Process Evaluation of Energy Trust of Oregon 2022-2023 New Buildings Program: Final Report

Prepared for:
Energy Trust of Oregon

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Date: 7/25/2023
To: Energy Trust Board of Directors
From: Dan Rubado, Sr. Project Manager – Evaluation
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Alex Novie, Sector Lead – Communities + New Initiatives
Subject: Staff Response to the 2022 New Buildings Process Evaluation

This process evaluation confirmed many of Energy Trust's assumptions about the commercial new construction market in Oregon and how New Buildings is serving it. The evaluation also revealed some new details about market actors, code compliance pathways, and program services. Of note was the very high program market share estimated by the evaluator—roughly 80% of eligible new construction projects in Oregon used the program's services. Although market share estimation is imprecise, these findings strongly indicate the program is serving most new commercial buildings. In keeping with past trends, the evaluation showed customers hold the program in high regard and are generally very satisfied with its services. Customers particularly value relationships with program outreach managers and the assistance they provide in navigating the program.

One exception to the high market share was in the multifamily sector, where program market share declined from 2016 to 2021 even as the number of program-supported projects increased by 50%. This was a period of dramatic growth in multifamily construction and small firms, new entrants into the market and smaller project teams may be less familiar with the program. Serving more multifamily buildings, particularly smaller ones, is a big opportunity and priority for New Buildings. Staff is looking at ways to increase outreach and services tailored to the multifamily sector to increase market share and deepen energy savings. Program staff and future evaluators will continue to quantify and monitor the program market share over time and, as recommended by the evaluator, will employ surveys of non-participants in these efforts to reduce uncertainty.

Although most new construction projects use the program's services and incentives, the evaluator noted many are completing only minor efficiency improvements through prescriptive lighting, water heating and commercial food equipment measures, leaving substantial energy savings on the table. It is a priority for New Buildings to encourage deeper energy savings by enrolling more projects in its whole building services. Staff plans to accomplish this by increasing program outreach and technical trainings, using simplified methods for whole building energy analysis that would appeal to smaller developers and design teams with fewer resources, and by encouraging more developers and project teams to hold early design assistance (EDA) meetings. EDA meetings have been successful in getting design teams to consider energy improvements and conduct whole building energy analysis.

New Buildings staff did a lot of work in advance of the major change to Oregon energy code in 2019 to make the transition easy for program participants to deal with. These activities included providing trainings on the new code, updating program forms and technical resources, simplifying the energy modeling process to focus on building performance rather than individual measures and providing assistance to help customers navigate the code. The evaluation found most building owners and design teams interviewed saw the code change as simply another regulatory change they needed to comply with as part of doing business. While some respondents expressed that meeting and exceeding energy code had become more expensive and was a growing barrier to efficiency, navigating the new energy codes did not seem to be a concern.

However, the evaluation's focus was on whole building projects and experienced design teams—smaller design firms may be having more difficulty interpreting and applying the new energy codes. In addition, local code officials charged with enforcing code reported being overwhelmed by the pace of code changes and the technical expertise required to stay up to date and assess new requirements. New Buildings will continue to support the market, particularly smaller firms, those that have not participated before and code officials to help them navigate the energy code and design buildings that exceed it.

Design teams noted they always try to sell efficiency and program participation to building owners, but Energy Trust incentives now cover a lower portion of the costs and are not enough to move some developers. Many respondents stressed the importance of the program's other services in supporting projects and influencing them to incorporate efficiency measures, particularly EDA meetings, energy modeling assistance, solar assistance and support from program outreach staff. EDA meetings were noted as the key to setting efficiency as a priority and influencing teams to improve building performance, while modeling assistance allowed teams to explore efficiency or solar options they might not have otherwise. The program will continue to promote these services to potential participants and highlight their value, particularly to smaller firms, those that are new to the program and those planning to participate at a lower level. In addition, the program will clarify that conducting energy modeling does not affect how they choose to comply with code.

As recommended by the evaluator, to improve the program's diversity, equity, and inclusion activities, program staff will increase coordination with other Energy Trust programs in their outreach to community-based organizations. This may reveal new projects that were not previously being served. In addition, staff will support the building design and construction community's efforts to identify and contract with minority- and women-owned businesses.

1. Executive Summary

Energy Trust of Oregon selected ADM Associates to conduct a process evaluation and research on how the commercial new construction market, including New Buildings Program participants, is adapting to energy code changes made in 2019 and 2021. This research included developing a characterization of the new construction market using primary and secondary data, conducting program staff interviews, conducting interviews with participants and nonparticipants, and conducting interviews with market experts and code officials actively involved in the commercial buildings market.

Table 1-1 shows how the team addressed the overall market and program related research topics Energy Trust identified for this project by data source.

Table 1-1: Project Research Topics

Research Topics	Project Document	Secondary Data	Staff	Participants	Non-participants	Market Actors
Market						
Market penetration	✓	✓				✓
Market feedback about exceeding code			✓	✓	✓	✓
Compliance with the new code			✓	✓	✓	
Program						
Program influence on decisions				✓	✓	
Program use and satisfaction			✓	✓		
Participant decision making regarding new code			✓	✓		
Program outreach and assistance to market			✓	✓	✓	✓
Program progress towards addressing DEI goals			✓	✓	✓	✓

1.1 Market Research

In 2022, ADM Associates, in consultation with Energy Trust and CLEAResult, prepared a market penetration analysis to describe the portion of the new construction market that received incentives from Energy Trust's New Buildings Program from 2019 through 2021. This research provides an update to previous market penetration research Energy Trust conducted. To complete this analysis, we used data from the Dodge database which lists all new construction projects in the state, reviewed the CoStar database, and the Commercial Building Stock Assessment (CBSA). The key takeaways from this analysis are:

- The percentage of types of new building projects in Energy Trust territory changed between the 2014 to 2016 (2016) time frame and the 2019 to 2021 (2021) time frame. For example, the number of multifamily projects more than doubled its share of the overall market from 2016 to 2021.
- Energy Trust increased the overall number of projects it supported by 50% and the overall square footage of projects by 54% from 2016 to 2021 signaling an increase in program interest.

- The market penetration of program supported projects changed from 2016 to 2021. There has been an increase in program involvement in schools, libraries, stores, restaurants, manufacturing, recreation, hospitals, and auto services whereas there has been a decline in the penetration of multifamily buildings. The decline in penetration of multifamily buildings coincides with a rapid uptick in the development of multifamily buildings in the market, a condition that may lead to owners not participating in the program as much because there may be less need to distinguish their product.
- Since 2016, the share of projects going through the Energy Trust program has declined in many rural areas while increasing in Multnomah, Clackamas, Marion, and Jackson counties. All other regions have stayed about the same.
- Our estimate for market penetration as of late 2021 for the program is 82% ± 9%, considerably higher than previous estimates. Unlike previous market penetration work, we included what we learned from our nonparticipant survey attempts in our overall estimate. Our attempts at reaching nonparticipants demonstrated that there were very few projects that did not receive some type of support from Energy Trust.

1.2 Program Research

We completed interviews with participants twice during the evaluation period. We completed the first set of interviews in spring/summer 2022, primarily with building owners and their representatives, and the second set of interviews in winter/spring 2023, primarily with designers.

Participants, both building owners and designers, tend to be regular users of Energy Trust programs and services, reporting familiarity with the New Buildings program, and experience with the program for four or more years. Most first learned about and participated with Energy Trust four or more years ago. Additionally, most respondents were familiar with the program track and service names suggesting a familiarity with program details.

Early design assistance and energy modeling assistance were critical aspects of the support received by participants – both buildings owners and designers—and respondents indicated high levels of satisfaction with all elements of the program. Almost all participant respondents that received early design assistance or energy modeling assistance described these services positively and many provided specific examples of how that assistance improved their project. For example, it helped them validate assumptions, contributed to the inclusion of solar on the project, and helped the design team convince decision maker stakeholders to invest in efficiency. One designer specified that without the energy modeling assistance their project would not have included solar and because of their positive experience with modeling and solar on their current project, they are looking to do solar on their next project. Across almost all aspects of the program's services, training, and staff, building owner respondents reported being very or somewhat satisfied. Similarly, designers reported high levels of satisfaction with the program.

Energy Trust support for solar is important to respondents. Even in cases where organizations are required to install solar, building owners and designers reported the Energy Trust support made the solar installation process easier because the support gave them a roadmap to follow. For example, one school respondent stated that the Energy Trust program representative "was super helpful for explaining" the necessary steps to complete a solar array.

Major changes to the energy code in 2019 and 2021 were not top-of-mind for building owners or designers. Building owners reported little awareness of the specifics around energy code, often leaving the details of code compliance to others on the design team. Designers reported treating code as just another thing to do, not something they expressed a lot of concern about. In most cases, the designers reported they paid more attention to constructing as efficient a building as possible instead of closely examining code to see where they could exceed code. Instead, they often design a very efficient building, and then, if needed due to cost, scheduling, or some other issue, choose to cut elements. For them, it was not a summative process for how to exceed code – what can be added - but rather a subtractive process – what has to be cut from a highly efficient building to make it meet budget and still exceed or meet code.

The building type informs which code compliance pathway designers choose, not influence from Energy Trust. For example, some buildings that had modeling done complied with code via the prescriptive pathway because the design team reported it was easier to complete the prescriptive pathway paperwork. Designers indicated that major renovations and historic buildings were more likely to need to comply with code via modeling because there are more tradeoffs needed with these projects.

In contrast to what we learned from designers, market experts and code officials that enforce code reported that the decision to select a particular code compliance pathway is determined by three variables.

- Cost: The Performance Pathway is more expensive and relies on extensive modeling and testing; the Prescriptive Pathway is less expensive and easier to complete.
- The type of equipment installed. Lighting installations rely more on prescriptive pathway while HVAC installations may use the performance pathway.
- The project cost and scope: Large new construction projects tend to rely more on the performance pathway, while small remodeling projects may rely more on prescriptive pathway.

Market experts and code enforcement officials recommended that code writers:

- Provide better guidance on solar requirements. Currently, code requirements for solar are not well-defined, creating confusion for builders and designers. Code officials want to understand better how to integrate these technologies to become “solar-ready”. In contrast, the building experts want clear guidance on incorporating these technologies into their building projects.
- Consider demand control ventilation requirements and incorporate sensors in the ventilation units that could adjust the levels based on occupancy loads.
- Consider exterior insulation and the elimination of thermal bridges in future code updates. However, these changes should be made gradually as it will take time for the market to “catch up.”

Both code officials and market experts expressed concern about the frequency and cadence of building code changes. Specifically, the code officials reported feeling overwhelmed by the level of technical expertise they were expected to have. Market experts were worried that the code changes would be too costly for small business owners as “energy improvements come with a price tag.”

1.3 Conclusions and Recommendations

Based on the findings of this evaluation effort, we present our conclusions and recommendations organized by research objective here.

1.3.1 Market Characterization and Market Penetration Estimate

Conclusion #1: Previous market penetration estimates have likely been underestimating the actual reach of Energy Trust's New Buildings program because previous work did not attempt to contact nonparticipants. Our work suggests that the program's penetration into the target market could be in the range of 73% to 95%, a notable increase from the roughly 50% estimate provided in previous research. This higher estimate is a result of our data collection efforts that found very few nonparticipants. While most projects are going through Energy Trust programs, there is still opportunity for projects to go after deeper savings by participating in Whole Buildings, Path to Net Zero, and Market Solutions tracks.

> **Recommendation #1.1:** For future market penetration estimates, use a survey or other means to verify that the people and projects identified as nonparticipants are within the program's target market.
>
> **Recommendation #1.2:** Continue to emphasize the importance of going beyond systems-based incentives by encouraging participants to pursue the deeper savings available to them. Focus outreach efforts on not just the potential for long-term energy savings but some of the non-energy benefits participants told us about: improved workflows that resulted from the early design meetings, identifying that solar was possible for a project, and assistance in meeting an organization's sustainability goals.

1.3.2 Adaptation to Recent Energy Code Changes

Conclusion #2: The interviews with building owners and designers suggest that the market is adapting to recent energy code changes with relative ease. Many owners and designers indicated that code changes were a relative afterthought because they were often focused on constructing the most efficient building possible and working back towards code in certain applications if a certain building element became too expensive or a certain piece of equipment would not be available when needed. It is possible that the participants and designers that work exclusively on systems-based projects and do not avail themselves of services like early design assistance and modeling assistance may have a different perspective about adapting to energy code.

> **Recommendation #2.1**: Consider surveying or interviewing participants and designers that apply only for equipment incentives to determine whether they struggle with code changes and, similar to recommendation 1.2, consider additional outreach to these participants and designers that focuses on how other Energy Trust services can help them address their code change concerns.

1.3.3 Program Participant and Trade Ally Experiences with the Program

Conclusion #3: Early design assistance, energy modeling assistance, and solar assistance are the critical aspects of the Energy Trust support received by participants, and respondents were highly satisfied with

all elements of the program. Almost all respondents that received early design assistance or modeling assistance described these services positively, and many provided specific examples of how that assistance improved their project. For example, it helped them validate assumptions, contributed to the inclusion of solar on the project, and helped the design team convince decision maker stakeholders to invest in efficiency. No respondent reported dissatisfaction with the program's services.

> **Recommendation #3.1:** When trying to convince participants to do more efficient projects, highlight the important non-financial role that early design assistance, energy modeling assistance, and solar assistance have provided design teams. These program services provide relatively small financial incentives relative to a multi-million dollar building, but the design team's reported benefits of these services suggest that these services are worth far more than just lowering the cost of the project.

1.3.4 Program Influence on Construction and Equipment Decisions

Conclusion #4: The need of each project affects a design team's decision-making about which code compliance pathway to choose more than anything else. Design teams choose their pathway based on what they think is going to be the easiest method to meet code obligations for a given project.

> **Recommendation #4.1:** The program could help participants that are receiving systems-based incentives only and that are not familiar with energy modeling or are concerned about the cost or additional work of modeling, that conducting energy modeling would not affect how they comply with code. Some participants unfamiliar or concerned about modeling may think that modeling will entail more complicated code compliance and that is not the case.

1.3.5 Program Outreach and Assistance to Market

Conclusion #5: Participants and designers were especially satisfied with the outreach the program provides, in particular, the support Energy Trust outreach staff provide to project staff. According to participants and designers, outreach staff help project staff with incentive paperwork, coordinating design meetings, explaining Energy Trust support to decision makers, and other activities. In fact, in many instances, this support is perhaps more valuable to project staff than the equipment incentives.

> **Recommendation #5.1**: Continue providing strong outreach support to project teams.

1.3.6 Program's DEI Goals

Conclusion #6: The market characterization indicates that the program is reaching most of the new construction market and a variety of organization types, both public and private, suggesting that the program is reaching organizations owned by and serving communities of color, women, and rural communities. However, Energy Trust would need to conduct additional research to verify that and to ensure that the handful of projects not going through the program are not owned by minorities, women, or located in rural areas. While participants, designers, and other respondents had few insights into how the program has been addressing its DEI goals and only a handful had recommendations for how the

program could address its DEI goals, some designers indicated that Energy Trust could support designers' efforts to contract with minority and women-owned businesses.

Recommendation #6.1: Increase outreach and communication with targeted groups to ensure these groups are aware of all aspects of support Energy Trust can provide to new construction efforts. This could include efforts Energy Trust is making with Business Lighting and Existing Buildings to reach out to community-based organizations.

Recommendation #6.2: Provide designer and architect community a list of minority and women-owned businesses they could potentially contract with.

2. Introduction

Energy Trust of Oregon selected ADM Associates to conduct a process evaluation of the New Buildings ("NB") program. Energy Trust initiated the NB program in 2003 to provide technical support to identify energy savings opportunities and cash incentives to implement electric and gas energy efficiency measures and designs in new commercial and multifamily buildings. The program also aims to transform the new construction market and push it toward more energy efficient building practices. In addition to technical support and cash incentives, the program has developed training and education offerings about advanced energy efficiency options and best-practice design targeted toward commercial building owners, developers, and design professionals. The program is delivered through four major tracks designed to meet the needs of developers and design teams with various levels of sophistication:

- The System Based track includes prescriptive and custom measures analyzed and offered individually.
- The Whole Building (WB) track is for projects that conduct whole-building energy modeling and takes an integrated design approach to improving building efficiency. The Path to Net Zero (PTNZ) is a sub-track under WB that assists projects that are committed to meeting the Architecture 2030 energy efficiency and renewable targets, with a goal of achieving net zero energy buildings.
- Market Solutions offers a package of incentives that have been developed and deployed for small- to mid-size commercial customers, many with incentives based on project square footage and offer good/better/best/very best efficiency levels. Currently, this track is available for multifamily properties but has historically been offered for other target markets.
- The Data Center track addresses a range of efficiency opportunities in stand-alone data centers locating in Oregon that can vary from enterprise centers (e.g. Google data center) to co-location facilities (e.g. – a data center that leases data storage to customers).

The program supports both commercial new construction and major renovations including multifamily projects and is implemented by a Program Management Contractor (PMC) on behalf of Energy Trust. Program staff work in close coordination with Energy Trust program management and marketing staff.

The current process evaluation research had multiple objectives:

- Develop a characterization of the Oregon new construction market, including an estimate of NB program penetration into the market.
- Assess how the commercial new construction market, including New Buildings Program participants, is adapting to energy code changes made in 2019 and 2021.
- Understand the experience of program participants as well as their trade allies (architects, engineers and contractors) working with the program and how to improve those experiences.
- Assess program influence on construction and equipment decisions.
- Assess program outreach and assistance to market.
- Assess the program's progress towards addressing DEI goals.

Part of this research effort was to provide ongoing results to the Energy Trust team to help them with the program planning efforts. The ADM team provided preliminary findings memos and an interim report during the evaluation period. This document brings together the data collection and analysis into one report that addresses all the research topics set forth by Energy Trust.

3. Methods

The ADM team used four primary data sources to conduct this research:

- Program staff interviews
- Two waves of participant interviews
- Nonparticipant interviews
- Market actor interviews

The team also used secondary data sources such as previous market characterizations reports and data from third-party entities operating in the commercial building market space. The team used these data sources to address the overall market and program related research themes Energy Trust identified for this project (Table 3-1).

Table 3-1: Project Research Topics

Research Topics	Document Review	Secondary Data	Staff	Participants	Non-participants	Market Actors
Market						
Market penetration	✓	✓				✓
Market feedback about exceeding code			✓	✓	✓	✓
Compliance with the new code			✓	✓	✓	
Program						
Program influence on decisions				✓	✓	
Program use and satisfaction			✓	✓		
Participant decision-making			✓	✓		
Program outreach and assistance			✓	✓	✓	✓
Progress toward DEI goals			✓	✓	✓	✓

The next Sections describe how we conducted each of these research tasks.

3.1 Document Review

The first task of this research project was to identify, obtain, and review a variety of reports and other documentation on the Program and the new construction market in general. We obtained the following documents:

- Prior New Buildings evaluation reports.
- Project tracking files, measure and project database, and project pipeline reports and data.
- Education and training materials.
- Energy Trust Annual and Quarterly Reports.

