to code in Oregon and Washington, as long as the owner commits to a few other changes, such as using recycled material. The experience of the interviewees was broad, and other certifications included the following:

- ENERGY STAR®
- WELL building standard
- Green Globes
- WA Sustainable Schools protocol
- Passive House
- Earth Advantage
- The green building standard of the Washington State Housing Financing Agency

B.5 Respondent Knowledge and Training Opportunities

- Respondents already felt knowledgeable about new technology and code changes, and felt that additional training would be most useful if it was detailed and in-depth rather than an overview.
- All respondents valued in-person trainings over webinars, especially if these trainings included a demonstration or hands on element. Most thought that webinars could still be useful if they were focused in scope and limited to one hour.
- While the respondents from the greater Portland and Seattle areas felt that they had sufficient access to trainings, the respondent from Kennewick felt that few trainings for the commercial sector were available in his area.

When asked to rank their knowledge of energy efficient products and practices on a scale of 1 to 5, two responded with a 3, one with a 4, and two with a 5 (this question was not asked of the building owner). When asked how they could benefit from additional training in this area, three respondents said that they could use training on emerging technologies in the field. Detailed case

studies, rather than brief overviews, were the most helpful when learning about these new technologies.

Respondents were asked how they currently stay up to date on trends and changes to the code. For staying up to date on industry trends, respondents relied on the following:

- Emails lists
- Conferences
- Journals (e.g., Journal of Light Construction, National Institute of Building Science journal, ASHRAE journal)
- Colleagues/networking.

For staying up to date on changes to the commercial energy code, respondents relied on the following:

- Building Enclosure Council presentation
- Learning on a project after the code has changed
- LinkedIn
- Conferences
- Participation in a TAG group
- Washington State University.

Most respondents had attended several trainings on commercial new construction in the past three years. These included trainings from the following organizations:

- Passive House
- Westford Symposium on Building Science
- WoodWorks (mentioned twice)
- International Living Futures Institute
- LEAN Construction Institute
- World of Concrete
- Design-Build Conference & Expo
- ASHRAE
- Green Building Initiative
- Pacific Energy Center
- Northeast Energy Efficiency Council
- AIA Seattle
- A4LE
- Smart Buildings Center

Respondents universally agreed that in person training was more valuable than online training, but most said that webinars could be useful if focused in scope and kept to one hour. Respondents thought that in-person training was more valuable because it was easier to ask questions as well as learn from demonstrations of the new technology or code requirement. One respondent noted that providing food made it easier and more attractive to attend an all-day or half-day training.

Respondents were then asked if they had heard of trainings sponsored by various organizations (Table 8). Most of the training organizations were not known to the participants, despite their active participation in trainings hosted by other organizations. Two respondents separately noted

that they thought that Better Bricks had stopped offering trainings, but that they were active ten years ago.

The respondent that worked in Kennewick, WA felt that there were few commercial trainings offered in his area and was struggling to find good resources as he switched from working in the residential sector to the commercial one. This real or perceived difference between training availability in major cities and more rural locations could be an opportunity to expand future trainings and outreach.

B.6 Awareness of Sponsored Trainings

Table 8: Awareness of Sponsored Trainings

Have you heard of trainings sponsored by…?	Yes	No
Better Bricks	0	4
Seattle 2030 (WA only)	2	2
Energy Trust of Oregon (OR only)	1	0
Building Owners and Managers Association (BOMA)	1	3
Northwest Regional Industrial Trainings	0	3
Trainings sponsored by your local utility	2	1

B.7 Drafting and Adopting Building Codes

- Respondents who were already involved in the code adoption process said that they planned to continue this work, while those that were not involved were not interested in getting involved.
- Multiple respondents complained that lax code enforcement meant that compliance with the code was left to the design and construction teams.

Respondents were asked if they had knowledge of the code drafting and adoption process. Four of the respondents had either participated in the building code adoption process or the energy code adoption process, and thus were quite familiar with the details. Of the other two, one felt informed on the topic and the other did not. Again, this awareness is likely an artifact of who responded to the interview request.

The three respondents that were members of their local technical advisory group (TAG) considered the experience valuable and planned to stay involved in the code adoption process. The respondent who had worked on building code adoption but not specifically energy code adoption said that he was interested in becoming involved in the energy code as well, since he enjoys working through the details and wants to see the code improve. The two respondents who were involved in the past were not interested in getting involved in the future.

Respondents were asked about their experience with building code officials. The building owner had a positive experience working with building code officials and made sure to be on-site often to make sure that any issues the official found were fixed by the official's next visit. The commissioning agent said that while she fills out forms after completing the commissioning tests, the results are rarely used by building code officials.

Three of the respondents mentioned that enforcement felt lax to them, and that officials were focusing on health and safety rather than the detailed energy code. The building owner said, "*There's a lot of loose interpretation and loose enforcement of the code - particularly commissioning items where you're required to do a test but not show the results. There're no real teeth for things like that. Perhaps in the future enforcement will be stepped up as people get used to doing the test*."

Appendix C Detailed Focus Group Findings

The evaluation included focus groups with architects and engineers who had worked on commercial new construction projects in Washington, Oregon, or Montana between 2017 and 2019. Overall, NMR conducted five focus groups with a total of 27 participants across the three states in May of 2019. The focus groups addressed the following topics:

- Participants' professional backgrounds and motivations
- Participants' and companies' perceptions of energy efficiency
- Motivations and barriers to applying the building energy code (e.g., awareness, understanding, costs)
- How companies track and stay informed of code changes
- Perceptions of building energy codes and code changes
- Interest in and perceived importance/value of engaging in building code enhancement activities
- Experiences with and preferences for professional development opportunities, including preferred learning environments, training formats, and supporting materials

C.1 Recruitment and Methods

The team conducted five focus groups: two in Seattle, Washington; two in Portland, Oregon; and one in Billings, Montana. To qualify, participants needed to (1) have worked on at least one commercial new construction project in their state since 2017 and (2) be required to stay up to date with the building energy code as part of their job. Commercial new construction projects did not need to be complete to satisfy the first requirement. The team sought to recruit six architects or engineers for each group so that at least four would attend. Potential recruits were identified using data from InfoUSA, online searches, and focus group facility databases. Participants received a check for $200 and a light dinner for attending.

Table 9 shows the counts of participants that attended each group. The team attempted to have no two participants from the same company. When respondents were from the same company, the team verified that the participants had not worked on commercial new construction projects in the last two years together and put the respondents in different groups.[3]

[3] Only one company had more than one participant. Three engineers from that company participated. Note that there were only five engineers total.

Table 9: Focus Group Participant Counts

Focus Group City	Time	Count of Architects	Count of Engineers	Total
Billings	6:00 PM	4	0	4
Seattle	6:00 PM	4	2[1]	6
Seattle	8:00 PM	5	1	6
Portland	6:00 PM	4	1	5
Portland	8:00 PM	5	1	6
Total	--	22	5	27

[1] One engineer was solely an energy modeler.

Each focus group lasted approximately 90 minutes and was moderated by NMR professional staff. The general guide to the focus group discussion is included in Appendix F. Note that the team adapted the questions following each group to incorporate findings iteratively and to delve deeper into certain topics. Additionally, each focus group followed the natural flow of conversation. As such, no group strictly adhered to the guide, and no two groups were asked all the questions. Still, every group addressed every key topic to some degree.

Respondents worked for a mix of small and large companies with 14 working for companies described as "large" and 13 working for companies described as "small." Small companies ranged from sole proprietors to companies with about twenty employees while large companies could have up to hundreds of employees and in-house specialist consultants. Large companies often had branches in multiple states and respondents were asked to focus on the state in which they lived.

C.2 Professional Backgrounds And Motivations

The architects were drawn to their profession due to its combination of creative and technical problem-solving tasks. Many knew they wanted to be architects from a young age and came from families in the construction industry. Additionally, the architects were drawn to the ability to create spaces that impact people.

> *"I'm passionate about built environment, it's where we spend most of our time. There is an affect spaces have on people. Well-designed spaces can be very uplifting."*

Overall, architects viewed themselves as generalists who are responsible for synthesizing information from many different experts. Architects expressed being most proud of projects that they saw function well and flexibly for end users, especially if the project had been built under major budget constraints or had brought new life to a community.

While all architects placed value in satisfying and retaining clients, some architects placed more emphasis than others on ideals such as energy efficiency or sustainability. These architects feel driven to push for energy efficient and sustainable building practices in their projects out of a concern for the environment and impacts of climate change. Participants mentioned that a "passionate few" of ideal-driven architects may participate in code committees, but none of the focus group participants had participated to date.

Alternatively, client-driven architects dedicate their energy to client satisfaction and financial stability as opposed to trying to persuade their clients to pursue additional goals. Their clientele is often difficult to convince to invest in energy efficiency and thus energy efficiency becomes impractical. Often these architects are from small companies that may not have the bandwidth or flexibility to delve deeply into energy efficient practices. Their clients often view energy efficient features as expensive line items that can easily be replaced to reduce costs. They have positive views of energy efficiency but look at it mostly as a code requirement for their projects. They do appreciate having an energy code that requires greater energy efficiency than their clients would ask for otherwise – seeing code as the only way to get energy efficient practices into their projects.

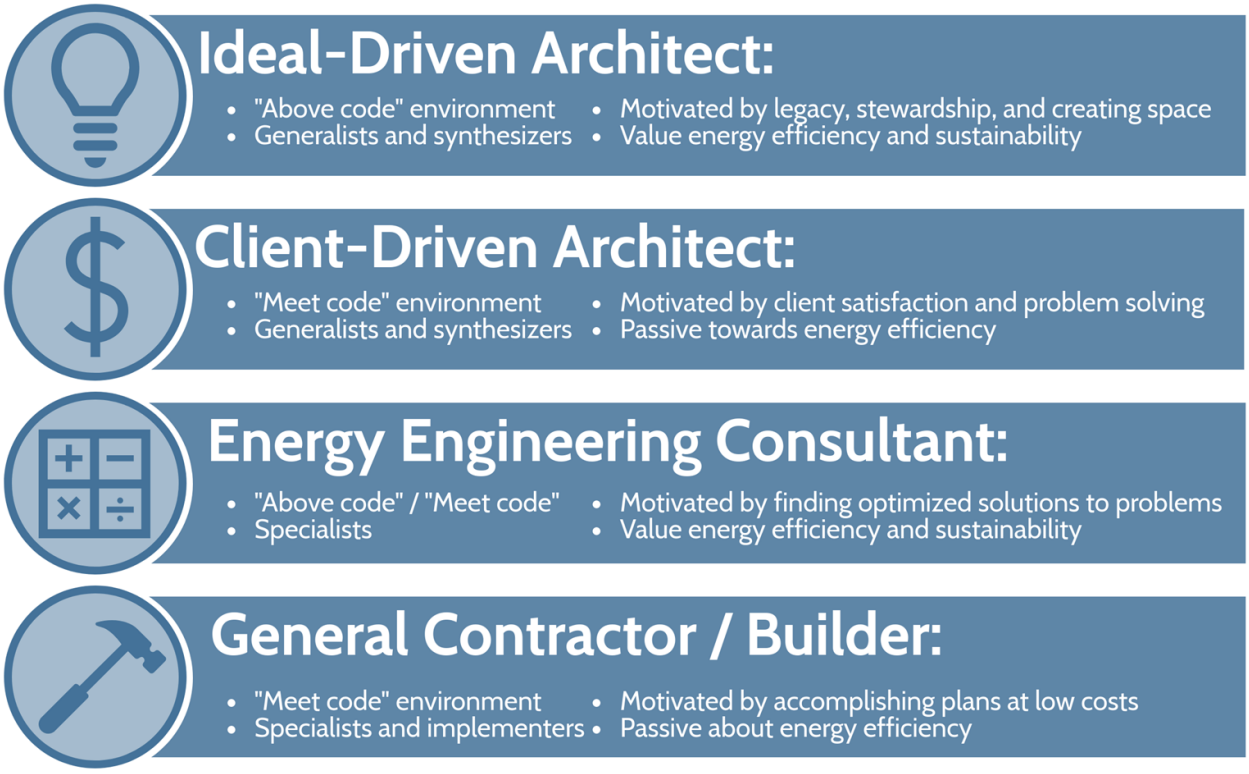
The engineers were driven to their profession by a passion for solving puzzles. They enjoyed mathematics and finding logical solutions to problems. They took pride in learning new things and passing new information onto others and as such were connected to informal groups of colleagues who enjoy discussing new technologies, methods, or industry news. Engineers viewed themselves as specialists on one to three topics and enjoyed digging deeply into the technical aspects of a building component.

> *"I'm an engineer so I'm a numbers guy. I like solving puzzles. I like finding the best solutions that meet all the goals in efficient ways."*

All five of the engineers were from companies that specialize in energy efficient projects and thus often shared a passion to push clients to be more energy efficient. The only focus group participants that had ever participated in the energy code adoption or development process were engineers.

The following figure profiles the segment personas identified from the focus groups and in-depth interviews.[4]

[4] The general contractor / builder segment was identified primarily from the in-depth interviews, although they were also alluded to in the focus groups.



C.3 Perceptions of Energy Efficiency

- **Recommendation:** Explore creating client demand for energy efficiency.
- **Recommendation:** Facilitate enforcement of energy code during construction.

Participants described the importance of energy efficiency to themselves personally and to their company. Overall, participants indicated that energy efficiency was more important to them than to their company, given their companies' needs to minimize costs to satisfy clients. Five participants indicated that energy efficiency was extremely important to their company and was incorporated into their business model. These companies get clients who are specifically looking for assistance in complying with or exceeding the energy code. Still, these participants acknowledged that clients' goals and interests largely dictate the overall energy efficiency of project.

C.3.1 Importance of energy efficiency to participants

- Architects and engineers consistently valued energy efficiency.

89% of participants personally find energy efficiency important.

The majority of focus group participants (89%) expressed that they personally found energy efficiency important.[5] Participants valued energy efficiency regardless of differences in the size of their company, whether they have built projects above code, or whether they work in Washington, Oregon, or Montana. Respondents equated energy efficiency with their interests in building "sustainably" or "environmentally." Additionally, respondents considered energy efficiency integral to good building design, with one observing that "*the form, function, and economy of a building are all highly influenced by energy efficiency*."

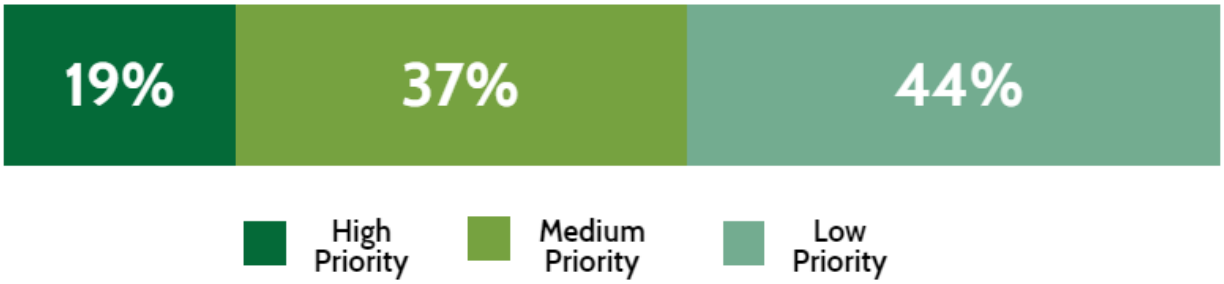
The remaining 11% of participants only valued energy efficiency insofar as their clients called for it and because energy code compliance is a requirement for their work: "*It's important because it's part of my job. If I don't get energy efficiency right, I don't get my building permits*."

C.4 IMPORTANCE OF ENERGY EFFICIENCY TO COMPANIES

- Companies' emphasis on energy efficiency varies by clientele.

Participants described a spectrum of priority given to energy efficiency across companies. The level of a company's emphasis on energy efficiency is usually determined by the company's clientele. Figure 24 shows the percent of respondents who indicated that their company gives energy efficiency a high, medium, or low priority.

Figure 24: Company Priority of Energy Efficiency



Five participants (19%), from four companies, indicated that energy efficiency was a high priority in their company and was incorporated into their business model. These companies get clients who are specifically looking for assistance in exceeding the energy code.

Ten participants (37%) noted that while energy efficiency is not their highest priority, they do often encourage clients to implement greater energy efficiency and strive to go beyond code when possible. Some of these companies have core values that align with energy efficiency. As one

[5] Note that all participants had chosen to participate in the focus group knowing it concerned energy efficiency and thus may be subject to self-selection bias in favor of energy efficiency.

participant stated, "*my company has a triple bottom line ethos about the environment. We are out ahead of our clients on energy. We try to gently push them to go above code*."

Another twelve participants (44%), explained that given their clientele, energy efficiency is a low priority. Typically, these companies work with developers who will be selling or leasing the buildings. One respondent said, "*energy efficiency is of less importance in my field because with the clients, it's all about cost. Energy efficiency is one of the first things to get value engineered out of a building*."

When trying to encourage clients to be more energy efficient, participants noted that they try to appeal to a client's values and goals. One participant described a specific instance of persuading a client to invest in energy efficiency and green building:

> *"We said to them, 'hey you are a bank, you want to be a financial institution of permanence, you want a beautiful building in downtown, you want it to last 100 years. Therefore, you want energy efficiency.'"*

When clients do not have a financial interest in energy efficiency, the energy efficiency of project is typically only increased as a byproduct of trying to accomplish some other goal. For example, one respondent described an instance when changes to the exterior led to increased mechanical system efficiency:

> *"Sometimes we can get them to go above code if its directly tied to system choices and how it effects the exterior of the building. We may upgrade to a mini-split because we can't put a PTHP through the wall. Sometimes its design review driven. If we can't have as many louvres on the exterior, we can then push our client to change the systems to get those louvers off."*

C.4.1 Barriers to energy efficiency

- Energy-efficiency levels are mostly dictated by client's goals and cost constraints.

As mentioned above, clients and their budget constraints largely dictate energy efficiency. Clients who plan to own and operate a building for a long time are more interested in energy efficiency because it can lead to savings in the long run. One participant described a specific type of client by saying, "*large tech clients are more interested in long term use of their buildings, we can push energy efficiency more with them*."

Conversely, clients who plan to build and sell a property, or lease a property out to tenants who will pay utilities, are typically not interested in energy efficiency. One participant said, "*For us, the barrier is who pays the energy bills. If the tenant will pay the bill, there is very little incentive for the developer to put more money into the system*."

Up-front costs were the most frequently cited barrier to incorporating energy efficiency into designs: "*Clients have lofty goals in the design phase but then when the bid comes along, they want to know the code minimum because they have cost constraints*" or "*when a project is over budget, we solicit feedback from the general contractor [for cost savings]. Every recommendation always involves compromises to energy efficiency, such as mechanical systems or insulation*."

Participants also cited operational challenges as a barrier to implementing energy efficiency. Specifically, they described clients rejecting advanced mechanical and ventilation systems because their facility managers were not comfortable with the newer technologies. This was particularly an issue at big institutions such as universities that may have one facility department that prefers to have similar systems in all their buildings. One respondent said, "*system complexity is a barrier. People who operate the building don't understand the systems and it's a hinderance to implementing it*." This can change the building in the design phase when the owner's facility manager says they cannot work with a certain system: "*the owner will come to us and say, 'I don't know what to tell you, if my guy isn't going to work on it, I can't do it*.'"

C.4.2 Enforcement of energy efficiency code

- Code enforcement is rigorous during permitting and lax during construction.
- Architects felt their own oversight, commissioning, and market pressures can mitigate reduced efficiency resulting from lax code enforcement during the construction phase

Participants across all groups consistently felt that enforcement of energy codes is rigorous during the permitting phase but not strictly enforced by officials during the construction phase. Respondents had mixed feelings on whether lax enforcement during construction led to less efficient designs or implementation. "*It's always about getting through the permit review process and making sure that the performance report is perfect, and documentation is all there. But the implementation during construction and commissioning is lacking*."

Respondents noted that they are filling their permits earlier in the design process to keep projects on schedule. This can lead to challenges later when features do not match the original plan estimates. Additionally, while energy code compliance is checked rigorously in the majority of major municipalities, respondents expressed that scrutiny of energy code compliance varies by town and is particularly lax in rural areas where officials may not have the time nor know-how.

Participants felt that officials do not emphasize enforcement of energy code during the construction phase: "*I don't see inspectors doing much besides checking boxes*." Despite lax enforcement, some architects felt overall energy efficiency matched plans and complied with code requirements citing their own supervision during construction and contractual liabilities on general contractors: "*Personally, we take a very strong stance in making sure what we're delivering is what is in the contract documents. It's on the architect to make sure what's delivered is what's planned for*." Commissioning can also ensure a quality implementation but depends on the client's interest and the commissioning agent's skill set:

> *"If the owner wants commissioning it's going to be inspected and every flaw must be corrected. We do commissioning but we don't do third party commissioning. We have found a lot of commissioning agents don't have enough mechanical knowledge to do a good job, if they are doing the whole building, things may fall through the cracks."*

Conversely, some architects felt that lax enforcement led to lower energy efficiency, due to contractors incorrectly implementing plans or making substitutions due to costs: "*It comes down to the contractor, some will do a good job no matter what, others know they can make so much more money by doing it cheaply and that they never get caught*."

Oversight capabilities differ between design-build and design-bid-build projects. Problems with implementation are more easily attributable in design-build than in design-bid-build where a single building component could have been influenced by the actions of many different companies: "*There is more trust in design-build models that if at the end of the day, if a project doesn't work, you're only going to one person as opposed to a detail that has eight products all touched five different companies*."

C.5 Energy Code and Code Changes

- **Recommendation:** Target engagement of architects and engineers who are passionate about energy codes.
- **Recommendation:** Develop and disperse materials explaining the rationale of upcoming code changes.

When participants had an opinion about the energy code, it was usually positive. They appreciated stringent code and increased code stringency as a way to address environmental concerns. Specifically, six participants (22%) expressed that they appreciated code because it allows them to achieve energy efficiency without having to undergo the challenging task of persuading clients: "*Most of my clients want to do code minimum so it would be good to have a stringent code minimum*."