- Code requirements.
- NEEA training and education materials related to the Luminaire Level Lighting Controls Program.
- The Oregon Energy Code, documentation on ASHRAE 90.1 (including its cost effectiveness in Oregon) and the Oregon Commercial Building Code.
- Reports from the US Department of Energy's Better Buildings Initiative.
- The Energy Trust New Buildings Program Implementation Manual (PIM).
- The Energy Trust New Buildings Program Whole Buildings Pathways Overview.

We used several of the above sources to inform the development of interview guides and to develop the participant and nonparticipant samples.

In addition, we used these sources to inform the development of the interview guide for the market actor interviews as well as the interpretation of the responses gathered in those interviews and as an additional source (in addition to the current research) of information on building owner, designer, and developer decisions.

3.2 Market Characterization

To conduct this analysis, ADM reviewed information from four data sources to characterize the Oregon new commercial construction market.

- Dodge Data & Analytics.
- Energy Trust New Buildings Program tracking data.
- CoStar.
- The Commercial Building Stock Assessment (CBSA).

Our review of CoStar and CBSA revealed they were inadequate sources for characterizing the new commercial construction market in Oregon. Appendix G describes our analysis of CoStar and the CBSA and explains why they were not as useful a source as the Dodge Data.

The core of the analysis involved updating previous market research Energy Trust completed[12] that compared the Dodge database[3] to the Energy Trust project data. Dodge collects data about new construction and major renovation projects including project type (new building footprint or renovation), building type (office, school, etc.), year, and location. For our analysis, we used the same criteria as the previous market research studies. That is, we queried the nationwide Dodge database using the following criteria:

[1] Energy Trust New Buildings Program 2013-214 Process Evaluation Report. PWP, Inc. February 2015. https://www.energytrust.org/wp-content/uploads/2016/12/NB_Process_2014_Report.pdf

[2] New Building Market Saturation 2014-2016, Andy Griguhn, October 2017.

[3] ADM purchased a subscription to the online Dodge database that allows the user to review projects and contacts associated with all new commercial construction and renovation projects that filed for permits.

- State: Oregon.
- Publish Date: Projects published from January 1, 2019, through December 31, 2021.[4]
- Action Stages: Projects in the construction or operation phase.
- Project Types: All construction types except single family homes, duplexes, and infrastructure projects like roads, bridges, and sewer lines.

The Dodge dataset download identified 4,661 project records that were actively under construction or completed in Oregon from 2019 to 2021. Despite trying to remove infrastructure projects using the online portal, we identified 51 such projects in the dataset and removed those, leaving 4,610 projects. We cross-referenced the zip code data in the Dodge list with a list of zip codes in Energy Trust territory to remove projects outside Energy Trust's potential influence. This resulted in 4,291 projects in the Dodge database located inside of Energy Trust territory.

Energy Trust tracks data similar to those tracked in Dodge, in addition to more project specific data like energy savings and key contacts. Comparing results from these two datasets helped us estimate the market penetration rate and compare penetration by things like project year and type.

We reviewed the CoStar and CBSA data as possible sources to support (or challenge) the Dodge analysis. The CoStar database provides data on commercial real estate and focuses on the rentability of buildings and space. CoStar shows the construction year of the building and the building type, so we attempted to use this dataset to cross reference the results we saw from Dodge to make sure our count of new construction projects was in the same ballpark as CoStar.

Similarly, we attempted to use the 2019 CBSA to cross-reference the Dodge results. The 2019 CBSA builds upon prior assessments conducted in 2003, 2009, and 2014. The CBSA authors sample buildings across the Pacific Northwest to describe the physical and energy-use characteristics of commercial facilities throughout the region. The CBSA findings include an estimate of building square footage in Oregon. We get an estimate of how many square feet of building space the market added by calculating the difference between the 2019 inventory and the 2014 inventory.

We completed our initial analysis using SPSS and Excel and provided a draft of results to Energy Trust in May 2022 and September 2022. The results in this report reflect Energy Trust's comments on and edits to those drafts.

Note that the nonparticipant data collection effort (Section 3.6), affected the market characterization, specifically the market penetration rate. While the market characterization and nonparticipant tasks were initially designed as independent tasks, where the nonparticipant interviews would cover issues like why they had not used Energy Trust services, our work determined that there were very few actual nonparticipants. Therefore, the nonparticipant data collection effort informed the market characterization more than providing any other insights.

[4] Published date for any project refers to the most current information that Dodge has about that project. It does not represent any date in the project timeline and so should not be compared with Energy Trust project dates.

3.3 Program Staff Interviews

The ADM team completed a first round of two group interviews with six key program staff in Q2 2022 and conducted a second round of interviews with six staff in Q1 2023.

The Q2 2022 interviews helped the evaluation team fully understand the program and the challenges the staff face with adapting the program to align with new code standards, maintaining past program successes, and increasing participation. It also informed the development of the interview guides.

The Q1 2023 interviews provided the ADM team with input about how the program may have changed in the last three quarters. Specifically, we asked about how the program may be adapting to performance-based new code standards, changing outreach efforts, experiencing successes or challenges not covered during the 2022 interviews, and working to increase participation in performance-based program tracks.

The interview guide is in Appendix A.

3.4 Participant Interviews

ADM completed interviews with participants twice during the evaluation period. We completed the first set of interviews in spring/summer 2022 and the second set of interviews in winter/spring 2023. The Sections below describe the research approach and highlight the differences for each of these data collection efforts.

3.4.1 Sample Preparation

Preparation of the samples differed between the spring/summer 2022 interviews and the winter/spring 2023 interviews primarily in who we targeted for the interviews. The spring/summer 2022 interviews largely attained feedback from building owners and their representatives whereas the winter/spring 2023 interviews focused on the design community – architects and others that led projects.

3.4.1.1 Spring/Summer 2022 Interviews

For the first round of interviews, ADM identified a population of 279 projects using project data and contact data received from Energy Trust in May 2022. These projects were subject to the 2019 or 2021 energy codes and were underway or recently completed within the last six months (November 2021 to May 2022). For our interview efforts, and based on feedback from Energy Trust staff, we selected projects that had engaged the program beyond just receiving system-based incentives. That is, the projects received support for pursuing Path-To-Net-Zero, Whole Building, Market Solutions, Data Center, Early Design Assistance, or Modelling Assistance (Table 3-2).

Table 3-2: Population and Target Completions for Spring/Summer 2022 Participant Interviews

Sample Status	Program Track	Population	Completion Goal	Completed
Sampled	Whole Building (WB)/ Path-to-Net-Zero (PTNZ)	48	Up to 12	10
	Market Solutions (MS)	19	Up to 6	6
	Data Center (DC)	1	1	0
	System-Based with design assistance or modeling assistance (SB)	36	Up to 6	6
	Total Sample	104	Up to 25	22
Not Sampled	System without design assistance or modeling assistance	175	None	None
Total	Total	279	-	-

We chose these projects for our sample because they reflect the population of people that made more conscious decisions about their participation in the program and were more likely to have larger buildings. Additionally, Energy Trust was interested in exploring how recent code changes interacted with their WB offerings. Projects that solely received systems-based or prescriptive incentives would not have the same level of engagement with the program and would therefore be unable to answer many questions about their program participation and how they used the program to address code and other key research questions.

For each of the 104 sampled projects, we attached all contacts (e.g., owners, architects, contractors), up to seven people associated with the project. We then asked Energy Trust program staff to review the contacts associated with each project and identify the key person that ADM should interview about that project. That exercise revealed 87 unique contacts associated with the 104 projects.

As noted in Table 3-2, we sought up to 25 completions equally apportioned across the program tracks and completed 22 by July 1. Due to the small numbers of participants in the Data Center and PTNZ tracks, we fell short of our goal for these tracks, but we completed more Whole Building interviews. Furthermore, staff reported to us that the distinction between a Whole Building and PTNZ project is somewhat arbitrary because often a participant will seek one of these tracks at the outset of their project but achieve another. In other words, participants in these tracks are somewhat interchangeable for the purposes of this research.

3.4.1.2 Winter/Spring 2023 Interviews

For the second round of interviews, ADM identified a population of 293 projects using project data and contact data received from Energy Trust in December 2022. These projects were subject to the 2019 or 2021 energy codes and were underway or recently completed within the last six months (June 2022 to December 2022). Like the first round of interviews, and based on feedback from Energy Trust staff, we selected projects that had engaged the program beyond just receiving system-based incentives. That is, the projects received support for pursuing Path-To-Net-Zero, Whole Building, Market Solutions, Data Center, Early Design Assistance, or Modelling Assistance (Table 3-3).

Table 3-3: Population and Target Completions for Winter/Spring 2023 Participant Interviews

Sample Status	Program Track	Pop.	Completion Goal	Completed
Sampled	Whole Building (WB)/Path-to-Net-Zero (PTNZ)	56	15	18
	Market Solutions (MS)	31	10	5
	Data Center (DC)	1	Census	0
	System-Based with design assistance or modeling assistance (SB)	62	10	12
	Total Sample	150	35	35
Not Sampled	System without design assistance or modeling assistance	143	None	None
Total	Total	293	-	-

We chose these projects for our sample because they reflect the population of people that made more conscious decisions about their participation in the program and were more likely to have larger buildings. Projects that solely received systems-based or prescriptive incentives would not have the same level of engagement with the program and would therefore be unable to answer many questions about their program participation and how they used the program to address code and other key research questions.

The second round of interviews differed from the first in one key area. Unlike the first round of interviews where we spoke primarily with building owners and their representatives, we prioritized speaking with the key designers of projects during the winter 2023 interviews to address questions about decision making around the code compliance pathway. We did not sufficiently address this issue in the spring/summer 2022 interviews in part because we spoke with building owners and representatives mostly. By specifically recruiting members of the design community (architects and engineers) in winter 2023, we could better understand how project teams make decisions regarding complying with code.

As noted in Table 3-3, we sought up to 35 completions distributed across the program tracks and completed 35 by April 20.

3.4.2 Interview Guide Preparation

ADM developed the spring/summer interview guide to cover the applicable research topics identified in Table 3-1. The team devoted much of the guide to addressing research topics related to market potential, adapting to new code changes, and experience using the program. Additionally, the interviews covered what topics or technologies Energy Trust should be considering as they plan the program for the future.

The guide has questions about the characteristics of participant organizations and their projects and explores if the respondent had ever chosen to not use Energy Trust services and if so, why they elected not use Energy Trust services.

The team prepared the interview guide to capture the perspectives of all types of participants (building owners and architects/designers/general contractors). This included modules of questions for different types of respondents or subtle wording changes to make questions more suitable for certain groups.

While this guide helped us address some of the key research objectives, as noted above, it did not fully address questions around decision making and the code compliance pathway. That issue, combined with the guide capturing information that was of less importance to this research, led us to notably revise the guide for the winter/spring 2023 interviews. Specifically, we:

- Reduced the number of introduction and awareness questions because of our confidence, based on the market characterization analysis, interviews with past participants, and interviews with staff, that the market is pretty aware of the program and has been for some time.
- Reworked the program influence questions to focus on how, if at all, it influences code compliance and energy efficiency decisions.
- Limited the satisfaction questions to a more open-ended approach with probes instead of using a rating scale as we were more interested in the depth of responses that approach provides.

For both sets of interviews, in cases in which a contact was associated with multiple active projects, the team asked the respondent to comment on any differences in how they are reacting to code changes or how their program experience differed, if at all, across their active projects.

We submitted each interview guide to Energy Trust staff for review and revised it based on feedback. Final versions of the instruments are included in Appendix B and Appendix C.

3.4.3 Recruiting Respondents and Fielding Interviews

For both sets of interviews, we sent an initial recruitment email to each identified first-round contact for Whole Building, Market Solutions, PTNZ, Data Center, and System Based projects that also used design assistance or modelling assistance. The email explained the purpose of the research, the approximate duration of the interview (45 to 60 minutes), and the importance of their participation and offered a $100 gift card to all participants that complete an interview. The email stated that we would follow up with a phone call but also encouraged respondents to respond by email to schedule an interview or provide the best times to call. The team followed the initial email recruitment with phone calls and additional emails contacting individuals up to five times. We used MS Teams to conduct the interviews, and with permission from the respondent, recorded the conversations to ensure the accuracy of our notes.

3.5 Market Expert and Code Official Interviews

The team completed interviews with 14 market actors – six market experts (e.g. Manufacturer representatives serving the commercial construction market), one statewide code official and seven jurisdictional enforcement code officials – actively involved in the commercial buildings market. These in-depth interviews captured their perspectives regarding the use of the code compliance performance pathway, the market's potential to exceed code, program outreach and assistance supplied to the market, and their perspectives on how Energy Trust could address their DEI goals.

Our sample for these interviews came from reviewing lists of code enforcement agencies in the state, ongoing work with NEEA's XMP Pumps and Circulators market, and asking Energy Trust and their implementation staff for contacts that would be able to address these questions.

These interviews took 45 to 60 minutes. To encourage participation and thank respondents for their time, we offered a $100 gift card to all interview participants able to receive such compensation.

We conducted interviews with these market actors over the course of the evaluation period and the guides are in Appendix E and F.

3.6 Nonparticipant Interviews

Using data from Dodge Data & Analytics and in consultation with Energy Trust, ADM prepared a sample of, and interview guide for, architects, building owners, and general contractors associated with commercial new construction projects that are being built under the new code and have not received New Buildings services or incentives (nonparticipants). The team originally intended to complete 30 nonparticipant interviews in the summer of 2022 and 30 more in Q1 2023. However, as we discuss below, based on the results of the first round of interviews, and in consultation with Energy Trust, the team elected not to pursue a second round of interviews because there were far fewer nonparticipants than originally envisioned, and those nonparticipants we did find reported very little information that would be of value to Energy Trust. The interview guide is in Appendix D.

3.6.1 Sample Preparation

ADM developed a representative sample of nonparticipating projects by using the Dodge database to identify all ongoing or recently completed projects. We used the PROJECT TYPE(S) and ZIP CODE fields to identify all non-infrastructure projects that were in Energy Trust territory. From those, we used the values in the ACTION STAGE(S)and STATUS fields to identify projects that were ongoing at the time of the most recent database update. This identified 816 projects. However, 482 of those 816 records had not been updated since 2020, generating the concern that those projects may no longer be ongoing. The majority of those 482 records were missing target completion dates or had target completion dates in 2021 or later. We eliminated the 139 records that had target completion dates in 2020 or earlier and had not been updated since 2020, as likely to no longer be ongoing. This left 677 ongoing projects.

We then identified an additional 29 projects identified in the ACTION STAGE(S) field as completed or near completion and having a TARGET COMPLETION DATE in 2021 or later. Thus, we identified 706 projects as ongoing or near completion.

From that list, we attempted to identify and eliminate any projects done with assistance from the New Buildings program. We first attempted to identify any projects that had the same address as a project in the list of New Buildings project completed since 2016 or ongoing. We were able to identify only 22 address matches, leaving 684 projects. ADM identified another 213 projects that matched New Buildings projects on the owner company name, contact name, phone number, or email address. These are not necessarily NB projects, as a given owner may conceivably have both participating and nonparticipating projects. However, excluding those projects provided confidence that we had excluded New Buildings projects. We asked contacts for participating projects about any nonparticipating project they completed, which allowed us to obtain information about many nonparticipating projects excluded, if any, in this way.

The total of 235 ongoing or recently completed projects excluded is somewhat below the total of 279 ongoing or recently completed NB projects. This provides some additional confidence that the above

process likely eliminated mostly nonparticipating projects, although it seemingly did not eliminate all of them. We used the remaining 471 projects from the nonparticipant sample frame in our outreach efforts in summer 2022. Note that we did not eliminate all projects that had not been updated since 2020 – only those with target completion dates in 2020 or earlier. There remained 334 projects that had not been updated since 2020. No target completion date was recorded for a large majority (89%) of those. Since there was no target completion date, we did not feel confident in eliminating those from the sample frame, but it is possible that many of them were completed in 2020 or earlier.

3.6.2 Interview Guide Preparation

ADM developed an interview guide to cover the applicable research topics identified in Table 3-4. The team devoted much of the guide to addressing research topics related to the market and new code topics. These questions pertain to current and anticipated future design and construction choices and perceptions.

Additionally, we identified several topics pertinent to the Program including questions related to the program's influence on the larger market, perceptions of how the program can serve the market through enhanced design and education services as well as the Whole Building and Market Solution tracks, and what the market potential is for achieving savings and carbon reduction by going beyond code.

Beyond the above, the guide also covered the key topics identified in the RFP and any other topics identified during the kickoff meeting or staff interviews. As Table 3-4 shows, we anticipated that we would cover most of the topics identified in the RFP in interviews with both owners and architects/designers/builders, although some topics would be applicable to the latter but not the former.

Table 3-4: Interview Topics for Nonparticipant Project Contacts

Topic	Owners	Architects, Designers, Builders
Firm characteristics	✓	✓
New construction services provided		✓
Major markets worked in	✓	✓
Number of Oregon projects by building type	✓	✓
Number of projects enrolled in Energy Trust program	✓	✓
Code paths of projects	✓	✓
Modelling software	✓	✓
Program awareness, reasons for nonparticipation, suggestions for improvements in program design, actions, and services	✓	✓
Information on Program involvement, if applicable	✓	✓
Challenges and concerns with new code, suggestions for changes	✓	✓
Perceived short- and long-term trends in and affecting market	✓	✓
Training and education	✓	✓
General training needs		✓
Use/value of Energy Trust training and education resources		✓
Effect of trainings on energy efficiency decisions		✓

The guide had questions about the characteristics of non-participating projects and covered reasons for why those projects did not go through the program. Interviewers asked these respondents if recent energy code changes affected participation decisions.

The team prepared the interview guide in a way that captures the perspectives of all types of participating market actors (building owners and architects/designers/general contractors). This could include modules of questions for each type of market actor or subtle wording changes to make questions more suitable for certain groups.

We submitted the interview guide to Energy Trust staff for review and revised it based on feedback.

In cases in which a contact was associated with multiple active projects, the team asked the respondent to comment on any differences in how they are reacting to code changes across their active projects.

3.6.3 Recruiting Respondents and Fielding Interviews

The implementation and approach to interviewing nonparticipants evolved over the summer of 2022. Our initial contacts with nonparticipants in late June and early July revealed two things that surprised the team.

1. Many of the “nonparticipant” projects were for public entities, a group that prior evaluations have shown generally participate in the New Buildings program because they have a vested interest in building efficiently. They tend to own and operate buildings for the long-term and have “green” energy requirements such as the statewide Green Energy Technology (GET) policy that requires public bodies to spend at least 1.5% of project costs on things like solar panels.

2. The first five “nonparticipants” we spoke with reported they were not actually a nonparticipant because their project was located outside of Energy Trust electric service territory (2), deemed ineligible by program staff (1), was residential (1), and had received Energy Trust incentives (1).

These two initial findings resulted in the team modifying their approach to the nonparticipant data collection effort. After consultation with Energy Trust staff, the team elected to contact as many of the “nonparticipants” as possible to get a better understanding of their true status – were they actually nonparticipants, participants that our scrubbing process did not catch, or something else. In other words, how many of the contacts in Dodge were actual nonparticipants and how would what we learn from that work affect our market penetration estimate. Prior evaluations of the program did not attempt to contact nonparticipants, so this approach provided new information for market penetration estimates.

Ultimately, our first phase of nonparticipant data collection revealed very few actual nonparticipants. This finding led the team, with Energy Trust approval, to cancel the second round of nonparticipants in 2023. Section 4.3.2 provides more details about the actual findings from the nonparticipant data collection effort.