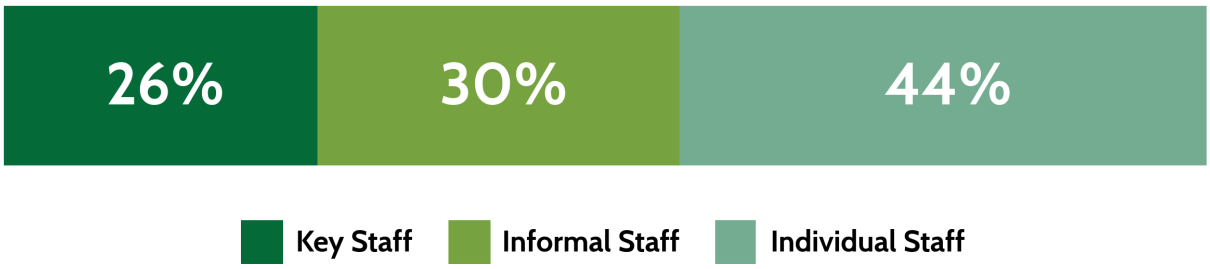
Other respondents supported the energy code but had concerns about its practicality. They feared that unrealistic standards could be impossible to achieve and would thus lead to dishonesty as designers try to get past plans approved and overestimations of efficiency.

C.5.1 Tracking of code changes

- Only one in four companies have designated staff to track code changes.
- Code experts at companies tend to be employees who have a passion for codes.

Every participant was asked how their company tracks and stays appraised of code changes (Figure 25). Seven participants (26%) said their companies have key staff that are designated to track changes and disseminate information. The individuals tended to be higher level staff and engineers who often had an existing passion for codes: "*There is a relationship between the person's interest and the quality of info you get out of it. It's about assigning someone with interest*." Eight participants (30%) indicated that while their companies have not specifically designated key staff to track code changes, they do have a few passionate employees who track codes and disseminate information. These individuals serve as informal resources to the individual employees who are responsible to make sure their own projects comply with code. Twelve participants (44%) said individual staff are responsible for tracking code changes and making sure their own projects comply with code. Additionally, architects who view themselves as generalists said that they rely on engineers and contractors to ensure compliance.

Figure 25: Company Tracking of Code Changes



C.5.2 Resources for Tracking Code Changes

- Participants rely on conferences, expert consultants, or city websites to keep track of code changes. Otherwise, they learn by trial and error.

When asked about which resources they use to learn about energy code, nine participants (33%) mentioned going to, or having colleagues go to conferences. They highlighted conferences that offer continuing education credits, which are a requirement for licensure. Participants valued the interactions between various experts at conferences and the ability to ask questions in person. Still, few respondents had specifically attended energy code trainings at conferences. Many saw an opportunity for more energy code trainings at conferences. One respondent said, "*Right now energy code is kind of just over there. It doesn't have the same life, health or safety aspects. Learning in a conference would be good*."

Five respondents said they simply learn by trial and error: "*We wait until another project has a problem. The guinea pig project solves all the problems*." Four of those five respondents came from small companies. Four respondents mentioned that they rely on various consultants for information on code: "*We'll hire a LEED consultant or an envelope consultant. It's about interpersonal relationships I'll call up a mechanical engineer and we'll talk about systems*." This echoed a common theme of architects considering themselves generalists as opposed to specialists. They often view themselves as the person tasked with reconciling information from many different experts and as such often turn to specialists for specific advice on code compliance.

Finally, participants stated that they often rely on the codebook themselves or online versions of energy code on municipality websites. Respondents highlighted online resources provided by the Seattle Department of Construction & Inspections as well as regular "code blast" e-mails sent by the Oregon Building Codes Division. Only half of the six participants in the focus group that mentioned the code blast emails, were aware of the emails.

C.5.3 Onerousness of Code Changes

- Respondents find code changes onerous when the changes are unclearly communicated, enforced differently across towns, and updated frequently.
- Respondents agreed more communication about the reasoning behind code updates would make code changes less onerous.

Respondents gave mixed responses when asked if adapting to code changes had proven onerous in the past. One respondent described challenges resulting from not knowing about changes: "*The challenge is since we don't have a team that helps us navigate through the code, we do get a lot of surprises*." Another explained that the challenge is really the variation across towns: "*With other jurisdictions, some codes are more ambiguous. You know how to do something but the inspector in a town has a very different interpretation*." A third participant found the frequency of changes challenging: "*I find it difficult with the code changes because it changes the liability every three years.*"

Conversely, participants from the companies geared towards energy efficiency did not find code changes onerous because they felt the code was typically catching up to their current practices: "*It's not that onerous because it follows what we're doing*."

Respondents felt that quick accessible emails highlighting the code changes and reasoning for changes would help make code changes less onerous. Some respondents highlighted sources such as the code blasts that already serve this function, but respondents had mixed levels of awareness of these email blasts. Respondents felt municipalities and relevant organizations could be more proactive about publishing code changes in an accessible way:

> *"Washington state could do a better job at passing that information out to everyone. You have to make the effort to get on the mailing list, sign up for emails, and watch for meetings. A broader brush for building contractors, operators, and mechanical contractors – it might get a lot more interest and support rather than people saying I didn't know about this."*

Regardless of whether respondents found code changes onerous, respondents largely shared an interest in having more easily accessible information about the logic behind each code change. The participants valued knowing "why" a code had changed and felt greater understanding about the reasoning would, help them comply with the intent of the code, make them more supportive of changes and readier to adopt changes into their practices: "*Sometimes it feels like the curtain is pulled back and boom there it is. What would help me is being able to see the conversations. Codes come out one at a time, if they could attach a rationale behind it and show the thought that went into it, that would help a lot" or "It would be helpful if I knew why there was a change. If I was part of the conversation, the goal, it would be easier for me to navigate the changes*."

Some participants envisioned potential resources tailored specifically by end-user and project phase. They cited a challenge in not knowing if a project complies until construction is finished. One respondent said, "*Right now it's like, 'okay you're done. Did you hit it?' If you didn't, you're in trouble, but if you had checkpoints to see if you were on track or not that would help people clear the code at the end and be less upset with the code*." Tailored resources could address this issue.

For example, one respondent described that in the initial phases of a project, a designing architect could benefit from a simple, generalized, visually appealing guide with rules of thumb that if met, will put you on track to comply with code. Then resources for "production architects" could have slightly more detailed checkpoints, followed by increasingly detailed resources tailored for each contractor or consultant of the construction process. Creating resources tailored to each "silo" of the construction process would make final compliance easier.

C.6 Code Adoption Process

- Respondents felt it was important for passionate architects and engineers to be involved in the code development process, but had little interest in participating themselves, citing time constraints, ignorance about the process, and doubts that they could have an impact.

Respondents felt it was important for architects and engineers to participate in the code adoption process but the majority of respondents were unfamiliar with the process itself. Engineers seemed to be more aware of the code adoption process than architects. Only two respondents, both engineers, had participated in the process before and only by providing comments. One architect had provided comment concerning the development of building code, but not to energy code. Many respondents had never considered participating in the code development or adoption process in their state: "*I haven't ever been involved, but I also haven't been asked*."

While respondents felt that it was important for architects and engineers to be involved with the code development and adoption process, very few were motivated to personally get involved: "*It's not that important to me right now because I'm focused on my clients*." They cited time constraints and doubts that their efforts would have an impact: "*Time is a big factor, being able to leverage my time for change is important, I need to know it can be effective and have an impact*." Architects at times also questioned if their specific expertise was useful given their reliance on specialized consultants: "*As architects we rely on experts, so we have to go to other people for perspective*." Architects were satisfied and hoped that knowledgeable, passionate contemporaries of theirs were involved in the process: "*I like that there are certain groups that identify that is their issue to take on, I like to read their comments, so I can be peripherally involved*."

Respondents also cited a lack of awareness of the code development process as a hindrance to their participation: "*Not knowing how to get involved is a barrier. It's hard to say I would want to get involved without knowing what the process is*."

C.7 TRAININGS

- Only one-third of respondents could recall attending a training relevant to codes or energy.
- Respondents prefer in-person trainings that are eligible for continuing education credits at conferences.

Respondents were asked about professional trainings they had attended in the past two years on any topic and to describe what methods of training they found the most useful. Only nine (33%) participants could recall attending a training relevant to energy or codes. Participants mentioned attending trainings through the American Institute of Architects, the Energy Trust of Oregon, the Association of Energy Engineers, and Earth Advantage. Participants preferred trainings that are (1) in-person, (2) conducted by passionate peers, (3) away from their office, (4) a group of various experts in one room, (5) supplemented by take-home materials, and (6) eligible for continuing education credits. For all these reasons, respondents found trainings in conference environments the most useful.

Respondents also highlighted "lunch and learns" hosted by manufacturer representatives or organizations like the ETO. As one respondent explained, "*they have lunches once a month. It's the same concept of the conference with peers but its more accessible*." Yet, while the lunches can be more convenient and accessible, some felt they are hard to pay attention to: "*I don't find lunch and learns useful because it's your mental break in the middle of the day and someone is talking at you. The most helpful ones get you out of your office*."

Respondents generally did not value webinars as much as in-person trainings, explaining that it is easy to get distracted with work while listening to a webinar. As one respondent said, "*It's easy to work on other projects during webinars. You lose attention*." This is one reason why participants preferred in person, out-of-office events. Such events get them in a head space dedicated to learning: "*Self-directed e-courses can be helpful because you can target what you don't know, but the conferences are great because of the interactions. You can learn from each other. That's more useful than the actual hand out*."

Appendix D Survey Instrument

D.1 Screening and Background

First, we'd like to learn about your role with your company and determine your eligibility for this survey.

S1. In the past three years, roughly what percentage of the projects that you have been involved in [STATE] have been residential and commercial construction? [READ DESCRIPTION]

- Commercial construction includes newly built or renovated facilities such as schools, apartment or condo buildings of four stories or more, hotels or motels, retail stores, commercial offices, government offices, warehouses, health care facilities, churches, theaters or arenas, and restaurants or bars.
- Residential construction includes newly built or renovated detached, single-family and two-family homes (duplex), and multifamily homes of three stories or less.

Please estimate the percentage of your work in the following categories: [READ LIST]

Residential new construction	_____ %
Residential retrofits or renovations	_____ %
Commercial new construction	_____ %
Commercial retrofits or renovations	_____ %
Other	_____ %
Total	**[SUM]**

[TOTAL SHOULD EQUAL100%. IF COMMERCIAL NEW CONSTRUCTION <=20%, END1]

S2. As part of your work, do you need to stay up to date on energy code requirements and changes for commercial new construction projects?

1. Yes [CONTINUE]
2. No [GO TO S4]

Great, you are eligible for this survey and will receive your **$25 Amazon gift card** shortly after completing the survey.

S3. Thinking of the way your firm stays updated on **current requirements and changes to energy codes for commercial new construction**, does your firm: [READ OPTIONS]

1. Assign primary responsibility to particular staff to stay up-to-date on energy code requirements and to serve as a resource for the rest of the firm?
2. Or is it left to individual staff people to stay up-to-date on applicable energy code requirements and changes?

S4. For this survey, NEEA needs to speak with individuals who have a primary responsibility for staying updated on **current requirements and changes to energy codes for commercial new construction, either for your firm as a whole or for individual projects.** Would you provide their email so that we may follow up with them directly? [RECORD RESPONSE, INCLUDING REFUSALS; SKIP TO END2]

S5. In which state of the Pacific Northwest is the **majority of your work**? Please choose one. [READ OPTIONS]
1. Washington
2. Oregon
3. Idaho
4. Montana

S6. [IF S5=Washington] Are any of your recent or current projects in Seattle? [DO NOT READ; Please choose one.]
1. (Yes)
2. (No)

D.2 CODE INVOLVEMENT

I1. Please indicate how much of a priority is given to each of the following aspects of code compliance in your firm's commercial new construction projects? [RANDOMIZE A-D, KEEP D FOR LAST] [READ LIST AND OPTIONS]

Code Area	Low priority	Medium priority	High priority
a. Energy efficiency	❍	❍	❍
b. Health and safety	❍	❍	❍
c. Structural	❍	❍	❍
d. Mechanical	❍	❍	❍

I2. [IF I1a (energy efficiency) = LOW OR MEDIUM PRIORITY] Why do you say that compliance with energy efficiency has a [LOW / MEDIUM] priority? [OPEN RESPONSE]

I3. Please rate how difficult it is to design a building that complies with the energy code for commercial new construction in [STATE FROM S5]. Please use a scale of 1 to 5, where 1 is "not at all difficult" and 5 is "extremely difficult."

	1 Not at all difficult	2	3	4	5 Extremely difficult

Designing a building to commercial new construction energy code	❍	❍	❍	❍	❍

I4. Thinking about the various factors that will affect the commercial new construction market in the near future (3-5 years), do you anticipate the priority given to energy efficiency will decrease, stay the same, or increase? [DO NOT READ OPTIONS]
1. (Decrease)
2. (Stay the same)
3. (Increase)
4. (Don't know)

D.3 Code Awareness & Sources of Code Information

C1. How knowledgeable are you of the following aspects of commercial new construction building energy code? Please use a scale of 1 to 5, where 1 is "not at all knowledgeable" and 5 is "very knowledgeable." [READ LIST]

	1 Not at all knowledgeable	**2**	**3**	**4**	**5 Very knowledgeable**
a. Commercial new construction energy code requirements	❍	❍	❍	❍	❍
b. Differences between prescriptive and performance energy code compliance paths	❍	❍	❍	❍	❍
c. Differences between the energy code requirements in different climate zones	❍	❍	❍	❍	❍

C2. Now, please rate how knowledgeable you are about various energy-efficient building practices, again using a scale of 1 to 5, where 1 is "not at all knowledgeable" and 5 is "very knowledgeable." [READ LIST]

	1 Not at all knowledgeable	**2**	**3**	**4**	**5 Very knowledgeable**
a. Building envelope practices that exceed energy code	❍	❍	❍	❍	❍
b. HVAC systems that exceed energy code	❍	❍	❍	❍	❍

c. Assessing the initial cost of above-code energy-efficiency practices	❍	❍	❍	❍	❍
d. Assessing the payback period or return on investment of above-code energy-efficiency practices	❍	❍	❍	❍	❍

C3. I am going to read a list of sources of information that you may rely on to stay abreast of changes to the commercial new construction building energy code. Please indicate how frequently you access these resources. [RANDOMIZE A-Q; READ LIST AND OPTIONS]

	Never	Rarely	Sometimes	Often	Always
a. American Institute of Architects (AIA)					
b. Association of Licensed Architects (ALA)					
c. Lean Construction Institute (LCI)					
d. BIMForum					
e. Society of American Registered Architects (SARA)					
f. American Society of Civil Engineers					
g. National Council of Structural Engineers Association (NCSEA)					
h. Charted Association of Building Engineers (CABE)					
i. American Council of Engineering Companies (ACEC)					
j. American Society of Mechanical Engineers (ASME)					
k. U.S. Green Building Council (USGBC)					
l. ASHRAE					
m. BetterBricks					
n. Local gas or electric utility					
o. [SEATTLE MARKET] Northwest Energy Efficiency Council (NEEC)					
p. [SEATTLE MARKET] Seattle2030					
q. [OREGON] Energy Trust of Oregon					

C4. I am going to read a list of sources that you said you 'often' or 'always' rely upon for information. Using a scale of 1 to 3, where 1 is "most valuable," and 3 is "least valuable,"

please rank these sources of information. [INSTRUCTION: Drag and drop the resource in to the appropriate group.]

ONLY SHOW RESPONSES RATED 'OFTEN' OR 'ALWAYS' FROM C3

a. American Institute of Architects (AIA)		**1- Most Valuable**
b. Association of Licensed Architects (ALA)		
c. Lean Construction Institute (LCI)		
d. BIMForum		
e. Society of American Registered Architects (SARA)		
f. American Society of Civil Engineers		**2**
g. National Council of Structural Engineers Association (NCSEA)		
h. Charted Association of Building Engineers (CABE)		
i. American Council of Engineering Companies (ACEC)		
j. American Society of Mechanical Engineers (ASME)		
k. U.S. Green Building Council (USGBC)		**3 – Least Valuable**
l. ASHRAE		
m. BetterBricks		
n. Local gas or electric utility		
o. [SEATTLE MARKET] Northwest Energy Efficiency Council (NEEC)		
p. [SEATTLE MARKET] Seattle2030		
q. [OREGON] Energy Trust of Oregon		
r. Other [SPECIFY]		
s. Other [SPECIFY]		
t. Other [SPECIFY]		

D.4 TRAINING EXPERIENCES

T1. I am going to read a list of sources for training and professional development regarding energy code requirements and compliance for commercial new construction. For each one, please indicate how many times you have used it in the past three years. If you have used it, please indicate how effective the training was for you; use a scale of 1 to 5, where 1 is "not at all effective" and 5 is "extremely effective." [READ LIST]

Trainings for Energy Code in Commercial New Construction	**# of Times Used in Past 3 Years**	**1 Not at all Effective**	**2**	**3**	**4**	**5 Extremely Effective**
a. Northwest Regional Industrial Trainings	❍	❍	❍	❍	❍	❍
b. National Center for Appropriate Technology (NCAT)	❍	❍	❍	❍	❍	❍

Trainings for Energy Code in Commercial New Construction	# of Times Used in Past 3 Years	1 Not at all Effective	2	3	4	5 Extremely Effective
c. [IF STATE=IDAHO] Idaho Association of Building Officials (IDABO) regional training	❍	❍	❍	❍	❍	❍
d. [IF STATE=IDAHO] Technical Assistance offered by the Idaho Association of Building Officials (IDABO) Circuit Rider program	❍	❍	❍	❍	❍	❍
e. [IF STATE=IDAHO] Idaho Building Safety Division	❍	❍	❍	❍	❍	❍
f. [IF STATE=IDAHO] Idaho Association of Cities	❍	❍	❍	❍	❍	❍
g. [IF STATE=MONTANA] Annual Montana Building Codes Conference	❍	❍	❍	❍	❍	❍
h. [IF STATE=OREGON] Oregon Department of Energy (ODOE)	❍	❍	❍	❍	❍	❍
i. [IF STATE=WASHINGTON] Local ASHRAE Chapter	❍	❍	❍	❍	❍	❍
j. Other [SPECIFY]	❍	❍	❍	❍	❍	❍
k. Other [SPECIFY]	❍	❍	❍	❍	❍	❍
l. Other [SPECIFY]	❍	❍	❍	❍	❍	❍

T2. [FOR EACH T1 < 4] Why did you give [T1 < 4 SOURCE] a rating of [RATING FROM T1] ? [OPEN RESPONSE; RECORD VERBATIM]

T3. Aside from training and professional development offerings from the previous question, what other resources do you use to stay abreast of current building energy code requirements? Do you rely upon… [MULTIPLE RESPONSE; READ LIST]

1. Colleagues
2. Local building department (code officials, inspectors, etc.)
3. Department of Energy Building Energy Codes Program Resource Guides
4. Trade or professional journal/magazines
5. Internet search such as Google

97. Other [SPECIFY]
98. None

T4. What types of training opportunities do you find most valuable? [Please select one option from the list below; READ LIST.]

1. In-person only
2. Online only
3. Mixture of online and in-person

4. No preference between online or in-person

D.5 Building Energy Code Enhancement Activities

E1. How involved have you been in the process for drafting and adopting ***new commercial building energy codes*** in [STATE]? Using a scale of 1 to 5 where 1 equals "not at all involved" and 5 equals "involved a great deal," please indicate your level of involvement. Have you…[READ LIST]

	1 Not at all involved	2	3	4	5 Involved a great deal
a. Provided expert review of new building energy code proposals	❍	❍	❍	❍	❍
b. Provided public comment on code proposals via public hearings or listening sessions	❍	❍	❍	❍	❍
c. Submitted public comment on code proposals via email or regular mail	❍	❍	❍	❍	❍
d. Participated in demonstration or pilot projects designed to test new building technologies or practices	❍	❍	❍	❍	❍
e. Other [SPECIFY]	❍	❍	❍	❍	❍

E2. [IF any E1 >1] How important is it to you to be involved in the process for drafting and adopting ***new commercial building energy*** codes in [STATE]? Please use a scale of 1 to 5 where 1 equals "not at all important" and 5 equals "extremely important." [RECORD 1-5]

E3. [IF E2 < 4] Why do you say it is not important for you to be involved in the process for drafting and adopting ***new commercial building energy*** codes in [STATE]? [OPEN RESPONSE; RECORD VERBATIM]

E4. How interested are you in getting involved in any future process of drafting and adopting ***new commercial building energy*** codes in [STATE]? Please use a scale of 1 to 5 where 1 equals "not at all interested" and 5 equals "extremely interested." [DO NOT READ]
1. (Not at all interested)
2. (2)
3. (3)

4. (4)
5. (Extremely interested)

E5. [IF E4 < 4] Why are you not interested in getting involved in future processes for drafting and adopting ***new commercial building energy*** codes in [STATE]? [OPEN RESPONSE; RECORD VERBATIM]

E6. [IF STATE=OR or WA] Have you been involved in any efforts to support a "reach code" in [STATE]? [IF NEEDED: A "reach code" is an energy code adopted at the code level that is more stringent than the energy code that would otherwise be enforced.]
1. Yes
2. No [GO TO FIRMOGRAPHICS]
3. Don't know [GO TO FIRMOGRAPHICS]

E7. [IF E6=1] Please explain how you have been involved in supporting a reach code in [STATE]. [OPEN RESPONSE; RECORD VERBATIM]

D.6 FIRMOGRAPHICS

We have a few final questions about your company and your role.