4. Market Research

ADM Associates, in consultation with Energy Trust of Oregon and CLEAResult, prepared market research about the new construction market in Oregon. This analysis included a market penetration analysis to describe the portion of the new construction market that received incentives from Energy Trust's New Buildings Program from 2019 through 2021. This research provides an update to previous market penetration research Energy Trust completed that examined data from 2014 to 2016.

Our data analysis begins with a review of the projects included in the Dodge database, which provides an overview of all new construction projects in the Energy Trust service area. The next section briefly describes construction trends identified in the CoStar database and the Commercial Building Stock Assessment (CBSA). We continue our analysis with a review of Energy Trust projects and compare them to the Dodge data including an analysis of trends over time and ultimately our market penetration estimate.

Additionally, this section of the report includes a summary of what we learned from staff, participants, code officials, and market experts about the new construction market in Oregon.

The market experts represented a broad cross-section of building experts in Oregon, including manufacturers, commissioning agents, trade allies and specialists in new construction and design. The types of services they offer in the Commercial Building Market include:

- Commissioning agent
- Development and remodeling of retailer shopping centers
- Energy Service Company (ESCO)
- Manufacturer/Manufacturer Rep (Commercial Kitchens)
- Building enclosure and design
- HVAC Contractor

These companies were all relatively well-established: the number of years in business in Oregon ranged from 6 to 77 years, with most having been operating for 20 to 50 years.

The market actors all worked in the commercial market. Five respondents said 50% or more of their work focused on the Metro-Portland region, while one respondent works exclusively outside of metro-Portland. The other respondents reported that work outside Portland-Metro accounts for between 5% and 40% of their total work.

4.1 New Construction Projects in Energy Trust Territory

The percentage of types of new building project starts in Energy Trust territory changed between the 2014 to 2016 (2016) time frame and the 2019 to 2021 (2021) time frame. For example, the number of multifamily projects more than doubled its share of the overall market from 2016 to 2021. Multifamily projects constituted a noticeably smaller part of the market (13%) in 2016 than it did in 2021 (28%). The construction of retail stores and restaurants declined by almost half from 2016 (22%) to 2021 (12%). Construction projects in many of the other market segments also changed over time (Figure 4-1).

Figure 4-1: Percent of Projects in Energy Trust Area by Market Segment and Years[5]

	2014 to 2016		2019 to 2021		Delta 2021 and 2014	
	Project	Perc. Project	Project	Perc. Project	Project	Perc. Project
Stores and Restaurants	703	22%	513	12%	(190)	-10%
Office and Bank Buildings	604	19%	950	22%	346	3%
Multifamily	430	13%	1,197	28%	767	14%
Schools, Libraries, and Labs (nonmfg)	383	12%	555	13%	172	1%
Manufacturing Plants, Warehouses, Labs	322	10%	285	7%	(37)	-3%
Hospitals and Other Health Treatment	249	8%	166	4%	(83)	-4%
Amusement, Social and Recreational Bldgs	166	5%	185	4%	19	-1%
Parking Garages and Automotive Services	115	4%	77	2%	(38)	-2%
Government Service Buildings	77	2%	274	6%	197	4%
Miscellaneous Nonresidential Buildings	75	2%	24	1%	(51)	-2%
Hotels and Motels	64	2%	31	1%	(33)	-1%
Religious Buildings	33	1%	20	0%	(13)	-1%
Data Center	1	0%	14	0%	13	0%
Total	3,222	100%	4,291	100%	1,069	

The square footage of new buildings by project type changed between 2016 to 2021. The changes in project type often aligned with changes in square footage, but not always. For example, there was a small increase in office and bank buildings construction projects from 2016 to 2021, from 19% to 22%, but this building type doubled its share of the overall square footage of all new construction projects from 7% in 2016 to 15% in 2021 (Figure 4-2).

Figure 4-2: Percent of Square Footage in Energy Trust Area by Market Segment and Years

	2014 to 2016		2019 to 2021		Delta 2021 and 2014	
	Sq. Ft.	Perc. Sq. Ft.	Sq. Ft.	Perc. Sq. Ft.	Project	Perc.
Stores and Restaurants	4,000,000	8%	2,038,793	3%	(1,961,207)	-6%
Office and Bank Buildings	3,471,000	7%	10,949,748	15%	7,478,748	8%
Multifamily	11,078,000	23%	36,979,034	51%	25,901,034	28%
Schools, Libraries, and Labs (nonmfg)	3,563,000	7%	6,776,884	9%	3,213,884	2%
Manufacturing Plants, Warehouses, Labs	9,634,000	20%	5,861,549	8%	(3,772,451)	-12%
Hospitals and Other Health Treatment	2,222,000	5%	3,177,256	4%	955,256	0%
Amusement, Social and Recreational Bldgs	1,438,000	3%	934,099	1%	(503,901)	-2%
Parking Garages and Automotive Services	9,314,000	19%	3,805,653	5%	(5,508,347)	-14%
Government Service Buildings	346,000	1%	945,730	1%	599,730	1%
Miscellaneous Nonresidential Buildings	623,000	1%	401,267	1%	(221,733)	-1%
Hotels and Motels	2,041,000	4%	592,468	1%	(1,448,532)	-3%
Religious Buildings	242,000	1%	45,331	0%	(196,669)	0%
Data Center	200,000	0%	582,500	1%	382,500	0%
Total	48,172,000	100%	73,090,312	100%	24,918,312	

[5] Note that the Dodge database has incomplete data for square footage, so the square footage data is an undercount of actual square footage built in the Energy Trust area. Both the 2014 and 2021 analysis show that the Dodge database had square footage data for just under one-third of all projects.

There was an increase in the number of projects in the Dodge database from 2019 to 2021 while the overall total square footage declined over time. The number of projects Dodge identified increased from 1,137 in 2019 to almost 1,700 in 2021 whereas the square footage of projects dipped noticeably from 31.7M square feet to 23.5M in 2021 resulting in a notable decrease in the average square footage of projects from 2019 to 2020 and 2021. These results suggest that the Covid-19 pandemic affected the size of projects going through the program as the year the pandemic started, 2020, was the same year project counts increased noticeably and the square footage of projects decreased noticeably. Perhaps the average square footage of projects will be closer to 2019 levels in 2022 and 2023 as those larger projects will have overcome the disruptions of the pandemic by that time. (Table 4-1).

Table 4-1: New Construction Projects and Square Footage by Year

	2019	2020	2021	Total
Projects	1,137	1,458	1,696	4,291
Square footage	31,734,889	17,815,035	23,540,388	73,090,312
Avg Sq. Ft	27,911	12,219	13,880	17,033

The location of new construction projects and the square footage they constitute did not change considerably from 2016 to 2021. There were a couple of exceptions. For instance, Deschutes County accounted for almost one-quarter (22%) of all new construction square footage reported in 2021 compared to about one-twentieth in 2016 (6%) (Figure 4-3).

Figure 4-3: Square Footage by County Over Time

	2014 to 2016		2019 to 2021		Delta 2021 to 2014	
	Sq Ft	Perc Sq. Ft.	Sq Ft	Perc Sq. Ft.	Sq Ft	Perc Sq. Ft.
Portland Metro	31,016,000	64%	41,007,495	56%	9,991,495	-8%
Multnomah	19,693,000	41%	24,172,771	33%	4,479,771	-8%
Clackamas	2,350,000	5%	3,813,468	5%	1,463,468	0%
Washington	8,260,000	17%	12,623,716	17%	4,363,716	0%
All other counties	713,000	1%	397,540	1%	(315,460)	-1%
Southern Oregon and South Coast	2,464,000	5%	2,301,239	3%	(162,761)	-2%
Jackson	1,471,000	3%	1,493,311	2%	22,311	-1%
All other counties	993,000	2%	807,928	1%	(185,072)	-1%
Willamette Valley and North Coast	9,948,000	21%	10,820,126	15%	872,126	-6%
Lane	4,490,000	9%	3,831,413	5%	(658,587)	-4%
Marion	2,937,000	6%	3,838,384	5%	901,384	-1%
All other counties	2,521,000	5%	3,150,329	4%	629,329	-1%
East of the Cascades	4,744,000	10%	18,961,452	26%	14,217,452	16%
Deschutes	2,689,000	6%	16,045,685	22%	13,356,685	16%
All other counties	2,055,000	4%	2,915,767	4%	860,767	0%
Total	48,172,000	100%	73,090,312	100%	24,918,312	0%

Additionally, there was a slight uptick in projects in the more rural areas of the region. In 2021, 19% of all projects occurred outside the major metro areas of cities like Portland, Eugene (Lane), and Bend (Deschutes), an increase of five percentage points from 2016 when projects outside the major metro areas accounted for 14% of all projects (Figure 4-4).

Figure 4-4: Project by County Over Time[1]

	2014 to 2016		2019 to 2021		Delta 2021 to 2014	
	Projects	Perc. Projects	Projects	Perc. Projects	Projects	Perc. Projects
Portland Metro	1,830	57%	2,393	56%	563	-1%
Multnomah	1,141	35%	1,397	33%	256	-3%
Clackamas	341	11%	354	8%	13	-2%
Washington	333	10%	594	14%	261	4%
All other counties	15	0%	48	1%	33	1%
Southern Oregon and South Coast	277	9%	288	7%	11	-2%
Jackson	159	5%	128	3%	(31)	-2%
All other counties	118	4%	160	4%	42	0%
Willamette Valley and North Coast	793	25%	973	23%	180	-2%
Lane	245	8%	373	9%	128	1%
Marion	356	11%	300	7%	(56)	-4%
All other counties	192	6%	300	7%	108	1%
East of the Cascades	322	10%	637	15%	315	5%
Deschutes	200	6%	344	8%	144	2%
All other counties	122	4%	293	7%	171	3%
Total	3,222	100%	4,291	100%	1,069	0%

4.2 Energy Trust New Buildings Projects

The New Buildings Program increased its overall number of projects by 50% from the 2016 period to the 2021 period. The program booked 2,300 projects from 2019 to 2021; an increase of 766 projects from the 2014 to 2016 period (Figure 4-5).

Figure 4-5: New Buildings Projects by Project Type and Period

Project Type	2014 to 2016		2019 to 2021		Delta 2021 and 2014	
	Projects	Perc. Project	Projects	Perc. Projects	Project	Perc. Project
Multifamily	336	22%	550	24%	214	2%
Stores and Restaurants	296	19%	435	19%	139	0%
Schools, Libraries, and Labs (nonmfg)	177	12%	321	14%	144	2%
Office and Bank Buildings	176	11%	277	12%	101	1%
Manufacturing Plants, Warehouses, Labs	197	13%	298	13%	101	0%
Government Service Buildings	56	4%	63	3%	7	-1%
Hospitals and Other Health Treatment	81	5%	116	5%	35	0%
Amusement, Social and Recreational Bldgs	41	3%	91	4%	50	1%
Parking Garages and Automotive Services	69	4%	51	2%	(18)	-2%
Miscellaneous Nonresidential Buildings	17	1%	12	1%	(5)	-1%
Religious Buildings	46	3%	11	0%	(35)	-3%
Data Center	7	0%	9	0%	2	0%
Hotels and Motels	35	2%	66	3%	31	1%
Total	1,534	100%	2,300	100%	766	

The New Buildings Program increased its overall square footage of projects by 54% from the 2016 period to the 2021 period. The program booked more than 138M square feet of projects from 2019 to 2021; an increase of almost 50M square feet from the 2014 to 2016 period (Figure 4-6).

The type of New Buildings projects and the square footage of those projects did not change notably from the last 2016 market penetration study to this 2021 study. In general, the types of buildings that went through the program shifted by just one or two percent across the two study periods (Figure 4-6).

Figure 4-6: New Buildings Square Footage by Project Type and Period

Project Type	2014 to 2016		2019 to 2021		Delta 2021 and 2014	
	Sq. Ft.	Perc. Sq. Ft.	Sq. Ft.	Perc. Sq. Ft.	Project	Perc. Sq. Ft.
Multifamily	31,708,124	36%	50,010,994	37%	18,302,870	2%
Stores and Restaurants	5,850,360	7%	6,967,585	5%	1,117,225	-1%
Schools, Libraries, and Labs (nonmfg)	11,287,664	13%	22,873,024	17%	11,585,360	5%
Office and Bank Buildings	8,625,999	10%	13,259,322	10%	4,633,323	0%
Manufacturing Plants, Warehouses, Labs	13,238,044	15%	21,967,917	13%	8,729,873	-2%
Government Service Buildings	2,727,017	3%	2,904,603	5%	177,586	2%
Hospitals and Other Health Treatment	3,133,184	4%	3,752,868	3%	619,684	-1%
Amusement, Social and Recreational Bldgs	1,881,989	2%	2,846,563	2%	964,574	0%
Parking Garages and Automotive Services	6,310,910	7%	6,200,549	5%	(110,361)	-2%
Miscellaneous Nonresidential Buildings	1,564,802	2%	1,585,196	1%	20,394	-1%
Religious Buildings	872,530	1%	220,182	0%	(652,348)	-1%
Data Center	398,900	0%	1,074,627	1%	675,727	0%
Hotels and Motels	1,634,217	2%	4,359,823	0%	2,725,606	-2%
Total	89,233,740	100%	138,023,253	100%	48,789,513	

The location of projects and the square footage of New Buildings projects did not change notably from the last 2016 market penetration study to the 2021 study. There was a small decrease (2%) in the percentage of projects in the Portland metropolitan area from 2016 to 2021 and a slight increase (1%) in projects in the Bend (Deschutes), Medford (Jackson), and Salem (Marion) areas (Figure 4-7 and Figure 4-8).

Figure 4-7: New Buildings Projects by Region and Period

	2014 to 2016		2019 to 2021		Delta 2021 to 2014	
	Projects	Perc. Projects	Projects	Perc. Projects	Projects	Perc. Projects
Portland Metro	834	54%	1201	52%	367	-2%
Multnomah	522	34%	800	35%	278	1%
Clackamas	111	7%	189	8%	78	1%
Washington	190	12%	197	9%	7	-4%
All other counties	11	1%	15	1%	4	0%
Southern Oregon and South Coast	193	13%	312	14%	119	1%
Jackson	98	6%	152	7%	54	0%
All other counties	95	6%	160	7%	65	1%
Willamette Valley and North Coast	239	16%	403	18%	164	2%
Lane	25	2%	34	1%	9	0%
Marion	86	6%	188	8%	102	3%
All other counties	128	8%	181	8%	53	0%
East of the Cascades	268	17%	384	17%	116	-1%
Deschutes	173	11%	269	12%	96	0%
All other counties	95	6%	115	5%	20	-1%
Total	1,534	100%	2,300	100%	766	0%

Figure 4-8: New Buildings Square Footage by Region and Period

	2014 to 2016		2019 to 2021		Delta 2021 to 2014	
	Sq Ft	Perc Sq. Ft.	Sq Ft	Perc Sq. Ft.	Sq Ft	Perc Sq. Ft.
Portland Metro	62,131,938	70%	98,428,570	71%	36,296,632	2%
Multnomah	40,952,788	46%	68,121,354	49%	27,168,566	3%
Clackamas	6,896,094	8%	11,965,620	9%	5,069,526	1%
Washington	14,167,588	16%	18,023,416	13%	3,855,828	-3%
All other counties	115,468	0%	318,180	0%	202,712	0%
Southern Oregon and South Coast	6,760,790	8%	8,771,692	6%	2,010,902	-1%
Jackson	4,446,150	5%	5,307,224	4%	861,074	-1%
All other counties	2,314,640	3%	3,464,468	3%	1,149,828	0%
Willamette Valley and North Coast	11,061,206	12%	20,392,401	15%	9,331,195	2%
Lane	1,526,994	2%	1,914,660	1%	387,666	0%
Marion	3,589,385	4%	10,954,596	8%	7,365,211	4%
All other counties	5,944,827	7%	7,523,145	5%	1,578,318	-1%
East of the Cascades	9,279,806	10%	10,430,590	8%	1,150,784	-3%
Deschutes	5,047,194	6%	7,130,845	5%	2,083,651	0%
All other counties	4,232,612	5%	3,299,745	2%	(932,867)	-2%
Total	89,233,740	100%	138,023,253	100%	48,789,513	0%

We also analyzed trends in participation by program track from 2016 to 2021. This analysis revealed a two percent increase in participation of the systems-based track and a one percent decrease in participation of the market solutions track (Figure 4-9) .

Figure 4-9: New Buildings Projects by Program Track

	2014 to 2016		2019 to 2021		Delta 2021 and 2014	
Program Track	Projects	Perc. Projects	Projects	Perc. Projects	Project	Perc. Project
System Based	1,160	76%	1,798	78%	638	3%
Market Solutions	273	18%	388	17%	115	-1%
Whole Building	94	6%	73	3%	-21	-3%
Path to Net Zero	0	0%	32	1%	32	1%
Data Center	7	0%	9	0%	2	0%
Total	1,534	100%	2,300	100%	766	0%

However, there was a four percent increase in participation in the market solutions track when examined by square footage (Figure 4-10).

Figure 4-10: New Buildings Square Footage by Program Track

Program Track	2014 to 2016 Sq. Ft.	2014 to 2016 Sq. Ft. Perc.	2019 to 2021 Sq. Ft.	2019 to 2021 Sq. Ft. Perc.	Delta 2021 and 2014 Project	Delta 2021 and 2014 Sq. Ft. Perc.
System Based	58,097,607	65%	89,738,125	65%	31,640,518	0%
Market Solutions	19,090,866	21%	33,931,596	25%	14,840,730	3%
Whole Building	11,646,367	13%	10,825,872	8%	-820,495	-5%
Path to Net Zero	0	0%	2,453,033	2%	2,453,033	2%
Data Center	398,900	0%	1,074,627	1%	675,727	0%
Total	89,233,740	100%	138,023,253	100%	48,789,513	0%

4.3 Estimation of New Buildings Program Penetration into the New Construction Market

For much of the last decade, it has been estimated that around half of all new commercial construction and major remodel projects occurring in Energy Trust territory participated in the New Buildings program. Prior market penetration rate studies demonstrated the program covered 58% of projects in 2012 and 2013 and 48% in the 2014-to-2016-time frame. The following subsections discuss our research to update the estimate of program penetration. The first subsection presents an analysis that relies solely on a comparison of NB project counts with new construction project counts from the Dodge database, which produced results consistent with what was found before. The second subsection presents a more refined estimate, based on information obtained from efforts to survey nonparticipating contacts for projects in the Dodge database, which produced a much higher penetration estimate.

4.3.1 Comparison of All New Construction Projects in Dodge to Energy Trust Projects

Our initial analysis, relying solely on the Dodge database and program data, shows that 54% of all projects participated in the New Buildings program from 2019 to 2021 (Table 4-2).