F1. Is your firm a(n) . . . ? [ALLOW MULTIPLE RESPONSE; READ LIST]
1. Architectural firm
2. Engineering firm
3. Energy consultant
4. Developer
97. Other [SPECIFY]

F2. In 2018, approximately how many commercial new construction projects did your company complete in [STATE]? [ALLOW FOR NUMBER INPUT AND DON'T KNOW RESPONSE]

F3. In the past three years, how many of your firm's projects received certifications such as LEED or ENERGY STAR? [ALLOW FOR NUMBER INPUT AND DON'T KNOW RESPONSE]

F4. [IF VALID NON-ZERO RESPONSE IN F3]: Have you been part of your firm's team for a project that received LEED or ENERGY STAR certification? [DO NOT READ]

1. (Yes)
2. (No)

99. (Prefer not to answer)

F5. What professional licenses, building industry certificates, certifications or other credentials do you possess? [MULTIPLE RESPONSE; READ LIST]

1. Certified Energy Manager
2. Certified Professional Building Designer
3. Licensed Architect
4. EPA Section 608 Certification
5. North American Technician Excellence (NATE) Certified
6. ASHRAE [“ASH-RAY”] Building Commissions Professional Certification
7. ASHRAE [“ASH-RAY”] Building Energy Assessment Professional Certification
8. ASHRAE [“ASH-RAY”] Building Energy Modeling Professional Certification
9. ASHRAE [“ASH-RAY”] Certified HVAC Designer
10. ASHRAE [“ASH-RAY”] High-Performance Building Design Professional Certification
11. ASHRAE [“ASH-RAY”] Healthcare Facility Design Professional Certification
12. ASHRAE [“ASH-RAY”] Operations and Performance Management Professional Certification

97. Other [SPECIFY]

F6. What is your role at your firm?

[DROP DOWN LIST; READ LIST]

Architect

1. Senior Principal/Partner
2. Junior Principal/Partner
3. Department Head/Senior Manager
4. Architect/Designer (I, II, III)
5. Project Manager
6. 1-, 2-, 3-Year Intern

97. Other [SPECIFY]

Engineer

1. Architectural Engineer
2. Engineer
3. Structural Engineer
4. Building Engineer
5. Building Services Engineer

97. Other [SPECIFY]

D.7 Focus Group Recruitment

[Portland, OR, Seattle, WA, and Billings, MT respondents only]

The Northwest Energy Efficiency Alliance (NEEA) is offering you the opportunity to take part in an important study. Eligible individuals who agree to participate in the study will receive $200 to participate in a two-hour focus group in [IF STATE=WA, Seattle, WA, IF STATE=OR, Portland, OR, IF STATE=MT Billings, MT]. The focus group will involve an in-depth discussion with four participants and will take place on a weekday evening. The information gathered through the focus group will help inform building energy code training and support in your area.

R1. If you are eligible, would you be interested in participating in the focus group?

1. (Yes) [GO TO R3 BELOW FAQ]
2. (No) [GO TO ADDITIONAL RESEARCH

I have a couple of final questions before I get your information for the Amazon gift card. As part of this research, we are interested in interviewing commercial builders, building owners, and developers to learn more about their experience with the commercial new construction market.

A1. Can you suggest any commercial builders, building owners, or developers that we might speak with?

1. (Yes)
2. (No) [SKIP TO INCENTIVE CONFIRMATION]
98. (Don't know) [SKIP TO INCENTIVE CONFIRMATION]
99. (Refused) [SKIP TO INCENTIVE CONFIRMATION]

A2. Please provide contact information, including their names, phone numbers, and emails: [RECORD MULTIPLE CONTACTS AS APPLICABLE]

1.	Commercial Builders	Name:	Phone:	Email:
2.	Building Owners	Name:	Phone:	Email:
3.	Commercial Property Developers	Name:	Phone:	Email:

3. Incentive Confirmation]
98. (Maybe) [GO TO R2]

R2. We understand you may be unsure about participating in the focus group, here is some additional information to help you make your decision –

> The focus will last 2 hours and will take place during weekday evening hours. We will discuss professional practices and motivations as they related to the building energy code. You will be paid $200 for your participation.
>
> NMR Group, Inc. is a third-party consulting firm. We have been hired by NEEA to conduct this study.

If you would like more information about the study, you can contact Steve Phoutrides of NEEA at 503-688-5488 or Sphoutrides@neea.org].

You do not have to decide now. Would it be okay if someone calls you when the focus groups are being scheduled to talk more about what would be involved?

1. (Yes) [CONTINUE TO R3]
2. (No) [GO TO ADDITIONAL RESEARCH

I have a couple of final questions before I get your information for the Amazon gift card. As part of this research, we are interested in interviewing commercial builders, building owners, and developers to learn more about their experience with the commercial new construction market.

A3. Can you suggest any commercial builders, building owners, or developers that we might speak with?

3. (Yes)
4. (No) [SKIP TO INCENTIVE CONFIRMATION]
100. (Don't know) [SKIP TO INCENTIVE CONFIRMATION]
101. (Refused) [SKIP TO INCENTIVE CONFIRMATION]

A4. Please provide contact information, including their names, phone numbers, and emails: [RECORD MULTIPLE CONTACTS AS APPLICABLE]

4.	Commercial Builders	Name:	Phone:	Email:
5.	Building Owners	Name:	Phone:	Email:
6.	Commercial Property Developers	Name:	Phone:	Email:

3. Incentive Confirmation]

CONTINUE TO R3 IF R1=1 OR R2=1

R3. Please provide your contact information so we can call and [IF R1=1 schedule the focus group] [IF R2=1 talk more about the details of the focus group]:

First and Last Name:

R4. [IF R1=1 or R2=1] Primary Number (###-###-####):

R5. EMAIL ADDRESS.

R6. What is the best method to contact you about the focus group? Email or phone?

1. (Email)
2. (Phone)
3. (Either)

R7. What is the best time of day to reach you? Morning, afternoon, or evening?

1. (Morning)
2. (Afternoon)
3. (Evening)
4. (Anytime)

If you are eligible for this study, when we call to schedule, your caller ID will most likely say “NMR” or “NMR Group” and will have a 617 area code.

D.8 Additional Research

I have a couple of final questions before I get your information for the Amazon gift card. As part of this research, we are interested in interviewing commercial builders, building owners, and developers to learn more about their experience with the commercial new construction market.

A5. Can you suggest any commercial builders, building owners, or developers that we might speak with?

5. (Yes)
6. (No) [SKIP TO INCENTIVE CONFIRMATION]
102. (Don’t know) [SKIP TO INCENTIVE CONFIRMATION]
103. (Refused) [SKIP TO INCENTIVE CONFIRMATION]

A6. Please provide contact information, including their names, phone numbers, and emails: [RECORD MULTIPLE CONTACTS AS APPLICABLE]

7.	Commercial Builders	Name:	Phone:	Email:
8.	Building Owners	Name:	Phone:	Email:
9.	Commercial Property Developers	Name:	Phone:	Email:

D.9 Incentive Confirmation

N1. May I have your email so that you can receive your $25 Amazon gift card for completing this survey?:

[END1] We are sorry, but you do not qualify for this survey. Thank you for your time.

[END2] Thank you very much for taking the time to complete this important survey.

[END3] We are sorry, but your quota group for this survey has been met. Thank you for your time.

Appendix E Interview Guides

E.1 Builder and Contractor Guide

E.1.1 Introduction

Hello, may I speak to [_____]? My name is _____, and I'm calling from NMR Group on behalf of the Northwest Energy Efficiency Alliance or NEEA. We are doing interviews with builders or contractors working in [STATE(S) WHERE DO WORK] to help NEEA provide direction and support for energy codes that apply to commercial buildings. We offer compensation of $100 for your time in responding to this interview, if you qualify, which should take about 30 minutes, in the form of an Amazon gift card sent to your email address. Your responses will be kept confidential; we will combine them with those of other respondents for the findings and analyses we present to NEEA. We can do this interview now or schedule for a more convenient time. [If need to confirm legitimacy, please call Steve Phoutrides of NEEA at 503-688-5488 or email him at Sphoutrides@neea.org.]

E.1.2 Screening

Screener 1: First, have you acted as [CONTRACTORS: the general contractor for/ENGINEERS: worked on] a commercial new construction project over the past three years where you implement building plans affecting energy usage?

[IF NO OR DON'T KNOW] We are sorry, but you do not qualify for this survey. Thank you for your time. [END INTERVIEW]

Screener 2: Were any of those projects located in Washington state, Oregon, or Montana?

[IF NO OR DON'T KNOW] We are sorry, but you do not qualify for this survey. Thank you for your time. [END INTERVIEW]

[MAY CONFIRM SCREENERS AHEAD OF THE CALL THROUGH THE EMAIL SETTING UP THE INTERVIEW; IF PASS SCREENERS, VERIFY OCCUPATION, TITLE, EMAIL, AND EMAIL ADDRESS FOR AMAZON GIFT CARD]

E.1.3 Recent Projects

1. First, can you describe the largest commercial new construction building project you have worked on in the past three years? Please tell me:
    a. How many buildings were involved?
    b. How big the project was, approximately, in square feet?

c. What was the use for this project? (PROBE: education, apartment buildings, hotels or motels, retail stores, commercial offices, government offices, warehouses, health care, entertainment (theaters or movie houses), restaurants and bars, other specified)

d. Where the project was located? (Note city or town and state)

e. Do you recall the applicable energy code for this project? (Probe depending on location: was it the Oregon Energy Efficiency Specialty Code, the Washington State Efficiency Code, the Seattle Energy Code, the Montana Commercial Energy Code, the Idaho Energy Code based on the 2009 IECC, the 2012 IECC, or the 2015 IECC?)

   i. [If they do not know the applicable energy code for a project] Have you heard of energy codes being based on a version of the International Energy Conservation Code or IECC such as the 2009 IECC, the 2012 IECC, and the 2015 IECC?

   ii. [If they do not know the applicable energy code for a project] Have you heard of energy codes being based on a version of the ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) standards?

E.1.4 Energy-efficient Practices

2. For your projects over the past three years, not just the one described above, please tell me how you approached plan review.

   a. Did your review plans of ensure all code requirements such as health, safety, and energy were met or was this covered by someone else such as the building designer? [NOTE WHO REVIEWED FOR CODE REQUIREMENTS, ESPECIALLY ENERGY CODE]

      i. [IF INVOLVED IN REVIEWING PLANS] Do the plans you review already incorporate energy code requirements and compliance?

         1. [IF REVIEWED PLANS INCORPORATING ENERGY CODE REQUIREMENTS AND COMPLIANCE TO ANY DEGREE] Can you tell me what this review entailed?
         2. What issues came up when you reviewed these plans? [PROBE: were there any issues with complying with the energy code? If so, what areas had trouble complying? Were different compliance paths considered?]
         3. Please describe a situation, if applicable, where you recommended an alternative to what was in a plan to comply with the energy code and what ultimately was done. [PROBE: was what they recommended more efficient and how; was there any

pushback and from whom; how did the changes ultimately come to be implemented?]

b. [ASK OF EVERYONE, EVEN IF DO NOT ACTIVELY REVIEW PLANS] Have you had a situation in any of your work, not just the project described earlier, where the energy code in the plan required you to institute a change to complete the task; in other words, where compliance with an energy code caused you to create a work-around to accommodate the code?

    1. [IF YES] Please describe what happened, what was the issue, how the energy code needed to be addressed, and what was done.

c. [ASK OF EVERYONE] In general, what is your experience with the energy code? [PROBE: does it make their job harder, is it a bother sometimes, is it something they are open to, or do they simply not have any knowledge or experience]

    i. Do you ever see the energy code as a barrier in any of your work? Why or why not?

d. [ASK OF EVERYONE] In your experience, how often are building plans altered in the field in a manner that affects energy usage? [PROBE EVEN IF THEY SAY NEVER: do situations come up when something on paper just doesn't work once construction begins?] Can you provide an example?

e. In your experience, how often do building plans contain products and construction practices that might not exactly meet what the energy code requires? What typically happens in these cases? [PROBE if there are ways to deal with these situations; also remind respondent of anonymity]

3. Thinking of your projects over the past three years, would you say any of the products [CONTRACTORS ONLY: and construction practices used], such as insulation, windows, lighting, or mechanical equipment, were above what was required by code?

4. [IF YES] Please describe what was done [Probe for why an above code option was chosen]

5. Were these [PRODUCTS OR CONSTRUCTION PRACTICES MENTIONED ABOVE] specified in the original building plans or were they specified later in the process?

    a. [IF NOT IN THE ORIGINAL PLANS] Can you describe how these [PRODUCTS OR CONSTRUCTION PRACTICES MENTIONED ABOVE] came to be installed? [Probe on who suggested the change and how it deviated from the original plan]

    b. [IF RESPONDENT SUGGESTED THE CHANGE] Please describe what you suggested. [PROBE was there any pushback and from whom; how did the changes ultimately come to be implemented?]

    c. Why did you suggest [CHANGES DESCRIBED ABOVE]?

6. Have any of your projects received certifications such as LEED or ENERGY STAR?

a. [IF YES] Please describe how the project(s) were certified [Probe on what features led to certification]

b. [IF LEED] Did the project receive LEED Silver, Gold, or Platinum certification?

c. Were you involved in the LEED/ENERGY STAR application and certification process?

i. [IF YES, PROBE who initiated and lead the process; was the respondent consulted; did the respondent fill out forms or provide other materials]

ii. [[IF RESPONDENT IS NOT BUILDER] What was the builder's role in the LEED/ENERGY STAR certification process?

7. How knowledgeable would you consider yourself about the options for energy-efficient products and practices in commercial new construction? Please rank your knowledge on a scale of 1 to 5 where 1 is not knowledgeable and 5 is very knowledgeable.

a. Why do you rank your knowledge as a [INSERT NUMBER]?

b. Do you believe you have sufficient knowledge of energy-efficient products and practices in commercial new construction? Why or why not?

c. [ASK OF EVERYONE] How could you benefit from more training on energy-efficient products and practices in commercial new construction?

i. In what areas would be most useful for you to have more training?

8. I am going to read you a list of factors relevant to construction of commercial buildings. For each one, please tell me how important it is to your clients, that is, building owners or developers. Please use a scale of 1 to 5, where 1=not at all important and 5=extremely important.

- Satisfying health and safety code requirements ___
- Energy efficiency ___
- Satisfying energy code requirements ___
- Exceeding energy code requirements ___
- Satisfying building structural integrity requirements ___
- Satisfying building mechanical integrity requirements ___

a. Why do you rank energy efficiency as a [NUMBER]? [IF NOT RANKED A 5] What considerations or factors, in your experience, are more important to building owners or developers? [Probe on examples where building owners or developers put other factors above energy efficiency]

9. Have you ever attended any trainings, including webinars, or conferences in the area of commercial or residential construction?

a. [IF YES] Approximately how many such events have you attended in the past three years?

    i. [IF MORE THAN FIVE] I would us to talk about what you consider important trainings you have attended in the past three years.

b. Please describe the event(s) you attended, what subjects were covered, and the approximate date(s). [NOTE if this was a classroom training, webinar, conference, on-site, or other event and whether it covered residential or commercial construction]

c. [IF NOT INCLUDED IN THE DESCRIPTION ABOVE] Did this/these training(s) deal with energy efficiency in any way? [IF YES, PROBE on what was covered; if energy code is mentioned, go to e.]

d. [IF NOT INCLUDED IN THE DESCRIPTION ABOVE] Did this/these training(s) deal with the existing or anticipated building codes? [IF YES, PROBE on what was covered and if the training(s) included the energy codes]

e. [IF ENERGY CODES INCLUDED in c or d ABOVE] Please tell me, briefly, the areas covered by the training(s), including various products or construction practices and methods of complying with the energy code.

f. [IF ATTENDED ANY ENERGY CODE TRAINING] How useful was the building energy codes event you attended? Please use a scale of 1 to 5, where 1=not at all useful and 5=extremely useful.

g. [IF ANSWERED f ABOVE] Why do you say that?

10. How do you most often learn of trainings on building products [CONTRACTORS: and construction practices]? [PROBE: if they mention a journal or website, get the exact name, to the extent they are able to recall.]

11. What types of trainings do you prefer? [PROBE IF NOT MENTIONED: online trainings, live webinars, half day trainings, full day trainings, trainings accompanied by dinner, in-field trainings, classroom trainings]

12. Please describe the most useful professional training you have attended, including the content and how it was delivered. [EVEN IF THEY HAVE NOT ATTENDED ANY TRAININGS] What makes professional trainings most useful in your experience (opinion)?

13. [ASK FOR THE TRAININGS BELOW THAT WERE NOT MENTIONED IN THE RESPONSE ABOVE] Have you heard of trainings sponsored by the following organizations? [IF YES TO ANY CONFIRM THAT THEY HAVE NOT ATTENDED]

    a. Better Bricks
    b. Seattle 2030 [ASK ONLY IF WORK IN WA]
    c. Energy Trust of Oregon [ASK ONLY IF WORK IN OR]
    d. Building Owners and Managers Association (BOMA)
    e. Northwest Regional Industrial Trainings
    f. Trainings sponsored by local utilities

E.1.5 Energy Codes and Inspections

14. How do you stay up to date on current and upcoming trends concerning your work as a [PROFESSION]? [PROBE: may have different sources of information depending on the issue or measure affected]

    a. [IF MENTION USING GOOGLE] Can you tell me what sources ultimately provide you with the information you are seeking?

15. Similarly, how do you stay up to date on current and upcoming changes in the energy codes affecting commercial buildings? [PROBE: may have different sources of information depending on the issue or measure affected]

    a. [IF MENTION USING GOOGLE] Can you tell me what sources ultimately provide you with the information you are seeking?
    b. Are there any colleagues or formal or informal groups that you engage with to discuss energy code in commercial buildings? IF YES: What groups are those? What is the frequency and format of your communications with them?

16. Are there any energy code related topics that you would be interested in learning more about? If so, which ones? [PROBE if not mentioned in response if they would be interested in learning more about changing requirements and trade-off strategies]

17. Do you have any knowledge of the process for drafting and adopting new building energy codes in [state(s) they work in]?

    a. [IF YES] [ASK ALL RESPONDENTS] Can you briefly describe the process and how closely you follow what happens? [IF IN WASHINGTON, ASK ABOUT INVOLVEMENT TO SUPPORT A REACH CODE OR LOCAL ENERGY ORDINANCE, EVEN IF HAVE REPLIED THAT THEY DON'T HAVE KNOWLEDGE ABOVE; IF NEEDED: A reach code" is an energy code adopted at the code level that is more stringent than the energy code that would otherwise be enforced.]

b. [ALL RESPONDENTS] Do you see yourself following the process for new code adoption more closely in the future? Why or why not?

18. To what extent have you been involved in the process of drafting and adopting new building codes in [state(s) they work in]?

    a. IF INVOLVED: In what way? To what extent have you focused on energy code in this process?

    b. [IF NOT MENTIONED ABOVE] Have you ever attended a public hearing involving energy codes?

        i. [IF YES] Please tell me, as you remember, what the hearing covered and your overall reaction to the process.

    c. IF NOT INVOLVED: Why have you not been involved in this process?

19. How interested are you in getting involved in the process of drafting and adopting new building energy codes in [state(s) they work in]? Please use a scale of 1 to 5, where 1=not at all interested and 5=extremely interested. Why do you say that?

E.1.6 Closing

20. [LOW PRIORITY] In your interactions with building code officials, would you say checking for a project's compliance with the energy code is a low, medium, or high priority in building inspections, relative to the issues the building department must address? Why?

    a. Has this changed over the past year or so? If yes, how has it changed?

    b. [IF WORK IN MORE THAN ONE MUNICIPALITY] Does the emphasis on energy code compliance vary in the different jurisdictions? If so, how?

21. [LOW PRIORITY] Are you involved in filing information to document energy code compliance for commercial construction with the local building department?

    a. [IF YES] Please briefly describe the type of information filed and your role. [PROBE: if they document all items on the checklist and identify the compliance options used]

    b. [IF WORK IN WASHINGTON STATE] Do you fill out the NREC (Non-Residential Energy Code) Compliance Form to document energy code compliance?

        i. [IF NO] Are you aware of anyone else filling out the NREC Compliance Form for your projects? If so, who does this?

I just have a few more questions for statistical purposes.

22. [LOW PRIORITY] Please tell me how many people work at your company.

23. [LOW PRIORITY] About what portion of your company's work is for residential construction and what portion is for commercial construction?
    a. [IF HAVE ANY RESIDENTIAL] About what portion of the residential work is on existing buildings versus new construction?
    b. About what portion of the commercial work is on existing buildings versus new construction?

24. Is there anything we have not covered that you would like to add; in particular, we are interested in any insights you have about commercial new construction and the energy code requirements and compliance.
25. We are also talking with [other] contractors and engineers in [STATE(S) WHERE DO WORK], with compensation for their time, on behalf of NEEA about energy codes that apply to commercial buildings. Could you provide us with any contacts for buildings constructed over the past three years? We won't use your name without your permission.
26. [IF PROVIDES ANY CONTACTS] Is it okay if I tell them you referred us?

Thank you so much for your time!

E.2 Owner and Developer Guide

E.2.1 Introduction

Hello, may I speak to [_____]? My name is _____, and I'm calling from NMR Group on behalf of the Northwest Energy Efficiency Alliance or NEEA. We are speaking with owners and developers of commercial buildings in [STATE(S) WHERE HAVE BUILDINGS] to help NEEA provide direction and support for energy codes that apply to commercial buildings. If you qualify, we're offering a **$100** Amazon gift card for your time in responding to this interview, which should take about 30 minutes. Your responses will be kept confidential; we will combine them with those of other respondents for the findings and analyses we present to NEEA. We can do this interview now or schedule for a more convenient time. [If need to confirm legitimacy, refer to Steve Phoutrides of NEEA at 503-688-5488 or Sphoutrides@neea.org.]

E.2.2 Screening

Screener 1: First, are you or is your company an owner or developer for a newly constructed commercial project, by which I mean one built over the past three years?

[IF NO OR DON'T KNOW] We are sorry, but you do not qualify for this survey. Thank you for your time. [END INTERVIEW]

Screener 2: Were any of your new commercial construction projects located in Washington state, Oregon, Idaho, or Montana?

[IF NO OR DON'T KNOW] We are sorry, but you do not qualify for this survey. Thank you for your time. [END INTERVIEW]

Screener 3: Did any of these new commercial constructed projects receive LEED or ENERGY STAR certification?