Table 4-2: Overall Market Penetration, 2012 to 2021

Study Year Published	Years Covered by Data	Energy Trust Projects	All Commercial Building Projects (Dodge Database)	Estimated Market Penetration Rate Using Dodge Database
2015	2012 to 2014	Unknown	Unknown	58%
2017	2014 to 2016	1,532	3,219	48%
2022	2019 to 2021	2,300	4,291	54%

We identified some anomalies in the market penetration analysis when examining it by project type and location. These result from the imperfect nature of the Dodge data and the assumptions we had to use to make comparable categories to the program data. For instance, the program data reports more manufacturing, warehouses, and labs projects (298) than Dodge reported (285), resulting in an impossible figure of 105% market penetration rate (Table 4-3). Similarly, we see a 700% market penetration rate for data centers in the 2014–2016-time frame. As with building type, the location information in the Dodge

data is imperfect. For example, we see more program projects in Jackson County (152) than Dodge reported (128) (Table 4-4). When interpreted as a rough estimate, however, it seems fair to say that the program is reaching many manufacturing projects and projects in Jackson County.

Analyzing the program market penetration by project type over time shows that the program has increased its penetration in some markets, decreased in others, and stayed about the same in others. The program has increased its penetration in schools, stores and restaurants, manufacturing, amusement, hospitals, miscellaneous, and hotels. It has decreased its penetration in multifamily, government, religious buildings, and data centers. The program has maintained a steady penetration rate in all other areas (Table 4-3).

Table 4-3: Market Penetration by Project Type Over Time

Project Type	2014 to 2016			2019 to 2021			Direction of Change [1]
	All New Constr.	NB Projects	Perc. NB Projects	All New Constr.	NB Projects	Perc. NB Projects	
Multifamily	430	336	78%	1,197	550	46%	⇩
Office and Bank Buildings	604	176	29%	950	277	29%	⇔
Schools, Libraries, and Labs (non-mftr.)	383	177	46%	555	321	58%	⇧
Stores and Restaurants	703	296	42%	513	435	85%	⇧
Mftr. Plants, Warehouses, Labs	322	197	61%	285	298	105%	⇧
Government Service Buildings	77	56	73%	274	63	47%	⇩
Amusement, Social and Rec. Bldgs.	166	41	25%	185	91	49%	⇧
Hospitals and Other Health Treatment	249	81	33%	166	116	70%	⇧
Parking Garages and Auto. Services	115	69	60%	77	51	66%	⇔
Miscellaneous Nonresidential Bldgs.	75	17	23%	24	12	50%	⇧
Hotels and Motels	64	35	55%	31	66	213%	⇧
Religious Buildings	33	46	139%	20	11	55%	⇩
Data Center	1	7	700%	14	9	64%	⇩
Total	3,222	1,534	48%	4,291	2,300	54%	⇔

[1] An increase of 10% or more of market penetration from 2016 to 2021 = ⇧. A decrease 10% or more from 2016 to 2021 = ⇩. All other = ⇔.

Analyzing the program market penetration by location over time shows that the program has increased its penetration in some markets, decreased in others, and stayed about the same in others. Market penetration has increased in parts of the Portland metro area, Southern Oregon, and parts of the Willamette Valley and North Coast. Market penetration has decreased in other parts of the Portland area and East of the Cascades. The program has maintained a similar penetration rate elsewhere (Table 4-4).

Table 4-4: Market Penetration by County Over Time

County	2014 to 2016			2019 to 2021			Direction of Change
	All New Constr.	NB Projects	Perc. NB Projects	All New Constr.	NB Projects	Perc. NB Projects	
Portland Metro	1,830	834	46%	2,393	1,201	50%	⇔
Multnomah	1,141	522	46%	1,397	800	57%	⇧
Clackamas	341	111	33%	354	189	53%	⇧
Washington	333	190	57%	594	197	33%	⇩
All other counties	15	11	73%	48	15	31%	⇩
S. Oregon and S. Coast	277	193	70%	288	312	108%	⇧
Jackson	159	98	62%	128	152	119%	⇧
All other counties	118	95	81%	160	160	100%	⇧
Will. Valley and N. Coast	793	239	30%	973	403	41%	⇧
Lane	245	25	10%	373	34	9%	⇔
Marion	356	86	24%	300	188	63%	⇧
All other counties	192	128	67%	300	181	60%	⇔
East of the Cascades	322	268	83%	637	384	60%	⇩
Deschutes	200	173	87%	344	269	78%	⇔
All other counties	122	95	78%	293	115	39%	⇩
Total	3,222	1,534	48%	4,291	2,300	54%	⇔

[1] An increase of 10% or more from 2016 to 2021 = ⇧. A decrease 10% or more from 2016 to 2021 = ⇩. All other = ⇔.

4.3.2 Revised Market Penetration Estimate Based on Nonparticipant Survey

The initial nonparticipant interviews led the research team to re-evaluate the approach to nonparticipant data collection and use the data collection effort to refine the market penetration estimate seen in Section 3.6. The first nonparticipant respondent represented a school district, an entity type that current and past research shows to have a high participation rate because schools keep buildings long-term, making efficiency financially important to them, and they are subject to the Green Energy Technology (GET) requirement.[6] The respondent revealed notable knowledge of Energy Trust programs and stated that she typically participates in the program. Furthermore, she reported not participating in the project we identified, a remodel of two classrooms, because Energy Trust had denied her application. It was not clear

[6] GET is a state regulation that requires public entities to spend 1.5% of the cost of their project on renewable energy, typically by including solar on the new building project.

why this project was denied. This experience of contacting a supposed nonparticipant and finding that their project was ineligible was duplicated multiple times, which led us to re-examine the contact list.

Further, examining the project titles of the sample frame revealed that our original criteria for excluding projects ineligible for Energy Trust support, like road and bridge construction projects, was inadequate. An additional manual coding of project titles completed in early July 2022 revealed that 42 of the 471 projects (9%) were ineligible for Energy Trust support because they were outdoor projects (e.g., "softball field improvements"). We excluded these 42 projects from our sample, leaving us with 429 projects.

We deduplicated the project list based on contact information and identified 287 unique contacts representing the 429 projects. Of those 287 contacts, we identified five that were "true" nonparticipants. That is, they were eligible for the program because they constructed or renovated a commercial building in Energy Trust territory but did not participate in the New Buildings program. The actual nonparticipants reported the following:

- A representative of a multifamily complex chose not to pursue Energy Trust incentives but elected to "work with Earth Advantage instead." It was unclear from this respondent how working with Earth Advantage precluded working with Energy Trust and the ADM team searched the program database and saw no matching building.
- A representative of a public library described their project as repurposing library space (shelving) into a classroom. According to the respondent, from an energy using perspective, the project was mostly about changing lighting and it did not have a notable effect on the heating and cooling in the building.
- A representative from a public transit agency and via data available online show that this project was for a new maintenance garage. The project was still underway in the summer of 2022, and it is possible they will pursue incentives in the future.
- A representative of a federal agency located in Southern Oregon reported not selecting Energy Trust incentives for the project but was unable to offer reasons why. Attempts to reach others involved in the project were unsuccessful.
- A representative of a state agency located in Eastern Oregon reported not selecting Energy Trust incentives for their project but was unable to offer reasons why. Attempts to reach others involved in the project were unsuccessful.

Table 4-5 shows the disposition of all 287 contacts identified. Far more contacts were outside the NB population than were eligible ("true") nonparticipants.

Table 4-5: Participation Status of 287 Contacts for Dodge Data Projects

	Private	Public	Total
Eligible ("true") nonparticipant	1	4	5
Outside NB population[1]	12	22	34
Energy Trust participant	16	10	26
Not reached	91	131	222
Total contacts	**120**	**167**	**287**

[1] No project completed, not eligible for incentives, outside of Energy Trust territory.

These data allow us to refine our market penetration estimate. Prior market penetration estimates relied on comparing program data to the population as represented by the Dodge data (see Section 3.6). They did not attempt to verify the Dodge data by talking to representatives of the unmatched projects. Taking that additional step shows that the program has penetrated much more of the market than the previous estimates completed in 2015, 2017, and earlier in 2022, which all hovered around 50%.

Our refined approach is in Table 4-6. As this shows, of the 287 projects, 26 (9.1%) were NB participants. Extrapolating that percentage to the entire Dodge population produces an estimate of 389 participating projects and 3,902 nonparticipating ones. Of the 39 contacts we reached who did not participate in NB, we confirmed that five (12.8%) were actually within the NB target market; the rest were outside the NB market for various reasons. Applying that percentage to the estimate of 3,902 nonparticipating projects produces an estimate of 500 "true" nonparticipants – i.e., projects that were within the target NB market but did not participate in NB. Adding this to the 2,300 participants (from Energy Trust project tracking data) produces an estimated total market size of 2,800 projects. This, in turn, produces an estimated penetration of 82.1%. We used the combined variances from the two estimated percentages (9.1% and 12.8%) to calculate a 90% confidence interval of ± 9.2% for the penetration estimate. Thus, assuming that the feedback from our 39 contacts provided an unbiased estimate of the percentage within the target market, the best estimate is that NB program penetration is somewhere from about 73% to about 91% of the market.

Table 4-6: Refined Market Penetration Estimate, 2019-2021

Parameter	# / %
Population in Dodge Data, 2019-2021	4,291
Percent of contacts identified as participants (26 / 287) ± variance of percentage	9.1% ± 0.03%
Estimated population NB participants in Dodge Data (9.1% x 4,291)	389
Potential nonparticipant population in Dodge Data (4,291 – 389)	3,902
Able to reach in potential nonparticipant population	39
Confirmed eligible ("true") nonparticipants	5
Percent of contacts confirmed "true" nonparticipants (5 / 39) ± variance of percentage	12.8% ± 0.29%
Estimated "true" nonparticipant population in Dodge (12.8% x 3,902)	500
Energy Trust project population, 2019-2021	2,300
Estimate of total market (2,300 + 500)	2,800
New market penetration estimate (2,300/2,800)	82.1%

Parameter	# / %
Combined variance of estimate (0.03% + 0.29%)	0.32%
90% confidence interval (± √0.32% * 1.64)	± 9.2%
New market penetration estimate: low (82.1% - 9.2%)	72.9%
New market penetration estimate: high (82.1% + 9.2%)	91.3%

If, for some reason, individuals outside of the target market were either harder or easier to reach than those within the target market (i.e., if a nonresponse bias were occurring), then the feedback from those 39 contacts *would not* have provided an unbiased estimate of the percentage within the target market. We conducted a sensitivity analysis to assess the possible impact of such bias. We repeated the above analysis under two additional scenarios, positing, respectively, that 33% and 5% of nonparticipating projects are in the target audience, rather than the 12.8% we estimated. The first alternative assumes that individuals inside the target market are much harder to reach than those outside the target market, causing us to underestimate the percentage. The second scenario assumes that individuals outside the target market are the harder ones to reach, causing us to overestimate the percentage. The first scenario produces a penetration estimate of about 64%, while the second scenario produces one of about 92%.[7] Thus, it is conceivable that the penetration rate is lower than the range shown in Table 4-6. However, that would mean that individuals *within* the target market are more than two and a half times harder to reach than those outside the target market (i.e., those with no completed project, not eligible for incentives, or outside Energy Trust territory). It is not clear why that would be the case.

4.4 Code Changes

The interviewed building code officials and commercial building experts provided insights into their perspectives about the code changes, areas of specific concern and their recommendations for code enhancements. This provides context for the insights about the market potential to exceed code and compliance with codes, discussed below.

4.4.1 Code Officials' Responsibilities

Local jurisdictional code officials have four primary responsibilities for buildings that are built or renovated in each jurisdiction:

- Review the plans.
- Administer the codes.
- Validate the plans after the permits have been issued through field visits.
- Approve the final plans.

[7] There is no concern about nonresponse bias regarding the estimated 9.1% participation percentage, since that was based on comparison of Dodge and Energy Trust records for a randomly selected sample, and so there was no possibility of systematic bias – only random error. However, as that random error leads to varying estimates of the potential nonparticipant population in the Dodge data, we accounted for it in the "alternative scenario" estimates, resulting in variations of half a percentage point or less.

However, local code officials focus primarily on plan review and on "protecting people and property by reviewing and inspecting the designs of buildings." Enforcing the Energy Code is just part of their overall responsibilities. "Energy codes are not the priority. Focus is on the plan. Protecting people and property and energy code is part of that."

The role of the Statewide Code Official at the Building Codes Division is to "develop and train building officials, answer questions about code guidance and issue state-wide interpretation of the code." State code officials are responsible for code development; however, state code officials do not conduct building inspections directly.

The seven code respondents were proud of Oregon's leadership in raising the standards for building codes.

> "Oregon's done a really fantastic job about going above and beyond for energy above and beyond what is required."
>
> "Oregon is involved at the national and state level of adoption…the Oregon Building Code puts us ahead of most of the country. It is among the top five on code adoption for energy (requirements.)"

The number of local building inspectors varies by jurisdiction, with the larger cities having as many as 150 building inspectors. But even smaller jurisdictions conduct hundreds of inspections yearly, as each building requires multiple visits to ensure code compliance throughout the project.

For example, a local code official for a medium-sized city estimated that they completed up to 24,000 inspections for both residential and commercial buildings. However, few code officials were able to break down the number of inspections related directly to energy codes, nor could they identify the number of individual buildings that they inspected during a specific year. Rather, code officials track projects by inspection rather than by individual buildings.

Another code official was able to identify eight major structures that were completed in 2022, while one code official could name the number of rooftop units (n=9) installed in the city but not determine the overall number of buildings.

4.4.2 Sources of Information About Code Changes

Most local code officials receive training about code changes from national and state associations. Code officials mentioned using the following sources of information about code changes.

- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) (local Oregon Chapters)
- Construction Specifications Institute (CSI)
- International Codes Council (ICC)
- National Fire Academy (NFA)
- National Fire Sprinkler Association (NFSA)

- Oregon Builders Association (OBA)[8]

4.4.3 Application of Building Code

The application of the 2019 or 2021 building energy code is based on the submittal date for the building permit. According to the building code officials, if the permit has been issued and the building is already under construction, then it will be "grandfathered in" to the older code (2019). However, any alterations in the submitted plan will trigger the new building code.

4.4.4 Impacts of Code Changes

The frequent code changes have increased the complexity for code officials and are stretching their abilities to ensure that the codes are properly followed.

> [The building code changes] added some stress and strife all around the industry, not only on the construction side, but on the building division side throughout the State."
>
> "The new building systems are so complicated … [The buildings] have all these controls and daylighting and special requirements that are hard to check to out in the field … the inspector doesn't have a clue what all that wiring is for."

Most commercial building experts said that five or more of their projects were directly affected by the code changes from 2019 to 2021, although some projects were "grandfathered" into an early code requirement.

One market expert respondent noted that some jurisdictions are moving away from natural gas equipment, which has had a direct impact on building designs. He also expects that water-cooling air handlers will also be phased out in future energy codes.

The market experts believed that the code changes will increase building costs by as much as 20% and increase the payback period for two or three years longer. The Energy Trust incentives reduced the overall cost of improvements. However, two market experts observed that some customers have had difficulty affording code upgrades even with Energy Trust incentives.

4.5 Market Potential to Exceed Code

Participants, market experts, and code officials provided insights about the possibilities and challenges to exceeding energy code in the coming years.

4.5.1 Participant Perspective

Interviews with participants, especially members of the design community, suggested that there was no consensus regarding the program's influence on a project's ability to exceed code. In general, participant

[8] It was unclear which organization this respondent was referring to here because, post interview, we could not find a specific organization called the "Oregon Builders Association." Perhaps the respondent was referring to residential code training and meant to say the "Oregon Home Builders Association." Or perhaps they meant a different organization and could not remember the official name.

respondents noted that whether a building exceeds code is more dependent on client's needs and building types, than incentive opportunities. Respondents explained that some clients are primarily driven by bottom line costs, while other clients are committed to their entity's sustainability goals. Moreover, for some projects, whether a building goes above code is based on the building's eventual use and ownership. Key motivators to designing above code included:

- Having clients with a focus on using energy performance as a marketing benefit for their property.
- Having clients with specific sustainability goals.
- Having clients with a focus on long-term operational cost control.

Nine designer respondents estimated that anywhere from 60 to 100% of the buildings they work on exceed code. These respondents predominantly represented public projects including government buildings, affordable housing, and schools. Moreover, these nine respondents agreed that efficient construction and sustainability was at the center of their organizations' mission and a goal of their clients.

Thirty-one designer respondents commented on the challenges of designing buildings that exceed code. All but three of these respondents highlighted budgetary issues as the biggest barrier to efficient construction. Respondents noted that there are not only sizable upfront costs (i.e., equipment costs, construction materials, etc.), but their clients, especially those not planning to own the building long-term, do not always understand (or care) about the benefits of efficient equipment and their long-term payback. Respondents also pointed to project timelines and supply chain issues as additional challenges to energy efficient construction however respondents did not specify if they thought the supply chain issues were residual from the pandemic or would persist into the future. Scheduling issues seemed particularly relevant to school based projects, with multiple respondents who design schools noting these projects have abbreviated timelines because work often must happen during school holidays and the projects need to be completed when schools are back in session. Some respondents noted challenges with specific equipment or building components -- notably HVAC systems, mechanical equipment, and building envelope – however these respondents admitted these issues were very project-dependent and not generalizable across all new buildings. Lastly, two respondents noted that Oregon's already stringent baseline code makes it challenging to exceed code.

Twenty-seven respondents talked about how they typically balance design decisions and budget constraints. All respondents indicated that this decision is ultimately project and client dependent. Multiple respondents noted that in general, when approaching project budget cuts and value engineering, they start with the "low hanging fruit," like finishes and other cosmetic elements. These respondents noted they prioritize keeping high efficiency equipment (like HVACs, windows, etc.) whenever possible, but sometimes these measures also have to be cut.

> "We look at fit and finish savings, like superficial aspects of the project…as we dig deeper, we get into air filtration systems. The last thing to go is the system designation itself. We really try to avoid that and push the most efficient long-term cost savings equipment." –Architect of office, Whole Building track
>
> "I think the process of what you do is really an art. So, I think the first thing you do is you look at what's required by code and you put those things in, then you go back to your funder and push

and say you guys want this, you got to pay for it." –Architect of affordable housing building, Market Solutions track

4.5.2 Code Official and Market Expert Perspective

Two code officials noted that designers tried to speed up the planning process as a way to get building permits issued under the 2019 code rather than the 2021 code.

The 2019 code change led to tighter requirements for air sealing and electrical power requirements. These new requirements have created some difficulty for some electrical contractors regarding lighting controls.

Several code officials explained that the ongoing supply chain issues associated with the pandemic have made it more difficult for builders to source specific equipment, such as appliances. Building owners have also reported that the costs are now 30% higher than they were pre-pandemic due to the supply chain shortage.

The market actors also shared how code changes will affect three major commercial building components: lighting, HVAC systems and the building envelope.

- **Lighting:** Code officials described the shift to the 2019 and 2021 codes as "dramatic" as lighting now conforms to ASHRAE 90.1. Although the lighting changes were easy to adopt and not viewed as a barrier, many officials viewed the new codes as complicated for the other equipment types with one official stating *"I think you have to be a mechanical engineer to understand a lot of that stuff."*
- **HVAC:** Both code officials and market experts viewed code changes relating to improved efficiency and ventilation requirements as needed improvements. This area had been "lagging" compared to other building systems in previous code updates. One expert said, *"I am happy for IAQ requirements. It's great that energy code is putting in some better requirement for ventilating units."*
- **Building Envelope:** Two commercial building experts explained that while setting higher standards for building envelopes will address moisture issues, they are concerned about the impacts of the new codes for building retrofit projects. Although most building retrofits can be accomplished relatively easily, if the building requires significant upgrades to the building envelope, then installing new windows or increasing insulation in buildings can be "*cost prohibitive*." Therefore, this could result in projects not going forward or in designers attempting to make non-shell changes to comply with or exceed code.

Code officials and market experts discussed the effect that three emerging trends may have on commercial building codes going forward:

- **Electrification:** Both code officials and commercial building experts believe that electrification will lead to lasting changes in the building codes going forward. Four code officials worry that the current building infrastructure is not able to support electrification in the commercial building stock. One code official stated, "*[Electrification will] absolutely change the codes. It's going to be really hard to implement. (Electrification) makes it a mess."*
- Commercial building experts currently working in high-performance buildings view electrification code impacts as minimal. But other experts view the rapid push towards electrification as a "mistake"

because renewables are not yet ready to fully replace other fuel choices on the electric grid. One market expert stated, *"The codes should be very careful about selecting electricity over fossil fuel. Changes are better driven by economics and energy policy. The codes should remain fuel agnostic, and we need that flexibility before the grid is renewable."*

- **Emerging Technologies:** The market actors identified several new technologies that will become even more important in commercial buildings, including:
    - IoT (Internet of Things), which includes automated algorithms for controlling HVAC systems and better systems integrations between buildings and EV charging.
    - Linking Time of Use with Smart Buildings to link electric vehicles and electrified transportation, which could include energy storage.
    - More affordable LED lighting with lighting controls.
    - Smart meters to track EV charging.
    - Constructing modular buildings off-site is a less expensive alternative.
    - Highly efficient heat pumps, heat pump boilers and economizers
    - On-Site Renewables
    - New refrigerant technologies.
- **On-site Renewables:** Three code officials, two local officials and one state official, are concerned about the risks associated with installing on-site renewables in commercial buildings. Two respondents expressed concerns about the effects that solar PV installations will have on a building's structural integrity and life and safety concerns such as fire access. One code official raised concerns that deploying solar PV installations in multifamily units will be difficult, given the current net metering laws that limit PV installation to individual units. "*Oregon doesn't have a lot of solar, and there are no comprehensive standards for off-site solar*." (Code official)
- The market experts were also divided regarding the current capabilities of on-site renewable technologies. As two respondents pointed out, although the Oregon state buildings have to be "solar ready," confusion remains about to how these codes will be developed and enforced. Another respondent does not believe that solar-thermal heating will be included in building designs until it is "mandated."
- One market expert believes that the push towards integrating distributed generation with energy storage to create "microgrids" will be an important element in future building designs. "*Codes can help move those things along by removing barriers and also pushing for the incorporation of those technologies…both buildings and grid renewable ready codes could play a role in making that happen."*

4.6 Compliance with the New Code

We received input about complying with code and selecting a compliance pathway – prescriptive or performance – from designer and building owner participants, to code officials and market experts.

4.6.1 Participant Perspective

Most 2023 participant designer respondents reported using the performance pathway to comply with code. Over half of 2023 participant respondents elected to comply with code using the performance pathway (57%, n=20), just over one-third used the prescriptive pathway (37%, n=13), and the remaining respondents were unsure of the pathway chosen. Private building projects were evenly split between using the performance and prescriptive pathways whereas public buildings heavily favored the performance pathway. Moreover, government and school projects tended to use the performance pathway, while market-rate multifamily buildings heavily favored the prescriptive pathway. Affordable housing projects were split between the two pathway options (Table 4-7).

Table 4-7: Code Compliance Pathway by Building Type, 2023 Participants

	Performance	Prescriptive	Don't know	Total
Public	14	6	1	21
School (K-12)	5	3	0	8
Affordable housing	3	2	0	5
Government	4	0	0	4
Healthcare	0	1	0	1
College	1	0	0	1
Industrial	0	0	1	1
Office	1	0	0	1
Private	6	7	1	14
Market rate multifamily	4	6	1	11
Office	1	1	0	2
Industrial	1	0	0	1
TOTAL	20	13	2	35

Most building owners reported limited knowledge of the energy code in general and that using the program for their project did not contribute to their knowledge of 2019 or 2021 energy codes. Fifteen of the 22 respondents explicitly stated that they had limited knowledge about energy codes and reported that others on the project team, typically an architect or engineer, had more knowledge about code compliance. While many respondents reported limited knowledge of code, there was some evidence that when code changes meaningfully affected construction, these respondents would hear about it from their design team. For example, one affordable housing representative reported that he worked with his design team to adjust the size and shape of windows in common areas to adapt to the new code. The original design called for larger windows but during construction it became apparent they could not meet the new code with the originally designed windows.

Most building owner respondents reported using a performance-based code compliance pathway and the program track or service used did not seem to affect the pathway reported. Of the 22 respondents, 14 used or were using the performance (modeling) pathway, four used or were using the prescriptive pathway (based on having specific features installed) and four did not know their code pathway. It was unclear if some of the respondents correctly identified their code pathway. (Table 4-8).

Table 4-8: Code Compliance Pathway by Program Track and Service (n=22)

	Performance	Prescriptive	Don't Know	Total
Market Solutions	4	1	1	6
Whole Building/PTNZ	8	1	1	10
Systems Based	2	2	2	6
Early Design Assistance	10	3	4	17
Energy Modelling Assistance	7	0	1	8
Total	14	4	4	22

4.6.2 Code Official and Market Expert Perspective

According to code officials, project representatives select the performance pathway primarily for large new buildings being built "above code" to meet a specific specification, such as LEED. Code officials view the performance pathway as better suited for large, more complex projects as this pathway is more complicated and expensive to use. As one code official explained," There's just a lot more work to do to show you can meet the code [using the performance pathway], and most are unwilling to do that unless it's going to benefit them in some way."

One code official explained that project teams choose the performance pathway for buildings that will be constructed above code anyway and that the performance pathway allows designers to build in extra features, such as additional windows, that a prescriptive pathway would not allow.

Project teams use the prescriptive pathway for smaller buildings with the intended goal of meeting current building requirements and complying as cheaply and easily as possible.

One code official estimated that 100% of all of the retrofits in his jurisdiction would go through the prescriptive pathway because it does not require expensive energy modeling.

Three market experts preferred using the performance pathway because it provides more flexibility in the building design. The performance path provides designers with the ability to specify above code equipment in one area of the building, for example high efficiency refrigeration, and less efficient equipment in another area of the building but still be above code building wide.

5. Program Research

Insights into the program related research objectives came from:

- **Spring/summer 2022 interviews with participants**: These interviews focused on owners and owner representatives, and we learned about their organizations, experience in new construction, experience using program services, and thoughts about what works well with the program and what could use improvement.
- **Winter/spring 2022 interviews with participants:** These interviews focused on designers, and we learned about their organizations, experience using program services, and about decision making related to program involvement, code compliance, and efficiency improvements.
- **Code officials and market experts:** Our interviews with code officials and market experts informed us about their awareness of Energy Trust programs and services and their insights into how Energy Trust can address their DEI objectives.

This Section describes what he heard from these sources, beginning with an overview of each respondent group, as context for the findings.

5.1 Respondent Characteristics

Respondents interviewed in spring/summer 2022 mostly represented building owners whereas those interviewed in winter/spring 2023 were designers or affiliated with designers. Few respondents in either group represented COBID certified firms, and the participant building types varied across the commercial sector from schools and offices to government buildings and multifamily housing (Table 5-1).

Table 5-1: Participant Characteristics

Characteristic	Spring/Summer 2022 (*n*=22)	Winter/Spring 2023 (*n*=35)
Role		
Architect/Designer	2	21
Owner Representative	11	4
Construction Manager	0	3
Energy Consultant	0	2
Building owner	9	1
Organization Type		
Architecture Firm	0	24
Developer	0	5
Engineering firm	0	2
School District	0	2
Non-Profit	0	1
Owner rep	0	1
Affordable housing agency	8	0
Government	8	0
Developer	5	0

Characteristic	Spring/Summer 2022 (*n*=22)	Winter/Spring 2023 (*n*=35)
College	1	0
COBID Status		
Certified by COBID	1	2
Not Certified by COBID	21	33
Participating Building Type		
Public	13	21
School (K-12)	2	8
Affordable housing	8	5
Government	2	4
Healthcare	0	1
College	1	1
Industrial	0	1
Office	0	1
Private	9	14
Market rate multifamily	3	11
Office	5	2
Industrial	0	1
Lodging	1	0

5.2 Program Influence on Code Compliance Pathway Decisions

According to the participant interviews, building type and project type influence code compliance decisions, not involvement with Energy Trust. Code compliance pathway selection and program track do align somewhat in that the more incentives the project is receiving from Energy Trust and the greater the likelihood the project is doing energy modeling, the more likely the project will comply with code using the performance pathway. But this pattern does not always hold with some systems-based project respondents reporting using the performance pathway and some whole building/PTNZ respondents complying with code via the prescriptive path (Table 5-2).

Table 5-2: Code Compliance Pathway by Program Type

Track	Perf.	Presc.	Don't know	Total
Systems-based	4	8	4	16
Market Solutions	5	5	1	11
Whole Building/PTNZ	22	4	1	27
TOTAL	34	17	6	57

One respondent, representing a market-rate multifamily building that followed the prescriptive pathway, underscored the need for a compelling reason to follow the performance path over the prescriptive pathway for market rate multifamily buildings, explaining that it is cheaper and easier to comply with code using the prescriptive path. Additionally, another respondent who used the prescriptive pathway to

comply with code for their recent project explained that the prescriptive pathway is easier and less risky than the performance pathway; this respondent explained that for their projects, the performance pathway only makes sense if there are unique project elements or some design tradeoffs required such as renovating a historic building, but this is uncommon in their design portfolio. Ultimately, respondents noted that the building type was far more important in deciding which compliance pathway to take.

5.3 Program Use and Influence

A key aspect of this research task was to learn how the program may have influenced decision making about efficiency and solar measures among program participants that received more than just prescriptive systems-based incentives through the program and were subject to 2019 or 2021 codes. This Section summarizes what we learned from our participant respondents about how program tracks and services may have influenced their decision making.

Most participants, both owners and designers, were experienced users of Energy Trust services. Eighteen of 22 spring/summer 2022 participants and 28 of 35 winter/spring 2023 participants reported doing multiple projects with Energy Trust over the last several years. Some respondents reported completing more than 10 new construction projects that received incentives from Energy Trust.

Participant respondents reported taking advantage of a variety of incentives offered by Energy Trust. The most popular incentive used was early design assistance, followed by the whole building and path-to-net-zero program track and energy modelling assistance (Table 5-3).

Table 5-3: Reported Program Track and Services Used

Program Track and Service	Total (n=57)
Whole Building/PTNZ	27
Early design assistance	25
Energy modelling assistance	17
Market Solutions	11
Early design assistance	5
Energy modelling assistance	1
Systems-Based	16
Early design assistance	15
Energy modelling assistance	2
Unable to report Program Track	3
Early design assistance	3
Energy modelling assistance	1

The sections below discuss what we learned from participants about each of these program tracks and services including how, if at all, these tracks and services influenced their decision making.

5.3.1 Whole Building and Path to Net Zero

Seventeen designer respondents, representing nine public projects and eight private projects, indicated they enrolled their project in the Whole Building or Path-to-Net Zero program track (Table 5-4).

Table 5-4: Whole Building and Path-to-Net-Zero

Building Type	Count
Public	9
School	4
Government	3
Affordable housing	2
Private	8
Market-rate multifamily	6
Industrial	1
Office	1

Among these respondents, 11 provided more details about their experience with these tracks. Six of these eleven respondents noted that this was their first net zero construction project, while five indicated they had previously been involved in net-zero construction projects. Among the five respondents indicating they were previously involved with net-zero construction, four had built market rate multifamily buildings for clients and one had built both a government building and an affordable housing building.

Respondents reported that Energy Trust did not influence the building owners' interest in net-zero or close-to-net zero construction. Instead, the building owners had sustainability goals or other commitments to energy efficiency that influenced their decision to pursue net-zero or close-to-net zero construction. The influence of the program is less about making a participant consciously choose the PTNZ track and more about facilitating the process to make PTNZ a possibility for participants.

Respondents noted that one of biggest challenges to building net zero buildings is upfront cost and making sure the building produces enough energy to offset the usage. Moreover, all respondents indicated that net-zero buildings take longer to build as there is more time needed for back-and-forth communications between designers and energy consultants.

> "The amount of energy, what are you producing on site. The client didn't want to buy [energy], he wanted [the building] to work. Physical challenges: cost of land, cost of construction, and the energy model [all affect project timelines]." –Architect of market-rate multifamily building, Whole Buildings/PTNZ

5.3.2 Market Solutions

All five designer respondents who indicated they participated in the Market Solutions track represented multifamily buildings, a reflection of the fact that the Market Solutions track recently changed to being exclusive to multifamily properties.[9] Three of the respondents represented affordable housing buildings and two represented market rate multifamily buildings. All but one of these buildings followed the prescriptive code compliance pathway; the building that chose the performance code compliance pathway was an affordable housing building. These respondents were unable to provide many details about their experience with this program track, often not knowing the program track name unless

[9] Prior to 2021, the Market Solutions track included building types other than multifamily.

prompted with clues by the interviewer. One affordable housing representative mentioned that Energy Trust does not influence their efficiency decisions because their funders often require them to build above code. For example, one state agency funder requires above code construction. This respondent indicated that Energy Trust facilitates the construction of an efficient building but is not necessarily an influence to build efficiently.

5.3.3 Early Design Assistance

Participant respondents from both data collection efforts provided their insights about early design assistance and we summarize what we learned from the two groups here.

5.3.3.1 Building Owner Participant Perspective

Most 2022 respondents that received early design assistance and had held their design meeting reported the assistance led to positive outcomes for their projects and about half provided specific examples about how the assistance was helpful. Thirteen of the 15 that received early design assistance reported that it was positive and six of the 13 reported specific aspects they appreciated. Early design assistance provided them:

- Validation and reinforcement of design ideas they had in mind before the project started (2 mentions).
- An opportunity to inform all stakeholders working on the project about Energy Trust and program requirements (1 mention).
- An opportunity to have the commissioning agent speak with all other project stakeholders and help the team understand what the commissioning agent would be looking at upon project completion (1 mention).
- The opportunity to use one meeting to discuss two projects that were happening simultaneously with the same design team. Because it can be hard to schedule all the stakeholders for a meeting, the flexibility of holding one longer meeting to review both projects was appreciated (1 mention).
- The ability to talk about solar options for their project. According to this respondent, the early design assistance ultimately led to the inclusion of solar on their project (1 mention).

5.3.3.2 Designer Participant Perspective

Thirty-one designer respondents indicated they received early design assistance, and twenty-three of the respondents provided additional details about their experience with the assistance. Respondents emphasized the important role the early design meeting played in bringing team members together at the onset of the project. These meetings served as an opportunity for all team members (designers, consultants, contractors, owners, and others) to discuss project goals, design plans, general organization, and timelines.

> "One of our goals is to have sustainability… on every project. And having the incentive to do that early design meeting and then continue the analysis past that makes that so much more possible than if that didn't exist… We're also able to talk about other sustainability goals as well, so it makes it really, you know, more broad and holistic too."

– Architect of a government building, performance pathway, Whole Buildings/PTNZ

Although some respondents noted they hold similar early design meetings for their projects, having the time and money to devote additional resources to the planning process helped facilitate project development and planning. Moreover, some respondents noted that this incentive opportunity feels unique to Energy Trust, explaining that to their knowledge, this sort of incentive does not exist elsewhere.

> "[The EDA incentive was a] good way to force the project team to be organized about what they were doing and get on the same page about what was happening. Get everyone marching down in the same direction. Good way to circle everyone up and kick things off." – Developer of market-rate multifamily building, Whole Building/PTNZ

Three respondents provided feedback to improve the early design assistance.

- An architect for a school building project that went through the System Based program track reported that they would like Energy Trust to capture discussions from the EDA meeting, specifically what incentives and support the project could receive, and, upon project completion, compare that to the incentives and support the project received.

  > "We sometimes do not know what may have gotten value engineered out of the process during construction. It would be good to have an accounting of what we came up with in the design that received incentives and what the actual outcomes was."

- An owner representative working on a school project would like to see more flexibility when the EDA meeting gets scheduled.
- An architect of a government building project that went through the Whole Building program track wished the EDA meeting would focus more on carbon emissions rather than energy savings:

  > "The conversation about gas is really changing and a lot of our projects, a lot of our clients, [the] sustainability community in general is talking about how the to go all electric and is it feasible? ... The conversation is shifting more to carbon emissions instead of energy, and ETO still focused on energy as the metric that we're talking about."

5.3.4 Energy Modelling Assistance

Participant respondents from both data collection efforts provided their insights about energy modeling assistance and we summarize what we learned from the two groups here.

5.3.4.1 Building Owner Participant Respondents

2022 Respondents that used modeling assistance appreciated the support with one respondent describing the support as a "critical" aspect of the program. Five of the seven respondents that reported receiving modelling assistance reported it led to positive outcomes for their projects. Four of the five appreciated the ability to run "what-if" scenarios such as how adding insulation to the roof would affect the rest of the design. The four specified that modeling assistance helped the team to:

- Ensure the project complied with code.
- Appropriately size the solar array for the project.

- Examine the project more holistically than they could have otherwise and provide information they could take to their executive team without confusing them with technical jargon.

Additionally, one respondent reported that the Energy Trust support ensured modeling happened, stating that without program support for modelling, it would not have happened.

One building owner respondent reported the design assistance was not especially helpful because they had already ordered many pieces of equipment before receiving the modeling support, so they were not able to adjust their design.

5.3.4.2 Designer Participant Perspective

Eleven respondents remembered receiving energy modelling assistance, were able to provide some details about the assistance received, and they all reported high levels of satisfaction with the assistance. One respondent noted they would not have done energy modelling if not for the incentive, another respondent noted the energy modeling is what pushed the project to construct to a net-zero level, while another respondent indicated the energy model allowed them to assess daylighting options, which they otherwise would not have been able to pursue.

Two respondents reported they wish the energy modelling component happened earlier in the building process so they could better plan their design, while one designer respondent indicated Energy Trust needs to emphasize energy modelling to program participants and provide additional financial support for it.

5.3.5 Solar Decisions

Participant respondents from both data collection efforts provided their insights about solar support they received from Energy Trust and we summarize what we learned from the two groups here.

5.3.5.1 Building Owner Participant Perspective

Most 2022 respondents reported using solar or expressed interest in solar for their existing or upcoming projects. Of the 22 respondents, 18 either installed (8), will install (4), or are considering installing (6) solar on their project, using Energy Trust's solar program for support. Of the four respondents that did not consider solar for their current project, two, one school representative and one developer, indicated their upcoming projects will include solar.

Five respondents, mostly affordable housing agencies, noted that the solar support from Energy Trust was pivotal to their decision-making process about whether to install (or not) solar. Four affordable housing agencies reported that Energy Trust support for solar gave them information and incentives that led to installing solar or seriously considering solar for their project.

Energy Trust support for solar is important to respondents, even when required to install solar. Of the eight governmental organizations, four specified that they were installing solar, in part, because of the Green Energy Technology Requirement (GET) that requires public entities to spend 1.5% of public building construction costs over $5M on green energy technology, a requirement most often satisfied by installing solar. Even in these cases several government entities suggested the Energy Trust support made the solar installation process easier because the support gave them a roadmap to follow. For example, one school

respondent stated that the Energy Trust program representative "was super helpful for explaining" the necessary steps to complete a solar array.