[TARGET 3 COMPLETED IDIs WITH LEED OR ENERGY STAR PROJECTS AND 2 COMPLETED IDIs WITH STANDARD EFFICIENCY PROJECTS. TRACK FOR QUOTAS. IF QUOTA FILLED:] We are sorry, but you do not qualify for this survey. Thank you for your time. [END INTERVIEW]

[MAY CONFIRM SCREENERS AHEAD OF THE CALL THROUGH THE EMAIL SETTING UP THE INTERVIEW; IF PASS SCREENERS, VERIFY OCCUPATION, TITLE, EMAIL, AND EMAIL ADDRESS FOR AMAZON GIFT CARD]

E.2.3 Overall Priorities & Recent Projects

27. In your opinion, what factors are most relevant or important to the construction of commercial buildings? [OPEN-ENDED]

- ...

a. Would you say the following factors are also fairly relevant or important in the construction of commercial buildings? [NAME FACTORS FROM THE LIST BELOW THAT WERE **NOT** MENTIONED IN THE OPEN-ENDED QUESTION; NOTE REPLY OF YES OR NO]

- Staying within the budget for construction costs
- Aesthetics or making the project attractive to the neighborhood
- Having the project meet its functional needs
- Attracting tenants
- Keeping operating costs over the life of the project low
- Satisfying health and safety code requirements
- Energy efficiency in general
- Use of energy-efficient products and construction practices
- ...

b. [IF RESPONDENT HAS LISTED MORE THAN TWO FACTORS AS BEING IMPORTANT] Of the factors you said are important for commercial new construction, which would you say is the most important and which one is the second most important? [OFFER TO REPEAT THE FACTORS LISTED AS IMPORTANT IF THE RESPONDENT DOES NOT REMEMBER ALL OF THEM]

c. ...

28. Can you describe the largest commercial new construction building project you or your company has been the owner of or developer for in the past three years? Please tell me [NOTE THAT IF FILLING QUOTA FOR LEED OR ENERGY STAR PROJECTS, WILL ASK RESPONDENTS TO FOCUS ON THAT PROJECT]

    a. How many buildings were involved?

        i. ...

    b. Where the project was located? (Note city or town and state)

        i. ...

    c. How big the project was, approximately, in square feet?

        i. ...

    d. What was the use for these buildings? (PROBE: education, apartment buildings, hotels or motels, retail stores, commercial offices, government offices, warehouses, health care, entertainment (theaters or movie houses), restaurants and bars, other specified)

        i. ...

    e. IF SCREENER 3 = YES: Did the project receive LEED or ENERGY STAR certification? [IF YES, ASK i.-v. BELOW]

        i. [IF LEED] Did the project receive LEED Silver, Gold, or Platinum certification?

            1. ...

        ii. Who made the decision to pursue [LEED/ENERGY STAR] certification?

            1. ...

        iii. What do you think are the advantages of [LEED/ENERGY STAR] certification? [PROBE on lower energy costs, more attractive to tenants, doing right or setting a good example, other advantages]

            1. ...

29. *We are interested in understanding your role in creating the vision that was used to guide the building's design and overseeing its implementation.* Please describe your involvement with creating the purpose or vision for this project and reviewing the associated building plans. More specifically,

    a. What need or purpose was addressed by this project and what was your role in creating a vision that addressed this need?

    ...

    b. What was your role in the review of the designer's proposal plans? [PROBE on what specific details the respondent focused on and what details were addressed by others; cover areas such as building costs, operating costs,

attractiveness, tenant comfort, indoor air quality, energy efficiency.]
...

c. [IF NOT ADDRESSED IN b ABOVE] How involved were you in the selection of materials and equipment for the building? [PROBE: did they review and approve the HVAC systems, windows, and lighting for the building? Did they have any questions or suggest any changes to what was proposed? What was done in the end?]
...

E.2.4 Energy-efficiency Knowledge and Practices

30. For the rest of our questions, I would like you to focus on all your projects over the past three years, not just the one described earlier. Is your role in reviewing building plans generally similar to what you described above?
....

a. [IF DIFFERENT, ASK] What areas have you focused on? [PROBE about building costs, operating costs, attractiveness, tenant comfort, indoor air quality, energy efficiency, compliance with building codes]
....

i. [IF NOT ADDRESSED ABOVE] How involved did you get in the selection of materials and equipment for the building? [PROBE: did they review and approve the HVAC systems, windows, and lighting for the building? Did they have any questions or suggest any changes to what was proposed? What was done in the end?]
....

31. [EVERYONE] Would you say your review of building plans is more detailed or cursory? Who, if anyone, do you rely on to do a thorough review?
...

32. Thinking of these projects, to what degree did you review plans that incorporate energy code requirements and compliance for these projects? [PROBE FOR DIFFERENCES AMONG THE PROJECTS DESCRIBED IN THE BEGINNING]
...

a. At what point in the process did you explicitly look at or incorporate requirements for complying with or exceeding applicable energy code? [PROBE FOR: 1. Financing / Capital Budgeting, 2. Concept / Planning, 3. Contracts / Bid Documents, 4. Bidding, 5. Construction]. Why did you need to look at energy code compliance at this stage and not sooner or later?
...

b. [IF REVIEWED ANY PLANS THAT INCORPORATE ENERGY CODE REQUIREMENTS AND COMPLIANCE] What issues did you focus on when you reviewed these plans? [PROBE if reviewed for costs, energy-efficient products and construction practices or other energy issues, health and safety, and any

other issues]

...

c. [IF REVIEWED FOR ANY ENERGY-EFFICIENCY PRODUCTS, CONSTRUCTION PRACTICES, OR OTHER ENERGY ISSUES] Were there instances where you or others recommended alternatives to what was in the original plans?

...

i. [IF YES] Please describe what was recommended and what ultimately was done. [PROBE: was what they recommended more efficient and how; was there any pushback and from whom; how did the changes ultimately come to be implemented?]

...

d. [ASK EVERYONE, REGARDLESS OF ROLE IN PLAN REVIEW] How do energy-efficient features generally come to be incorporated in your buildings? [PROBE if they are there from the start because the designers know that is what the owner wants, if the owner knows what is efficient and tells the builders to incorporate them, or some other process.]

...

33. Have you discussed the energy efficiency of your project(s) with other parties such as architects or designers, builders, realtors, tenants, or anyone else?

...

a. [IF YES] With whom did you discuss the energy efficiency of your project(s)?

...

b. What did you discuss? [PROBE: if multiple parties mentioned above, get summary of discussion with each party. Similarly, if more than one recent project, get summary for each project]

...

34. Have you ever attended any trainings, including webinars, or conferences on any construction topics? You can include residential topics. [IF NO OR DON'T KNOW, GO TO QUESTION 10]

...

a. [IF YES] Please describe the event you attended, what subjects were covered, and the approximate date(s). [NOTE if this was a classroom training, webinar, conference, on-site, or other event and whether it covered residential or commercial construction]

...

b. [IF NOT INCLUDED IN THE DESCRIPTION ABOVE] Did this/these training(s) deal with energy efficiency in any way? [IF YES, PROBE on what was covered; if energy code is mentioned, go to d.]

...

c. [IF NOT INCLUDED IN THE DESCRIPTION ABOVE] Did this/these training(s) deal with the existing or anticipated building codes? [IF YES, PROBE on what was covered and if the training(s) included the energy codes]
...

d. [IF ENERGY CODES INCLUDED in b or c ABOVE] Please tell me, briefly, the areas covered by the training(s), including various products or construction practices and methods of complying with the energy code.
...

e. [IF ATTENDED ANY ENERGY CODE TRAINING] How useful was the building energy codes event you attended? Please use a scale of 1 to 5, where 1=not at all useful and 5=extremely useful.
...

f. [IF ANSWERED e ABOVE] Why do you say that?
...

E.2.5 Energy Codes and Inspections

35. Do you have any interactions with building code officials such as inspectors or plan reviewers?
….

    a. [IF YES] Please describe your interactions with code officials for the projects in (Washington state, Oregon, Idaho, Montana). [PROBE if interactions involved any energy issues]
    ….

36. In the past five years, what impact have changes in commercial building code had on your projects? [PROBE for cost, schedule, health and safety, energy efficiency, etc.]
...

37. Are there areas where you think the current commercial building code could be improved further? What areas are those? Why and in what ways do you think commercial building code could be improved in these areas?
...

38. Are there areas where you think the current commercial building code is too stringent or imposes requirements that are onerous to comply with? What areas are those? Why do you say commercial building code in these areas is too stringent or imposes requirements that are onerous to comply with?
...

39. How important do you think it is for building codes to be modified so that the quality of commercial construction in [STATE] continually improves? Please use a scale of 1 to 5, where 1=not at all important and 5=extremely important. Why do you say that?
...

40. How important do you think it is for **energy conservation code** to be modified so that the energy efficiency of new commercial buildings in [STATE] continually improves? Please use a scale of 1 to 5, where 1=not at all important and 5=extremely important. Why do you say that?
    ...

41. Do you have any knowledge of the process for drafting and adopting new building energy codes in [state(s) they work in]?
    ...

    a. [IF YES] Can you briefly describe the process and how closely you follow what happens?

    b. ...

42. [IF HAVE ANY KNOWLEDGE OF PROCESS] To what extent have you been involved in the process of drafting and adopting new building codes in [state(s) they work in]?
    ….

    a. IF INVOLVED: Have you focused on energy code in this process?
       ...

    b. [IF IN WASHINGTON, ASK ABOUT INVOLVEMENT TO SUPPORT A REACH CODE OR LOCAL ENERGY ORDINANCE. IF NEEDED: A “reach code” is an energy code adopted at the code level that is more stringent than the energy code that would otherwise be enforced.]
       ...

    c. [IF NOT MENTIONED ABOVE] Have you ever attended a public hearing involving energy codes?

        i. [IF YES] Please tell me, as you remember, what the hearing covered and your overall reaction to the process.

        ii. ...

43. How interested are you in getting involved in the process of drafting and adopting new building energy codes in [state(s) they work in]? Please use a scale of 1 to 5, where 1=not at all interested and 5=extremely interested. Why do you say that?
    ...

E.2.6 Closing

44. [LOW PRIORITY. SEND AS A FOLLOW UP IF NEEDED] I have a couple of final questions. Could you tell me how many people work at your company?
    ...

45. [LOW PRIORITY. SEND AS A FOLLOW UP IF NEEDED] About what portion of your company’s work is for residential construction and what portion is for commercial

construction?
Residential: …
Commercial: ...

a. [IF HAVE ANY RESIDENTIAL] About what portion of the residential work is on existing buildings versus new construction?
   Existing: …
   New construction: ...

b. About what portion of the commercial work is on existing buildings versus new construction?
   Existing: …
   New construction: ...

46. Is there anything we have not covered that you would like to add; in particular, we are interested in any insights you have about commercial new construction, energy efficiency, the energy code requirements and compliance

47. We are also talking with builders or general contractors in [STATE(S) WHERE DO WORK], with compensation for their time, on behalf of NEEA about energy codes that apply to commercial buildings. Could you provide us with any contacts for buildings constructed over the past three years? We won't use your name without your permission?

48. [IF PROVIDES ANY CONTACTS] Is it okay if I tell them you referred us?

Thank you so much for your time!

Appendix F Focus Group Guide

F.1 INTRODUCTION – 10 MINS

Good evening and thank you for coming today. My name is [NAME] and I'm with an independent market research firm called NMR Group Inc that has partnered with Northwest Energy Efficiency Alliance (NEEA) to learn more about the commercial new construction market and energy codes in [STATE].