The solar support from Energy Trust enabled one owner respondent to appropriately size their array. Without the solar support, combined with the modeling support, this developer respondent was concerned that they would not have emphasized efficiency enough and built too large a solar array to compensate for the lack of efficiency.

5.3.5.2 Designer Participant Perspective

Of the 28 designer respondents who reported on their buildings' solar status, 22 had solar panels installed (n=15) or included the necessary infrastructure to support solar in the future (n=7). The six remaining respondents indicated not pursuing solar because it was too expensive (3 mentions) or there were physical building challenges to include solar on their project.

Respondents cited a variety of reasons for installing solar panels or making their building solar ready. For example, public agency representatives reported that the Green Energy Technology (GET) requirement that mandates a public project spend 1.5% of its cost on renewable energy requires these projects to include solar panels (or some other renewable energy source). Respondents representing private projects that included solar reported doing so because of interest in making a "green building" and because the financial support from Energy Trust made them realize the long-term energy savings they could realize.

5.3.6 Presenting the New Buildings Program to Clients

Designer respondents noted that clients' awareness of Energy Trust's programs and offerings varied. Respondents working with public entities (n=21) agreed that their clients, particularly schools and affordable housing buildings, were familiar with Energy Trust's incentives and often built them into their budget and planning processes. These clients frequently have governmental funding and/or regulations that dictate they build efficient and "green" buildings. These respondents noted that it is easier to talk about the New Buildings Program with clients who have worked with it before, as there is less skepticism and hesitancy; they know what the program entails and do not need to be convinced of its value.

When clients are less familiar with the New Buildings program, respondents (n=12) indicated they try to bring it up early and often to maximize incentive potential. Although some clients express interest in the program, this interest sometimes wanes when they understand what is involved and how expensive some of the additional components may be:

"Let's say it's $150,000 out of their pocket, but then they only get $15,000 and then incentives. It's not a good return for them. They get a little nervous and they're more likely to pull the plug if they don't see a reasonable cost benefit. –Architect of a school, Systems Based assistance

5.3.7 Cost Implications of Participating

About half of designer respondents indicated that participating in the Energy Trust program does not typically change the cost of their construction project in either direction (Table 5-5). Respondents who reported a decrease in project cost emphasized the benefit of the early design assistance, indicating this sort of meeting would have cost far more if they had to organize it on their own (see Section 5.3.3). Some

of the respondents who noted there was no change in project costs because of the incentives explained that they often include the incentives in their initial cost proposal, so it is difficult to disentangle things. Additionally, the respondents who indicated the project cost more despite incentives explained that although the upfront costs were higher, the client recognizes the long-term benefits and savings of investing in efficient products and this process was facilitated by the New Buildings Program.

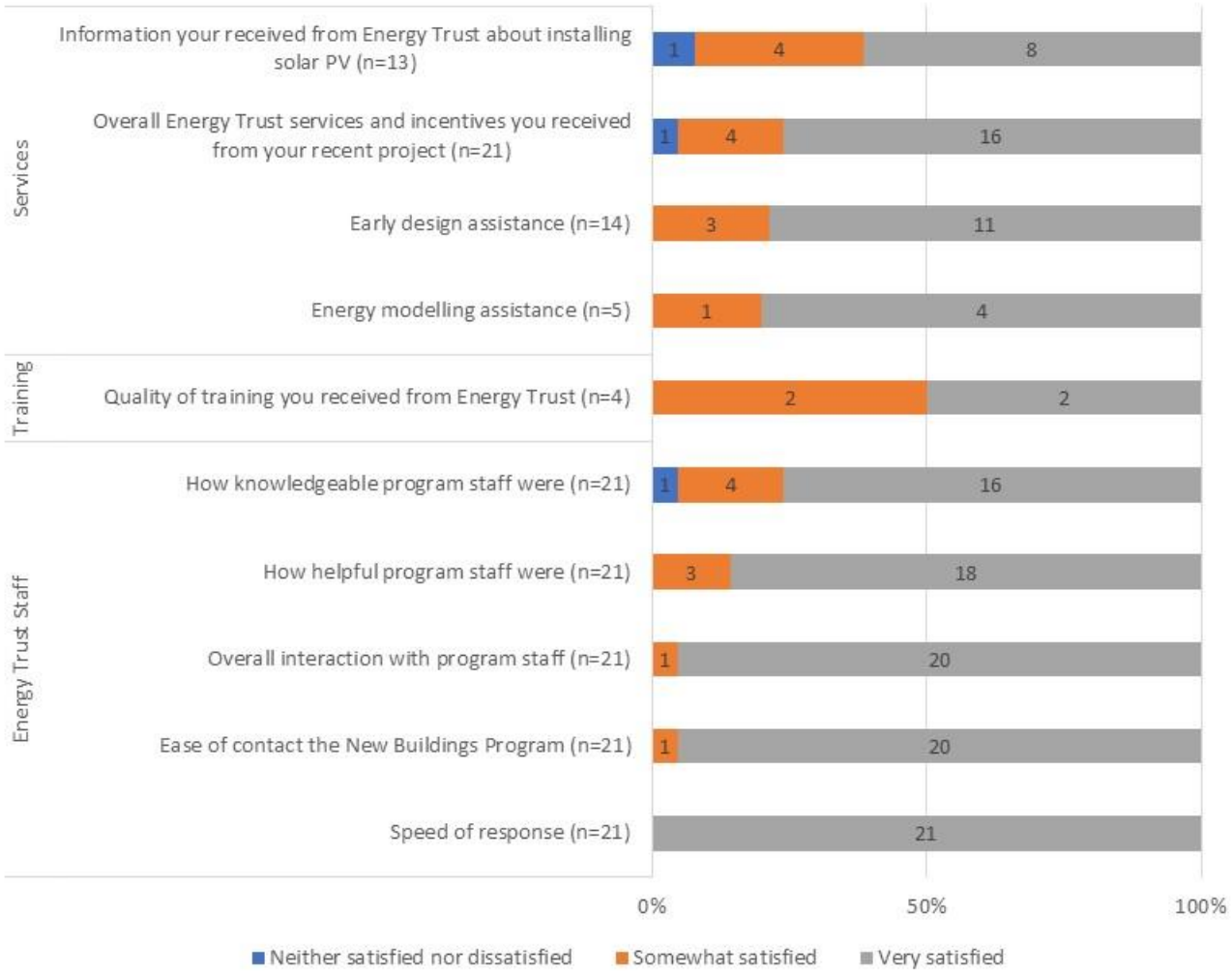
Table 5-5: Cost Impacts of Participation

Cost Impact	*n*	Quote
Cost decreased	5	"I mean we certainly would not have been able to afford any of the consultants that would, that we worked with in the predesign phase, particularly…There's no way we could have afforded to work with those consultants and that was really invaluable for helping us in the predesign phase of the project." —Architect of market-rate multifamily building, Whole Building track
No change in cost	16	"Working with ETO is a wash. We don't track the time we spend working with ETO and meeting their requirements. But generally, it is baked in the process and the incentives are worth it." —Architect of market-rate multifamily building, prescriptive pathway, Whole Building track
Cost increased	3	"Netting out the increased costs that we wouldn't have otherwise done, upfront costs it's more expensive. We spent more on the project than we got back incentives. It's a long-term approach. We haven't compared incentives to plus long-term payoff of solar or efficiencies. Strictly from day one cash coming in versus out, it was a more expensive project." —Developer of market-rate multifamily building,

5.4 Program Satisfaction

Unlike the interview guide used for the 2023 participants, we asked spring/summer 2022 participants to rate their satisfaction with program element on a scale. These participants reported high levels of satisfaction with the program's staff, services, and training when asked to report their satisfaction with program elements on a scale of not at all satisfied to very satisfied. Only three participants across three different elements of the program were neutral about their satisfaction with that element (Figure 5-1).

Figure 5-1: Program Satisfaction



In general, 2023 respondents were satisfied with their participation in the New Buildings Program and their relationship with Energy Trust more generally. Multiple respondents commented on Energy Trust's responsiveness, knowledge, and problem-solving skills, and respondents very much appreciated Energy Trust's support both programmatically and financially. Respondents also appreciated how Energy Trust tries to have a presence in their communities; they are public facing and attend events. Respondents also appreciated Energy Trust's regular communication and check-ins to ensure projects were running smoothly.

> "I like how ETO is not just about the programs, but you have folks in communities attending other events and hearing what's going on in communities and hearing people's needs. Incredibly meaningful."– Architect of government building, Whole Building track

> "Having a program that has checklists and things we need to consider. Having a third-party involvement is a value. A third party [like Energy Trust] verifies, or asks questions, it is the collaborative process that makes ETO valuable. They are sounding boards. The incentives are

helpful, and they offset some cost but the sounding board and collaboration is key." – Architect of market-rate multifamily building, Whole Building

5.5 Progress Towards DEI Goals

Less than half of 2023 respondents were able to provide suggestions for how the Energy Trust can better engage and support minority and women-owned businesses and trade allies. Suggestions included increased outreach and communication with targeted groups (n=7); providing designer and architect community a list of minority and women-owned businesses they could potentially contract with (n=5); and trust-building in those communities (n=1). This respondent did not elaborate on how to build trust.

Four code officials were worried that the increased code requirements could make building improvements cost-prohibitive for small business owners, especially those in rural areas. These building officials wanted the code to "be less restrictive" as the current codes have become so stringent that they are leading to the Law of Diminishing Returns.

5.6 Program Improvement Suggestions

Participants, code officials, and market experts made suggestions for things to consider that would improve the program.

5.6.1 Participants

Many participant respondents reported the program could adapt to changing market conditions by supporting or emphasizing certain measures, changing program processes, or altering outreach efforts. Respondents identified measures, outreach ideas, or process changes the program should be thinking about in the future.

Respondents identified seven measures the program should emphasize or support anew. Note that several of these suggestions are items Energy Trust may already be supporting and these respondents are just not aware of that support, or they may be suggestions Energy Trust may not have the authority to implement.

- Three respondents reported that Energy Trust should continue to support and expand support to help customers install solar. This could include supporting more solar ready buildings (installing all but the solar panels) to make solar installation easier and less expensive in the future.
- One affordable housing agency respondent reported that developing ways to efficiently cool buildings continue to be a challenge. According to this respondent, Energy Trust should continue to work to identify and support efficient cooling options, knowing that more owners will want to include cooling in future multifamily buildings.
- One affordable housing agency respondent stated that Energy Trust should encourage good installation of air sealing measures, and greater adoption of heat pumps and heat pump water heaters.
- An architect noted that anything Energy Trust can do to assist builders with water conservation will be important. This respondent recognizes that water is outside of Energy Trust's purview but thinks

there needs to be ways to encourage water conservation, especially in the drier eastern part of the state.

- An affordable housing agency respondent reported that Energy Trust should be looking for ways to help builders install electric vehicle infrastructure. While installing new electrical load is not in line with Energy Trust's efficiency mission, the move to electrification is tangentially connected to Energy Trust's mission.

Respondents identified three process-related improvements the program could undertake.

- Three respondents, a government agency, developer, and affordable housing agency, specified that the program should pay close attention to market conditions and adjust incentives and processes accordingly. For example, one respondent mentioned increasing incentives for measures that have been notably impacted by inflation.
- A government agency representative and affordable housing agency representative suggested Energy Trust encourage tracking energy usage post occupancy and providing incentives to affect behavior of occupants of these new buildings. This would help verify the investments made in efficiency and identify areas where changing behavior may help reduce energy consumption further.
- One affordable housing agency mentioned that Energy Trust might be able to do more to encourage developers to install more in-unit efficiencies, like appliances, so that tenants would be more likely to attain some of the benefits of efficiency. This respondent suggested preparing in-unit home energy scores that would allow tenants to see how efficient (or not) their unit is compared to others.
- Other respondents suggested additional incentive offerings including more funding for up-front preconstruction costs, cooling equipment, electrification, and post-construction energy-use tracking.

Respondents provided three suggestions to improve program outreach.

- A government agency representative and market rate multifamily developer reported that Energy Trust should look for ways to increase use of Energy Trust programs among private developers. One suggestion was to link experienced builders and users of the program with those that have not used or have only minimally used the program to demonstrate the ease and utility of participating.
- A government agency representative suggested providing more regional examples of the life-cycle cost savings specific to the region that is associated with program participation, especially Whole Building participation.
- An affordable housing agency representative reported that Energy Trust could do more to encourage COBID certified businesses to participate in the program by providing incentives to building owners that use COBID certified designers, contractors, and suppliers.

Lastly, a few respondents (n=5) noted their contact person at Energy Trust has changed multiple times. Although these respondents acknowledged staff transitions occur and COVID-19 has complicated communication, they expressed frustration in not always knowing who their primary contact was and how to get the information they needed about their projects. Communication issues were particularly salient among more rural respondents who noted that they do not feel as though they get the same level of support as their Portland-metro area contemporaries.

5.6.2 Code Officials and Market Experts

Awareness levels of Energy Trust's programs were mixed among code officials and market experts. Most code officials were unaware of any training provided by Energy Trust regarding codes and standards. Similarly, three market experts were "very familiar" with the Energy Trust's programs, while three were not (Table 5-6).

Table 5-6: Comparison of Awareness Levels for Building Code Officials

	Building Code Officials (n=8)	Commercial Building Experts (n=6)
Never heard of the program	5	1
Knew the program name but not much else	1	2
Somewhat familiar with the program	1	0
Very familiar with the program	1	3

Three market experts reported that Energy Trust provided guidance regarding the different program pathways, and one specifically mentioned participating in training for early design assistance.

Code official and market expert respondents had a variety of recommendations for how Energy Trust can better support the new construction community and promote high efficiency construction moving forward (Table 5-7). The most commonly cited suggestion, supporting electrification, is something that most of these respondents acknowledged Energy Trust could not do as part of their mandate, but they also noted that electrification is where the field and market are heading.

Table 5-7: Future Support

Support	Count
Electrification and support for buildings moving away from natural gas	6
More comprehensive and system wide incentives, rather than parts and pieces	3
Measure specific incentives (EV, heat pumps/cooling equipment, smart controls)	2
Increased outreach and promotion of existing programs, as some people are not aware of the programs or less knowledgeable and therefore more skeptical	2
Reframing of programs away from energy savings and toward carbon emissions reduction	1
Demand control and automation programming and assistance	1

Code officials wanted to learn more about the ways in which Energy Trust could offer training and incentives to support the code changes. Specifically, building code officials want more specialized code training from Energy Trust, emphasizing understanding code changes. These code officials struggle to find ways to educate their staff, especially junior staff, about the energy codes.

The code officials would prefer in-person training classes because they viewed that as more engaging compared to other training modes. Three code officials emphasized the need for continual and ongoing codes training.

> "…training from the Energy Trust would be extremely beneficial to many jurisdictions throughout the State" – Code official

"The Tri-County area would be very excited about having more training opportunities for our staff, so that we can work together with the construction community to provide more energy efficient buildings…One of the things that's very important to us would be to have that training on the energy codes and the changes with the ASHRAE standard." – Code official

In contrast, the market experts wanted Energy Trust to continue its advocacy for code improvements, continue its incentives for commercial building improvements and continue to offer its "high-quality training." One commercial building expert believes that Energy Trust should do even more to bring key decision-makers to the table through their financial incentives.

"…I think that's an opportunity to reach decision-makers about the absolute potential of Deep Energy Retrofits." – Market expert

6. Conclusions and Recommendations

Based on the findings of this evaluation effort, we present our conclusions and recommendations organized by research objective here.

6.1 Market Characterization and Market Penetration Estimate

Conclusion #1: Previous market penetration estimates have likely been underestimating the actual reach of Energy Trust's New Buildings program because previous work did not attempt to contact nonparticipants. Our work suggests that the program's penetration into the target market could be in the range of 73% to 95%, a notable increase from the roughly 50% estimate provided in previous research. This higher estimate is a result of our data collection efforts that found very few nonparticipants. While most projects are going through Energy Trust programs, there is still opportunity for projects to go after deeper savings by participating in Whole Buildings, Path to Net Zero, and Market Solutions tracks.

> **Recommendation #1.1:** For future market penetration estimates, use a survey or other means to verify that the people and projects identified as nonparticipants are within the program's target market.
>
> **Recommendation #1.2:** Continue to emphasize the importance of going beyond systems-based incentives by encouraging participants to pursue the deeper savings available to them. Focus outreach efforts on not just the potential for long-term energy savings but some of the non-energy benefits participants told us about: improved workflows that resulted from the early design meetings, identifying that solar was possible for a project, and assistance in meeting an organization's sustainability goals.

6.2 Adaptation to Recent Energy Code Changes

Conclusion #2: The interviews with building owners and designers suggest that the market is adapting to recent energy code changes with relative ease. Many owners and designers indicated that code changes were a relative afterthought because they were often focused on constructing the most efficient building possible and working back towards code in certain applications if a certain building element became too expensive or a certain piece of equipment would not be available when needed. It is possible that the participants and designers that work exclusively on systems-based projects and do not avail themselves of services like early design assistance and modeling assistance may have a different perspective about adapting to energy code.

> **Recommendation #2.1**: Consider surveying or interviewing participants and designers that apply only for equipment incentives to determine whether they struggle with code changes and, similar to recommendation 1.2, consider additional outreach to these participants and designers that focuses on how other Energy Trust services can help them address their code change concerns.

6.3 Program Participant and Trade Ally Experiences with the Program

Conclusion #3: Early design assistance, energy modeling assistance, and solar assistance are the critical aspects of the Energy Trust support received by participants, and respondents were highly satisfied with

all elements of the program. Almost all respondents that received early design assistance or modeling assistance described these services positively, and many provided specific examples of how that assistance improved their project. For example, it helped them validate assumptions, contributed to the inclusion of solar on the project, and helped the design team convince decision maker stakeholders to invest in efficiency. No respondent reported dissatisfaction with the program's services.

> **Recommendation #3.1:** When trying to convince participants to do more efficient projects, highlight the important non-financial role that early design assistance, energy modeling assistance, and solar assistance have provided design teams. These program services provide relatively small financial incentives relative to a multi-million dollar building, but the design team's reported benefits of these services suggest that these services are worth far more than just lowering the cost of the project.

6.4 Program Influence on Construction and Equipment Decisions

Conclusion #4: The need of each project affects a design team's decision-making about which code compliance pathway to choose more than anything else. Design teams choose their pathway based on what they think is going to be the easiest method to meet code obligations for a given project.

> **Recommendation #4.1:** The program could help participants that are receiving systems-based incentives only and that are not familiar with energy modeling or are concerned about the cost or additional work of modeling, that conducting energy modeling would not affect how they comply with code. Some participants unfamiliar or concerned about modeling may think that modeling will entail more complicated code compliance and that is not the case.

6.5 Program Outreach and Assistance to Market

Conclusion #5: Participants and designers were especially satisfied with the outreach the program provides, in particular, the support Energy Trust outreach staff provide to project staff. According to participants and designers, outreach staff help project staff with incentive paperwork, coordinating design meetings, explaining Energy Trust support to decision makers, and other activities. In fact, in many instances, this support is perhaps more valuable to project staff than the equipment incentives.

> **Recommendation #5.1**: Continue providing strong outreach support to project teams.

6.6 Program's DEI Goals

Conclusion #6: The market characterization indicates that the program is reaching most of the new construction market and a variety of organization types, both public and private, suggesting that the program is reaching organizations owned by and serving communities of color, women, and rural communities. However, Energy Trust would need to conduct additional research to verify that and to ensure that the handful of projects not going through the program are not owned by minorities, women, or located in rural areas. While participants, designers, and other respondents had few insights into how the program has been addressing its DEI goals and only a handful had recommendations for how the program could address its DEI goals, some designers indicated that Energy Trust could support designers' efforts to contract with minority and women-owned businesses.

Recommendation #6.1: Increase outreach and communication with targeted groups to ensure these groups are aware of all aspects of support Energy Trust can provide to new construction efforts. This could include efforts Energy Trust is making with Business Lighting and Existing Buildings to reach out to community-based organizations.

Recommendation #6.2: Provide designer and architect community a list of minority and women-owned businesses they could potentially contract with.

7. Appendices

7.1 Appendix A: Staff Interview Guide

Overview of Data Collection Activity

DESCRIPTOR	THIS INSTRUMENT
Instrument Type	In-depth interview
Estimated Time to Complete	60 Minutes
Population Description	Energy Trust and Program Implementer Staff for Commercial New Construction Program
Sampling Strata Definitions	None
Population Size	6 staff
Contact List	6 staff
Completion Goal(s)	Census
Contact List Source and Date	Energy Trust Staff- Phil Degens
Type of Sampling	Census
Contact Sought	Key staff associated with New Buildings Program
Fielding Firm	ADM

Research Objectives and Associated Questions

Research Theme	Research Question	Associated Questions
Influence	What is the program influence on building efficiency at each stage of a Whole Building or Market Solutions project?	Q3 to Q26
	What influence is the program training/education services having on building efficiency for Whole Building or Market Solutions projects?	Q27 to Q32
	What would designers/developers have done differently without the whole building or market solutions incentives and services at each stage of a project?	Q3, Q7, Q10
	How well is the program, as currently designed, supporting the new construction market and influencing it to exceed the 2019/2021 codes?	Q24 and Q25
	How much does the New Buildings program influences the broader commercial new construction market?	Q9 to Q26
	How do you think that enhanced design and education services could benefit customers and improve building efficiency?	Q9 to Q26, Q43 to Q45
Program satis.	What is the difficulty/value of working with the program on whole building and market solutions projects under the new code?	Q24, Q25,Q37
	How building designers access the programs training and education services?	Q27 to Q32
	What are building designers/developers' perceived program benefits in working with the 2019/2021 codes for whole building and market solutions projects?	Q24 and Q25
Mkt. potential	What is the market potential for savings and carbon reduction for beyond code new commercial and multifamily construction in 5-10 years?	Q43 to Q45
	How the program can effectively approach and serve major renovation projects, through the whole building and market solutions tracks, to exceed the 2019/2021 codes?	Q43 to Q45
Outreach	What is the program assistance to designers/developers in navigating the new codes and improving buildings efficiency?	Q30, Q33,Q34
DEI goals	How is the program progressing on its DEI goals?	Q38 to Q42

Script

Hello, My name is _____ and I work for ADM and am working on the Energy Trust New Buildings Market Research project. We are conducting this interview today to help us understand the recent achievements of the program and the challenges you face with adapting the program to align with new code standards, maintaining program success, and increasing participation, especially in the performance-based (Whole Building and Market Solutions) program tracks. We are concentrating this research on projects that are subject to the 2019/21 code compliance pathways so as we go through the questions, please be thinking about those projects as opposed to older projects subject to previous codes.

I anticipate this interview will last about 45-60 minutes. I'll start with some introduction/background questions and then get into questions about the influence of the New Buildings program in the market, the use and satisfaction with the program, your progress in improving diversity, equity and inclusion through the program, and what market potential you think the program has.

This is really designed to be a conversation so please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. The recording is confidential. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes as best as possible

Introduction

[ASK ALL]
Q1. To start with, briefly tell me your title and describe your role with the New Buildings (NB) Program? What are your day-to-day activities with the program?

[ASK ALL]
Q2. How long have you worked with the program?

Program Influence

The next several questions are about your perspectives on the influence the program has had in the marketplace. We understand that the NB program aims to influence the new construction market in a variety of ways. For example, there are different tracks a participant can use (System-based, Whole Building, etc.) and service offerings (Early Design Assistance, Modeling Assistance). Remember, we are most interested in your perspective on the influence the program is having on projects subject to the 2019 and 2021 codes.

[ASK ALL]
Q3. First, please describe and explain the purpose of the Custom Whole Buildings and PTNZ track. What is the difference between the two tracks?

[ASK ALL]

Q4. What do you suspect participants of the Custom Whole Buildings and PTNZ tracks would have done if that track did not exist? Probes: Would they have not used Energy Trust services, used a different track, something else? How, if at all, would these choices differ across market segments (e.g, office v multifamily)?

[ASK IF NOT ADDRESSED ABOVE]
Q5. How, if at all, does use of these tracks differ between new construction and major renovation projects?

[ASK ALL]
Q6. Please describe and explain the purpose of the Market Solutions track.

[ASK ALL]
Q7. What do you suspect participants of the Market Solutions track would have done if that track did not exist? Probes: Would they have not used Energy Trust services, used a different track, something else? How, if at all, would these choices differ across market segments (e.g, office v multifamily)?

[ASK IF NOT ADDRESSED ABOVE]
Q8. How, if at all, does use of this track differ between new construction and major renovation projects

[ASK ALL]
Q9. Please describe and explain the purpose of the System-based (or prescriptive) track.

[ASK ALL]
Q10. What do you suspect participants of the System-based (or prescriptive) track would have done if that track did not exist? Probes: Would they have not used Energy Trust services, used a different track, something else? How, if at all, would these choices differ across market segments (e.g, office v multifamily)?

[ASK IF NOT ADDRESSED IN Q9 OR Q10]
Q11. How, if at all, does use of this track differ between new construction and major renovation projects?

[ASK ALL]
Q12. Please describe and explain the purpose of the Data Center track.

[ASK ALL]
Q13. How often, if ever, do participants switch program tracks mid-project? For example, do participants ever start using the Whole Building track and then decide mid-project to go the systems-based/prescriptive track or drop out of the program altogether?

[ASK IF PARTICIPANTS SWITCH TRACKS IN Q13]

Q14. Why do participants switch tracks or drop out of the program and when in the project does this tend to happen?

[ASK ALL]
Q15. Now I would like to switch gears and talk about the program offerings. Please describe and explain the Early Design Assistance offering. [If needed: Who is eligible to receive this offering, how, if at all, does it fit into the different tracks, and how is it designed to influence the market].

[ASK ALL]
Q16. Please describe and explain the purpose of the Modeling Assistance Offering. [If needed: Who is eligible to receive this offering, how, if at all, does it fit into the different tracks, and how is it designed to influence the market].

[ASK ALL]
Q17. How often, if ever, do repeat participants choose different program tracks than what they used in the past?

[ASK IF PROGRAM TRACKS CHANGE IN Q17]
Q18. Do these participants tend to choose more involved tracks for newer projects, for example go from system-based to Whole Building, or do they tend to select less involved tracks for newer projects? Why do you think this happens?

[ASK ALL]
Q19. Please describe and explain the purpose of the Modeling Assistance Offering. [If needed: What does it entail, who is eligible, how does it fit into the different program tracks].

[ASK ALL]
Q20. Are there certain tracks of the NB program (System-based, Market Solutions, Whole Building, Path-to-Net-Zero (PTNZ)) or offerings (Modeling or Design Assistance) that have been particularly successful in achieving savings or attracting participants?

[ASK IF Q20 INDICATES SUCCESSFUL TRACK]
Q21. What has made those tracks or offerings successful?

[ASK ALL]
Q22. Are there certain tracks of the NB program (System-based, Market Solutions, Whole Building, Path-to-Net-Zero (PTNZ)) that struggled to achieve savings goals or attract participants?

[IF Q22 INDICATES SUCCESSFUL TRACKS]
Q23. Why do you think those tracks or offerings have challenges? Probes: Is it a lack of awareness? Perception that a track is too costly or onerous, something else?

[ASK ALL]

Q24. How, if at all, has the program been achieving its goals in getting the market to exceed the 2019 and 2021 energy codes? To what do you attribute the success and how are you measuring success?

[ASK ALL]
Q25. What opportunities do you think the program needs to pursue to better influence the market to exceed the 2019 and 2021 energy codes? How could the program do this?

[ASK ALL]
Q26. To conclude this section about the influence of the program, are there any other efforts the program is doing to influence the market. If so, please describe.

Education and Training

[ASK ALL]
Q27. I'd like to switch gears and talk about the program's training and education efforts and your perspective on how those have influenced the market. So, what types of training and education have you offered the market over the last couple of years? I suspect these efforts look different than they did pre-pandemic. Is that right?

[ASK ALL]
Q28. What training and education offered in recent years has worked well and achieved the goals you had? What was it that worked well? [Probes: Was it improved compliance with a program rule, improved adoption of a technology, something else]

[ASK ALL]
Q29. What training and education offered in recent years did not achieve your goals, if any, and why did it not achieve those goals?

[ASK ALL]
Q30. How do you market or promote your education and training services to all potential New Buildings market actors? [Probes: Do you partner with trade groups, lunch and learns at architects' offices, email campaigns, etc. How does the marketing/outreach differ by market actor and by industry type?]

[ASK ALL]
Q31. How, if at all, have you directed your training and education efforts at the different program tracks, offerings, and code changes?

[ASK ALL]
Q32. What education and training efforts, if any, do you think the market needs, that you are not currently offering? Why?

Program Use and Satisfaction

For the next few questions, I would like your perspective on participant's use and satisfaction with the program.

[ASK ALL]
Q33. As briefly as possible, what outreach does the program conduct to recruit past and new participants? Please let me know if we have already covered this in our prior discussions.

[ASK ALL]
Q34. What have participants told you or what have you heard about why they choose to participate in the program? Is there anything beyond just the incentives?

[ASK ALL]
Q35. What have participants told you or what have you heard about why they choose to pursue efficiency for their building? If needed: Are there non-energy benefits they are interested in like improved comfort for occupants, or the ability to market a "green" building to potential tenants].

[ASK ALL]
Q36. How, if at all, does program satisfaction among participants vary …

1. Across the different program tracks?
2. During different phases of participation?
3. With specific aspects or requirements of participation?
4. Across market segments (office, multifamily, etc.)

[ASK ALL]
Q37. What, if anything, have you heard from participants about difficulties they are having using the program under the new code?

DEI Goals

[ASK ALL]
Q38. I have just a couple of questions about the NB program's diversity equity and inclusion (DEI) objectives. First, what are the objectives and what metrics are you using to know when you or the program achieved that objective?

[ASK ALL]
Q39. What actions has the program taken to effectively engage Oregon's diverse businesses"?[10]

[ASK ALL]
Q40. What progress do you think the program has made in engaging Oregon's diverse businesses?

[ASK ALL]
Q41. What, if anything, has been a barrier to the program engaging Oregon's diverse businesses" and what could be done to overcome those barriers?

[10] New Building Program Implementation Manual, Q4, 2021. Diversity, Equity and Inclusion Statement. P. 72.

[ASK ALL]
Q42. What else, if anything, could the program do to better to engage Oregon's diverse businesses and address Energy Trust's DEI objectives?

Market Potential

[ASK ALL]
Q43. In the next year or two, what are the measures, processes, or services needed to push the market beyond the 2021 code and do these needs vary across market/customer segments?

[ASK ALL]
Q44. Looking out five to ten years from now, how do you see the program influencing the market as the code emphasizes efficiency more? How do you see this influence differing, if at all, between new construction and major renovation projects? And, how does it differ across market segments?

[ASK ALL]
Q45. Looking out five to ten years from now, how do you see the program addressing carbon reduction goals? Are there certain services or measures that will be more important? If so, what are those services or measures.

7.2 Appendix B: Owner Participant Guide

Overview of Data Collection Activity

<table>
<tr><th>DESCRIPTOR</th><th>THIS INSTRUMENT</th></tr>
<tr><td>Instrument Type</td><td>In-depth interview</td></tr>
<tr><td>Estimated Time to Complete</td><td>45 to 60 minutes</td></tr>
<tr><td>Population Description</td><td>A representative of a New Construction Program project subject to 2019/21 code with contact info available</td></tr>
<tr><td>Sampling Strata Definitions</td><td>Program Pathway (Market Solutions, Whole Bldg, PTNZ, Data Center, Systems?)</td></tr>
<tr><td>Population Size (projects)</td><td><table><tr><th>Pathway</th><th>Count</th></tr><tr><td>PTNZ</td><td>7</td></tr><tr><td>Whole Bldg</td><td>41</td></tr><tr><td>Market Solutions</td><td>19</td></tr><tr><td>Data Center</td><td>1</td></tr><tr><td>System with design assist or modeling assist</td><td>36</td></tr><tr><td>TOTAL</td><td>104</td></tr></table></td></tr>
<tr><td>Contact List Size</td><td>104</td></tr>
<tr><td>Completion Goal(s) (projects)</td><td>~25 in Q2 2022 and ~35 in Q1 2023 for a total of ~60<table><tr><th>Pathway</th><th>Q2 2022</th><th>Q1 2023</th></tr><tr><td>PTNZ</td><td>Up to 6</td><td>TBD</td></tr><tr><td>Whole Bldg</td><td>Up to 6</td><td>TBD</td></tr><tr><td>Market Solutions</td><td>Up to 6</td><td>TBD</td></tr><tr><td>Data Center</td><td>1</td><td>TBD</td></tr><tr><td>System</td><td>Up to 6</td><td>TBD</td></tr><tr><td>TOTAL</td><td>25</td><td>35</td></tr></table></td></tr>
<tr><td>Contact List Source and Date</td><td>Contact data received from Phil Degens on 5/19/22 and project data received from Phil on 4/26/22</td></tr>
<tr><td>Type of Sampling</td><td>Stratified random</td></tr>
<tr><td>Contact Sought</td><td>Key person responsible for project and participation with program</td></tr>
<tr><td>Fielding Firm</td><td>ADM</td></tr>
<tr><td>Incentive</td><td>$100 per completed interview</td></tr>
</table>

Research Objectives and Associated Questions

Research Theme	Research Question	Associated Questions
Awareness and Influence	What is the program influence on building efficiency at each stage of a Whole Building or Market Solutions project?	Q17 to Q37
	What influence is the program having on training/education on building efficiency for Whole Building or Market Solutions projects?	Q57 to Q62
	What designers/developers would have done differently without the whole building or market solutions incentives and services at each stage of a project?	Q17 to Q26
	How well is the program, as currently designed, supporting the new construction market and influencing it to exceed the 2019/2021 codes?	Q27 to Q37
	How much does the New Buildings program influence the broader commercial new construction market?	Q12 to Q16
	How enhanced design and education services could benefit customers and improve building efficiency?	Q57, Q58, Q60
Program satisfaction	What is the difficulty/value of working with the program on whole building and market solutions projects under the new code?	Q17 to Q37
	How building designers access the programs training and education services?	Q57, Q58, Q60
	What are building designers/developers' perceived program benefits in working with the 2019/2021 codes for whole building and market solutions projects?	Q17 to Q37
Mkt. potential	What is the market potential for savings and carbon reduction for beyond code new commercial and multifamily construction in 5-10 years?	Q64, Q65, Q53, Q55
	How the program can effectively approach and serve major renovation projects, through the whole building and market solutions tracks, to exceed the 2019/2021 codes?	Q17 to Q37
Out-reach	What is the program assistance to designers/developers in navigating the new codes and improving buildings efficiency?	Q27 to Q37
DEI goals	How is the program progressing on its DEI goals?	Q3, Q63
Firmo-graphics	Collect data about respondent	Q1 to Q16

Recruitment Scripts

Email Recruitment

Hello [NAME],

My name is ____ and my firm, ADM, is working with Energy Trust on an evaluation of their New Buildings program. We understand you worked on a project that received support from Energy Trust for the building at [ADDRESS] in [CITY].

To ensure that the Energy Trust New Buildings program continues to serve customers well during increasingly frequent changes to code, we need the help of people like you – those who have recently used Energy Trust services to support the design of high-performance buildings.

We would like to speak with you about your recent participation in the program and learn what you and your project team considered when you chose to participate, and during your participation in the program, as well as any changes you think would help the program serve you better. We anticipate this interview will last about 45-60 minutes.

Can you suggest a time when you would be available in the next couple of weeks to talk about your participation? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Thanks for your consideration. If we do not hear back from you in the next couple of days, we will follow up with a phone call.

Phone Recruitment Script

[Identify correct contact at firm]

Hello,

My name is _____ and I work for ADM Associates. Energy Trust of Oregon hired ADM to conduct an evaluation of the New Buildings program. I am calling you today because we need the help of people like you – those that have recently used Energy Trust services to support the construction of energy-efficient buildings. We understand you received Energy Trust support for the buildings at [ADDRESS]. Is that right?

[ASK IF ADDRESS NOT CORRECT] Verify that respondent recently participated in a project that received Energy Trust support and record that address.

[ASK IF ADDRESS CORRECT] We are conducting this evaluation to help make sure the program is serving the needs of the people that use it. We would like to speak with you about the benefits and barriers your project team considered when you chose to participate, and during your participation in the program, as well as any changes you think would help the program serve you better. We anticipate this interview will last about 45-60 minutes.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, I would be happy to send you a link to ADM's privacy policy. If you have

questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Can you suggest a time when you would be available in the next few weeks to talk about your participation? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

Introduction Script

Hello,

This is _____ from ADM Associates, calling about the Energy Trust of Oregon New Buildings Market Research project.

To recap our previous [*email exchange or phone conversation*], we are conducting this interview today to help us understand your reasons for participating in Energy Trust's New Buildings program for your project at [ADDRESS]. We want to learn about any successes or challenges you experienced in participating with the program. I anticipate this interview will last about 45-60 minutes.

I'll start with some introduction/background questions and then get into questions about the possible influence of the New Buildings program on your decisions and your satisfaction with the program.

Please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture your answers accurately. The recording is confidential. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes as best as possible

Screening

[ASK ALL]

S1. First of all, can you confirm that your organization recently participated in Energy Trust of Oregon's New Buildings Program – that is that the project received assistance which could have included financial incentives, from Energy Trust to design or install energy efficient systems? [*If needed: This could have been financial incentives such as money for energy efficient upgrades or could have been technical assistance such as support for energy modeling or a design charrette*.]

[SINGLE RESPONSE]

[Do not read:]

1. Yes
2. No [ASK IF THERE IS SOMEONE ELSE THAT CAN HELP, IF NOT THANK AND TERMINATE]

98. Don't know [THANK AND TERMINATE]

99. Refused [THANK AND TERMINATE]

[ASK ALL]

S2. To verify, we understand your recent project that received Energy Trust support is located at [ADDRESS] Is that correct?

[SINGLE RESPONSE]

[Do not read:]

1. Yes, address is correct.
2. No. *fill in correct address here.*_____

S3. We understand that your project at [ADDRESS] received the following types of services from Energy Trust?