Today, we would like to talk to you about your practices related to energy efficiency and your perceptions of the building energy code in [STATE]. We are looking for perspective from those who are affected by the building energy code to find opportunities to facilitate future code adoption processes.

Before we begin, I would like to establish a few ground rules.

- We need to cover quite a bit of material today, so we need to stay on topic as much as possible.
- We also need to know your honest opinion. There are no right or wrong answers. So, don't be afraid to disagree with someone else.
- We understand that you all have different experiences and perspectives and that's what we want to hear from you.
- Please listen to one another and feel free to build on what someone else says.
- Everything you say will be held completely confidential and will not be associated in any way with your name.
- We are recording this discussion so that we can go back and analyze it, so please speak one at a time, so that we are able to listen to our recording
- By the same token, please do not engage in any side discussions with somebody else
- Behind this mirror, I have colleagues listening to our discussion and they may occasionally send in a note with a question.
- Since we have to cover quite a bit of material today, I may interrupt you so that we can move on to the next topic.
- Finally, I would like to request all of you to please turn off your cell phones

Introductions – Starting here, I would like each of you to give me your name and describe yourself. Please tell me your job at the company, the area of [STATE] where you conduct most of your work, the number of commercial new construction projects you personally have worked on in the past two years.

F.2 BACKGROUND – 10 MINS

B1. What attracted you to your profession? What motivates you professionally?

B2. Tell me about something you've done well in your job. What were the circumstances and your responsibilities? Has there been a challenge you've overcome or an accomplishment in your career that you are particularly proud of?

B3. How do you keep up with trends, new technology, and requirements in your field?

F.3 DESIGN AND ENERGY CODE- 30 MINS

D1. How important is energy efficiency to you? How important is it to your company? In what ways, if any, does your company incorporate or promote energy in its commercial building practices?

D2. What do you see as the major barriers to constructing commercial buildings so that they comply with applicable energy code requirements? (PROBE: awareness, understanding, costs)

D3. What do you see as the major barriers to constructing commercial buildings so that they exceed applicable energy code requirements? (PROBE: client awareness, client interest, costs)

D4. Let's focus on challenges associated with cost. On average, how much more does it cost to construct a commercial building that exceeds code requirements for energy efficiency (as a percentage of total project cost)?

D5. Have you ever had a project that incorporated energy-efficiency features that then needed to be taken out because of associated costs?

D6. Have you ever developed a project proposal that incorporated energy-efficiency features that then needed to be taken out because you were concerned you would lose the bid due to associated costs?

D7. How often do you advocate to clients that they should exceed code requirements for commercial building energy efficiency? What reasons do you give for them to do so? How frequently do they agree?

D8. What is your role generally in impacting the energy efficiency of commercial new construction projects? Do you have any flexibility to make commercial buildings more energy efficient than expected or planned? If Yes: how often do you take advantage of that to make those buildings more energy efficient [PROBE: describe a specific project]?

D9. There are various ways to make commercial new construction more efficient overall. When you are trying to make a commercial building more efficient, are there particular systems, materials, or equipment that you emphasize? [PROBE: insulation, HVAC systems, sealing leaks, windows/skylights, directional orientation] Why?

D10. Please walk me through your process for ensuring that a new commercial building meets or exceeds applicable energy code.

a. What happens at the design stage? Who has responsibility for that?

b. What happens in the construction stage (note: may have sub-stages)? Who has responsibility for that?

c. What happens in the code inspection and approval stage? Who has responsibility for that? Who interacts with the code inspector? What is the nature and frequency of those interactions?

D11. In general, how much attention do code inspectors in your area pay to compliance with energy code in new commercial buildings? Why? Why not?

a. In the past two years, has there been any change in the scrutiny that code inspectors give to energy code compliance in new commercial buildings? If Yes: Why do you think that is?

D12. Aside from interactions with code officials in the context of specific projects, do you have any more general interactions with them?

a. If Yes: What is the nature of these interactions? When and how frequently do they occur?

b. Do any of these interactions focus specifically on energy code? If Yes: Please describe them.

F.4 Acquiring Code Knowledge and Information Sources- 30 mins

A1. How knowledgeable would you say you are about the commercial building energy code in the area of [STATE] where you conduct most of your work?

A2. Do you think the current energy code results in commercial new construction that is sufficiently energy efficient? Why do you say that?

A3. Are there any commercial building energy code requirements that you do not support? Why is that? How do you think the energy code can be improved?

A4. How do you track or stay apprised of changes to energy code for commercial buildings?

a. Do you track the code cycle/code proposals/adoption process, or do you wait for the code to be adopted?

A5. What resources do you rely on to learn about code updates or changes?

a. Which resources or methods do you find the **most useful** for learning about changes to overall building code? Which resources or methods do you find the most useful for learning about changes specifically to building energy code? Why? (PROBE: specific reasons)

b. Which resources or methods do you find the **least useful** for learning about overall building code? Which resources or methods do you find the least useful for learning about changes specifically to building energy code? Why? (PROBE: specific reasons)

A6. What resources do you rely on to learn about new technologies and building practices that are above code?

A7. How is information about changes to building code requirements disseminated throughout your company? In your company, are there specific staff who have responsibility for staying abreast of changes to building code requirements? If yes, what is their role or title and why were they assigned this responsibility?

A8. Have you attended any building code trainings in the last two years? Where? Which states or areas did they focus on? How much of the focus was on energy code for commercial buildings? Who conducted them? In what ways were they useful? In what ways were they not useful? (PROBE: specific examples)

A9. What would be your ideal format for training on building codes? (PROBE: venue, content, delivery, length, certification, applicability, authority to apply the knowledge)

F.5 Interest in Building Code Development-15 mins

I1. By show of hands: Who here has participated in any aspect of the process of developing new building code requirements in [STATE]? What did you do? Did you address commercial buildings? Did you address energy code for commercial buildings? Please tell me about your experience of the process.

   a. [IF NOT MENTIONED]: Did you…

      i. Provide expert review of new building code proposals?

      ii. Provide public comment on code proposals via public hearings or listening sessions?

      iii. Submit public comment on code proposals via email or regular mail?

      iv. Participate in demonstration or pilot projects designed to test new building technologies or practices?

      v. Anything else?

I2. By show of hands, who here *is not* familiar with the process for developing new building code requirements in [STATE]? Are you interested in becoming familiar with the process for developing new building code requirements?

   a. If Yes: What is your reason for wanting to become familiar with this process?

   b. If No: What is your reason for not being interested in the process for developing new building code requirements?

I3. How important do you think it is to be involved in the process for drafting and adopting new commercial building energy codes in [STATE]? Why? Why not?

I4. How interested are you in actually getting involved in the development of commercial building energy codes? Why? Why not? (PROBE: environmental concerns, business concerns)

I5. Are there any barriers that would prevent you from participating in the development of new building code? What are they? How can these barriers be overcome?

Appendix G Example of Energy Code Committee Meeting Minutes

State of Oregon

Agenda Item I.D.

Construction Industry Energy Board
Regular meeting minutes
Oct. 23, 2018

CIEB members present:
Heather Miller, representing the Electrical and Elevator Board
Thomas Kyle, representing the Electrical and Elevator Board
Blake Shelide, officer of Oregon Department of Energy
Walter Caudle, representing the Mechanical Board
John Chmelir, representing the RMSB
Matthew Rozzell, representing the State Plumbing Board
Travis Argue, representing the State Plumbing Board

The next two members are from the Building Codes Structures Board temporally filling in because that board currently does not have representation
Eric Sandoval, representing the Building Codes Structures Board
Gary Heikkinen, representing the Building Codes Structures Board

Members absent:
Vacant, two members representing the Building Codes Structures Board
Jay Hansen, representing the Mechanical Board
Vacant, one member representing the RMSB

Staff present:
Mark Long, Building Codes Division Administrator
Richard Rogers, chief building official, Policy and Technical Services
Alana Cox, manager, Policy and Technical Services
Tony Rocco, structural program chief, Policy and Technical Services
Mark Heizer, P.E., mechanical & energy systems engineer, Policy and Technical Services
Todd Smith, senior stakeholder & public affairs analyst, Administration
Kelly Thomas, technical policy analyst, Policy and Technical Services
Shannon Flowers, policy analyst, Policy and Technical Services
Debi Barnes-Woods, boards administrator/coordinator, Policy and Technical Services

Guests Present:
Roger Kaina, Oregon Department of Energy
Brent Wehage, Lease Crutcher Lewis
Shawn Miller, IEC
Don MacOdrum, Energy Trust of Oregon
Kirsten Adams, AGC Oregon
Vinh Mason, City of Portland
Brian Krieg, SMACNA

Appendix H Example of Technical Advisory Group Meeting Minutes

STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Department of Enterprise Services

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Energy Code Technical Advisory Group
Meeting Review Notes for May 31, 2019

TAG Members Present: Kjell Anderson, Chair; Alan Nolan; Bruce Carter, Chuck Murray; Dave Baylon; Gary Heikkinen; Hans Frederickson; Jason Ramey; *Jonathan Jones; Kim Barker; *Louis Starr; Mike Fowler; Mike Lubliner; Patrick Hayes; *Poppy Storm; *Tanya Beavers; Tena Risley; Treasa Sweek

Visitors Present: Shilpa Surana, Graham Wright, Henry Odem, Shane Nilles, Carolyn Logue, Dave Nehren, Jenifer Gilliland, Mike Kennedy, Nick O'Neil, Luke Howard, Edward Hosack, Duane Jonlin, Al Audette, David Mann, Eric Lyons, Eric Lacey, Dan Whitmore, Roger LeBrun, Dana Moroz, Bob Hitchner, Kent Mitchell, John Crouch

TAG Members Absent: Alan Duer, Amy Wheeless, CJ Brockway, David Reddy, Robby Oylear, Todd Blevins, Paul Highly

Staff: Krista Braaksma

* indicates an alternate member

Agenda Items	TAG Actions
1. Welcome and Introductions	Meeting called to order at 9:02 a.m. Kjell Anderson welcomed everyone and introductions were made.
2. Review and Approve Agenda	Agenda modified to change the order of proposals. It was also noted that R24 had been withdrawn and R15 had been acted on at the previous meeting. The Section R406 review was moved to after R10, R 34 was moved between the two. R28 and R27 were moved up to be heard after R04. R11 was moved down to be heard before R07 and R09 will be heard immediately after.
3. Review and Approve Minutes	The minutes of the May 17, 2019 meeting were approved as written.
4. Review of Code Change Proposals	
WSEC-R10	Alan Nolan introduced a revised version of his proposal worded to be more consistent with the other options in the category. It incorporates a 0.28 window with the raised heel truss and advanced framing. The TAG discussed the required space for insulation. Chuck Murray introduced a modification that left out the language on free space and referred the user to Appendix A. Chuck Murray and Patrick Hayes moved to recommend approval as modified with Chuck's language. The motion carried with no opposing votes.
WSEC-R34	Dave Baylon felt this may be a good option if it provided full floor insulation and was vented at the same level as the house rather than crawlspace venting. Patrick Hayes felt the insulation should be the same as for