[The boxes will be checked for the tracks and options they have experience with based on the program data. [Interviewer We are verifying program data here. So we will want to ask the respondent things like, "I see you received support from Energy Trust for doing energy modeling. Does that sound correct?" The interviewer can explain what we mean by energy modelling.]

PROGRAM OFFERINGS	
1. Systems-Based (Provides incentives for single measures like upgrading HVAC equipment]	❑
2. Market Solutions (Provides a package of efficiency measures, suited to a specific industry or building type like multifamily)	❑
3. Whole Building/Path to Net Zero (Provides a suite of services to help owners achieve close to a net zero energy target)	❑
4. Energy Modeling or Technical Assistance (60% of approved costs for energy analysis study, up to $40,000)	❑
5. Early Design Assistance (Project can receive incentives for completing an energy-focused early design charrette)	❑

6. Data Center (Energy Trust provided financial incentives for a data center project] ❑

Introduction

My first few questions are about your company, your role in the company, and your background in the industry. So, to start….

[ASK ALL]
Q1. Which of the following best describes your role in the design and construction process?

[SINGLE RESPONSE]
1. Building owner or developer
2. Owner representative
3. Design professional (e.g., architect, engineer, or energy analyst)
4. Green building/sustainability consultant
5. Construction project manager
6. Contractor (e.g., general contractor or specialty contractor involved in construction)
7. Other_____

[ASK IF Q1 ≠ 1]
Q2. My understanding is that you work for a [*fill in information call list that identifies firm type*] Is that correct? [*Select firm type reported by respondent*]

[MULTIPLE RESPONSE]
1. Architecture firm
2. Engineering firm
3. General contractor
4. Design-Build firm (Involved in design through construction phase))
5. Commercial developer
6. Building owner
7. Green building/sustainability consultant
8. Other_____

[ASK ALL]
Q3. Is your company certified by COBID (Certification Office for Business Inclusion and Diversity) in Oregon? [*COBID aims "to level the playing field by providing certified firms a fair opportunity to compete for government contracts regardless of owner ethnicity, gender, disability, or firm size."]*

[SINGLE RESPONSE]
1. Yes, we are certified by COBID
2. No, we are not certified by COBID

[ASK ALL]
Q4. What is your job title at your organization?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q5. How long have you been in your current position?

[SINGLE RESPONSE]

[Do not read:]
1. Less than 1 year
2. 1-3 years
3. 4-6 years
4. 7-9 years
5. 10 or more years
6. Don't know
7. Refused

[ASK ALL]
Q6. How long have you personally been involved in the commercial new construction market?

[ASK ALL]
Q7. Briefly, what are your key roles as they pertain to working with Energy Trust?

For the next few questions, please answer based on your experience over the last year.

[ASK ALL]
Q8. What types of buildings have you worked on that received services or incentives from the Energy Trust in the last year? [If needed: Is it office space, retail, schools, etc.]

[MULTIPLE RESPONSE]

[Do not read, probe to code:]
1. Office
2. Retail (shops, grocery, car dealer)
3. School
4. Warehouse
5. Multifamily
6. Government/Institution
7. Industrial
8. Other, please specify: [OPEN-ENDED RESPONSE]
9. Not applicable
10. Don't know
11. Refused

[ASK ALL]
Q9. What other building types have you worked on that did not enroll to receive program incentives or assistance? [[*Please answer this to the best of your availability knowing that you may not be familiar with all projects being done at your firm*]

[MULTIPLE RESPONSE]

[Do not read, probe to code:]
1. Office
2. Retail (shops, grocery, car dealer)
3. School
4. Warehouse

5. Multifamily
6. Government/Institution
7. Industrial
8. Other, please specify: [OPEN-ENDED RESPONSE]
9. None
10. Don't know
11. Refused

[ASK IF Q9 SELECTIONS >0]

Q10. Why did you choose not to receive Energy Trust incentives or support? [*Probes: Was the project too small to bother with the program, was they type of building not suited to the program for some reason…etc*.]

[ASK ALL]

Q11. What portion of all your new commercial construction work in the U.S. is in …?

[*Interviewer: These values should add to 100%.]*

[NUMERIC RESPONSE]

1. Portland metro area (Multnomah, Washington, Clackamas Counties) [FORCE NUMERIC RESPONSE]
2. Other areas in Oregon [FORCE NUMERIC RESPONSE]
3. Other areas outside Oregon [FORCE NUMERIC RESPONSE]

Program Awareness

The next several questions are about your general awareness and use of the program.

[ASK ALL]

Q12. When did you first learn about the services and incentives Energy Trust offers (the program) for new construction and major renovations?

[SINGLE RESPONSE]

1. Less than 1 year
2. 1-3 years
3. 4-6 years
4. 7-9 years
5. 10 or more years
6. Don't know
7. Refused

[ASK ALL]

Q13. How did you first learn about this program?

[Do not read, probe to code:]

[MULTIPLE RESPONSE]

1. Outreach contact from Program
2. Energy Trust training
3. Client
4. Colleagues/Word of Mouth
5. Online
6. Other, please specify: [OPEN-ENDED RESPONSE]

7. Don't know
8. Refused

[ASK ALL]
Q14. How long ago did you first participate the program?

[SINGLE RESPONSE]
1. Less than 1 year
2. 1-3 years
3. 4-6 years
4. 7-9 years
5. 10 or more years
6. Don't know
7. Refused

[ASK ALL]
Q15. How many projects that received program support have you been involved in?

[SINGLE RESPONSE]
1. 1 project
2. 2-3 projects
3. 4-5 projects
4. 6-7 projects
5. 8 or more projects
6. Don't know
7. Refused

[ASK IF Q1 ≠ 1, NOT A BUILDING OWNER]
Q16. Do you talk about the program with all clients who are eligible, or do you offer it more selectively? How do you present the Energy Trust services and incentives to your clients?

Program Influence on Recent Project

Thanks for your responses so far. I would now like to talk about your recent work with Energy Trust at the project at [ADDRESS]. I will start with some general questions and then focus on some of the specific tracks and offerings Energy Trust provided for the project.

[ASK ALL]
Q17. Can you walk me through the process of participating in the Energy Trust program (applying for incentives, working an outreach manager, etc.) for your project at [ADDRESS]? How did you get involved with the Energy Trust for this project and what happened next? What steps were the easiest and worked the best? Which were more challenging (and why)?

[ASK ALL]
Q18. How, if at all, has working with the Energy Trust program for your project at [ADDRESS] contributed to your knowledge of new energy codes, specifically the 2019/2021 codes?

[ASK ALL]
Q19. How, if at all, has the program contributed to your ability to meet or exceed those codes for your recent project?

[ASK ALL]
Q20. Why did you [or your client] choose these Energy Trust services? What, if any, other Energy Trust services or incentives did you consider for the project?

[ASK ALL]
Q21. How helpful, if at all, were the services and incentives in supporting your decisions around energy efficiency for your project at [ADDRESS]?

[ASK ALL]
Q22. How helpful, if at all, were the services and incentives in supporting your decisions around installing solar or other renewable energy sources for your project at [ADDRESS]?

[ASK ALL]
Q23. How helpful, if at all, were the services and incentives in supporting your design decisions for your project at [ADDRESS] ?

[ASK ALL]
Q24. How would you assess the overall cost implications of participating in the Energy Trust program for the project at [ADDRESS]? Did participating lower the cost, not impact the cost much, increase the cost? And, what was the level of its impact (High, Medium, Low)

[ASK ALL]
Q25. How easy or difficult was the process of receiving the Energy Trust support for this project? Was it understandable what you would be getting from participating? Were there any inconsistencies with what you understood you would need to do and what you had to do?

[ASK ALL]
Q26. What would you have done differently, if anything, had Energy Trust not supported your project?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]
Q27. What code compliance pathway did you take for your project at [ADDRESS]?

1. Prescriptive - based on having certain features in your building
2. Performance - based on energy modeling.

[ASK ALL]
Q28. How, if at all, did taking the path you did towards code compliance impact the total cost of the construction project?

[ASK ALL]
Q29. For your recent project at [ADDRESS], did you take advantage of any tradeoffs for code compliance and if yes across what measure categories (Lighting, building envelope, HVAC, renewable energy – solar panel, ….)? [*For example, did you alter your shell design to accommodate a change in lighting to meet code*]

[ASK ALL]

Q30. What was the motivation for using the tradeoff allowance?

[ASK ALL]
Q31. How, if at all, did this tradeoff allowance impact the cost of the construction project?

[ASK ALL]
Q32. For your recent project, how, if at all, did complying with the new code affect your choices for….

1. Lighting
2. Building envelope (mostly fenestration)
3. HVAC and its control system
4. Renewable energy

[ASK ALL]
Q33. For your recent project, how, if at all, did participating in the program affect your choices for….

1. Lighting
2. Building envelope (mostly fenestration)
3. HVAC and its control system
4. Renewable energy

[ASK ALL]
Q34. Were there any major design features for your project at [ADDRESS] considered but not used in the end? Why?

[ASK IF PTNZ =1]
Q35. What are the challenges in constructing a near net zero building? How did the Energy Trust support help you overcome these challenges, if at all?

[ASK ALL]
Q36. What, if anything, did you most appreciate about the support and incentives you received for the project at [ADDRESS]?

[ASK ALL]
Q37. What, if anything, could be improved about the support and incentives you received for the project at [ADDRESS]?

Early Design Assistance

[ASK IF S3 =5] Now I'd like to ask you some specific questions about early design assistance. This is the assistance Energy Trust provided to support your building design during or before the schematic design phase of your project.

[ASK IF S3 =5]

Q38. How did early design assistance from Energy Trust help you make decisions about your recent project's design, systems, or equipment? [*If needed: such as passive heating and cooling, highly efficient systems, renewable energy systems?*] Did it verify certain assumptions? Did it expose new ideas you had not considered? How so?

[ASK IF S3 =5]
Q39. How, if at all, did early design assistance from Energy Trust help you adapt to or learn about the new energy codes?

[ASK IF S3 =5]
Q40. What, if anything, did you most appreciate about the early design assistance you received?

[ASK IF S3 =5]
Q41. What, if anything, could be improved about the early design assistance you received?

Energy Modeling Assistance

[ASK IF S3 =4] Now I'd like to ask you some specific questions about energy modeling assistance and your project at [ADDRESS]. This is the assistance Energy Trust provided to you to conduct a detailed energy study about efficient options available for your project. The modeling assistance incentives cover up to 60% of the cost of an energy study, up to $40,000 total.

[ASK IF S3 =4]
Q42. How did the energy modeling assistance from Energy Trust help you make decisions about your recent building's design, systems, or equipment? [*If needed: such as passive heating and cooling, highly efficient systems, renewable energy systems?*] Did it verify certain assumptions? Did it expose new ideas you had not considered? How so?

[ASK IF S3 =4]
Q43. How, if at all, did the modeling assistance from Energy Trust help you adapt to or learn about the new energy codes for your recent project at [ADDRESS]?

1. [OPEN-ENDED RESPONSE]

[ASK IF S3 =4]
Q44. What, if anything, did you most appreciate about the modeling assistance you received?

[ASK IF S3 =4]
Q45. What, if anything, could be improved about the modeling assistance you received?

Motivations and Barriers to Efficiency

The next several questions are about the market for new commercial buildings in Oregon and your thoughts about what may motivate or inhibit construction of high efficiency buildings.

[ASK ALL]

Q46. Who are the key decision makers in new building projects you worked on and what are their key roles? [*If needed: Key decision makers may be an architect, building owner, corporate headquarter staff, or someone else.*]

[ASK IF Q1 ≠ 1, NOT A BUILDING OWNER]

Q47. What do you think motivates building owners to invest in energy efficiency? [*If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.*]

[ASK IF Q1= 1, BUILDING OWNER]

Q48. What motivates you to invest in energy efficiency in your buildings? [*If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.*]

[ASK ALL]

Q49. What prevents owners [IF Q1=1 "Such as yourself"] from constructing energy efficient buildings? How big of a barrier is cost when compared to other factors? [*If "lack of interest," or "higher cost" ask "anything else?" If needed: Is it the time needed to design an efficient building compared to a code built building? Is it a lack of equipment availability? Is it a lack of trained professionals to help with design and construction? Something else? EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.*]

[ASK ALL]

Q50. What impacts did the changes to the building energy code in 2019 and 2021 have, if any, on building design decisions and selection of energy-using equipment?
[PROBE ABOUT: Design, equipment, code compliance pathways. For design and equipment specifically ask if the impacts are related to lighting, building envelope such as fenestration, or HVAC systems]

[ASK ALL]

Q51. What, if any, are the challenges for meeting the new code for…? How much of a challenge does this create for your work?

1. Lighting (High, Medium, Low)
2. Building Envelope – Mostly Fenestration (High, Medium, Low)
3. HVAC Systems (High, Medium, Low)
4. Other, specify. (High, Medium, Low)

[ASK IF Q1 ≠ 1, NOT A BUILDING OWNER]

Q52. What internal and external resources do you use to keep up with code?
[IF NEEDED: By resources we mean any internal or external sources of information you

rely on to keep you informed about code changes. This could be a trade association, regular contact with code officials, lunch-and-learns at your firm or anything else.]

Use of Renewables

[ASK ALL]
Q53. Have you considered or have you already installed solar photovoltaic (PV) panels to your building at [ADDRESS]?

1. Yes, considered
2. Yes, installed
3. No, have not considered and not installed

[ASK IF Q53 1 or 2 = YES]
Q54. What if any, support did you received from Energy Trust to help you make a decision about installing PV for your project at [ADDRESS]?

[ASK IF Q53=1 or 2, YES]
Q55. How satisfied were you with the assistance you received from Energy Trust about installing solar PV, on a scale from 1 to 5 where 1 is not at all satisfied and 5 is very satisfied?

1. Not at all satisfied
1. Somewhat dissatisfied
2. Neutral
3. Somewhat satisfied
4. Very satisfied

Program Use and Satisfaction

For the next few questions, I would like your perspective about any interactions you may have had with Energy Trust staff and any experience you may have with Energy Trust training.

[ASK ALL]
Q56. While participating in the New Buildings Program, how often did you communicate with the New Buildings program outreach manager? Would you say:

[SINGLE RESPONSE]
1. 0
2. 1 -5 times
3. 6-10 times
4. 11-20 times
5. More than 20 times

[ASK ALL]
Q57. Have you ever attended training or educational events sponsored by Energy Trust in the last two years?

[ASK IF Q57= YES]
Q58. How useful were those events to you and why?

[ASK IF Q57= YES]
Q59. What, if any, training or assistance did you receive from Energy Trust to help you understand code changes?

[ASK IF Q57= YES]
Q60. What other topics did Energy Trust cover in the training or educational events?

[ASK ALL]
Q61. And how satisfied were you with each of the following aspects of your work with Energy Trust? Again, on a scale from 1 to 5, with 1 indicating "not at all satisfied" and 5 indicating "very satisfied", please tell me how satisfied you were with: [If you did not have contact with staff, please let me know that is not applicable.]

[SCALE QUESTION]
1. The ease of contacting the New Buildings Program
2. The speed of the response
3. How helpful program staff were
4. How knowledgeable program staff were
5. Your overall interaction with program staff
6. The quality of any training you received from Energy Trust (if no training received, select n/a)
7. The amount of the incentives for your project
8. [ASK IF S3=5] Early design assistance
9. [ASK IF S3=4] Energy modeling assistance
10. [ASK IF Q53=1 or 2] the information you received from Energy Trust about installing solar PV.
11. The overall Energy Trust services and incentives you received for your recent project.

[ASK IF Q61_1 OR Q61__2 OR Q61_3 OR Q61_4 OR Q61_5 =1 OR 2, INDICATED ANY DISSATISFACTION]
Q62. Why were you dissatisfied with:

1. [ASK IF Q61_1= 1 or 2] The ease of contacting Energy Trust or the New Buildings Program [OPEN-ENDED RESPONSE]
2. [ASK IF Q61_2= 1 or 2] The speed of the response [OPEN-ENDED RESPONSE]
3. [ASK IF Q61_3= 1 or 2] How courteous program staff were [OPEN-ENDED RESPONSE]
4. [ASK IF Q61_4= 1 or 2] How knowledgeable program staff were [OPEN-ENDED RESPONSE]
5. [ASK IF Q61_5= 1 or 2] Your overall interaction with program staff [OPEN-ENDED RESPONSE]
6. [ASK IF Q61_6= 1 or 2] the quality of the training [OPEN-ENDED RESPONSE]
7. [ASK IF Q61_7= 1 or 2] amount of the incentives [OPEN-ENDED RESPONSE]
8. [ASK IF Q61_8= 1 or 2] early design assistance [OPEN-ENDED RESPONSE]
9. [ASK IF Q61_9= 1 or 2] energy modeling assistance [OPEN-ENDED RESPONSE]
10. [ASK IF Q61_10= 1 or 2] information about solar [OPEN-ENDED RESPONSE]
11. [ASK IF Q61_11= 1 or 2] overall program [OPEN-ENDED RESPONSE]

DEI Goals

[ASK ALL]

Q63. Energy Trust has specific goals to increase trade ally and program participation in their commercial programs, especially among MBE or WBE businesses. What, if anything, could Energy Trust do to better support and attract MBE and WBE businesses to the program?

Recommendations for Future

[ASK ALL]

Q64. What topics or considerations should Energy Trust be looking at to help the market develop and build high efficiency buildings, especially those exceeding code, over the next three to five years?

[ASK ALL]

Q65. How is the program doing in addressing the needs of the current new construction market? Do you have any recommendations for improvement? Are there any future trends that the program should be thinking about?

Thank you for taking the time to complete this important interview! Have a great day!

7.3 Appendix C: Designer Participants Guide

Overview of Data Collection Activity

<table>
<tr><th>DESCRIPTOR</th><th>THIS INSTRUMENT</th></tr>
<tr><td>Instrument Type</td><td>In-depth interview</td></tr>
<tr><td>Estimated Time to Complete</td><td>45 to 60 minutes</td></tr>
<tr><td>Population Description</td><td>A designer representative of a New Construction Program project subject to 2019/21 code with contact info available.</td></tr>
<tr><td>Program Website</td><td>https://www.energytrust.org/programs/new-construction-major-renovations/</td></tr>
<tr><td>Sampling Strata Definitions</td><td>Program Pathway (Market Solutions, Whole Bldg, PTNZ, Data Center, Systems?)</td></tr>
<tr><td>Population Size (projects)</td><td>
<table>
<tr><th>Pathway</th><th>Count</th></tr>
<tr><td>PTNZ</td><td>4</td></tr>
<tr><td>Whole Bldg</td><td>52</td></tr>
<tr><td>Market Solutions</td><td>31</td></tr>
<tr><td>Data Center</td><td>1</td></tr>
<tr><td>System with design assist or modeling assist</td><td>62</td></tr>
<tr><td>Subtotal</td><td>150</td></tr>
<tr><td>System-based WITHOUT Design Assist or Modeling Assist</td><td>143</td></tr>
<tr><td>TOTAL</td><td>293</td></tr>
</table>
</td></tr>
<tr><td>Contact List Size</td><td>104</td></tr>
<tr><td>Completion Goal(s) (projects)</td><td>~25 in Q2 2022 and ~35 in Q1 2023 for a total of ~60
<table>
<tr><th>Pathway</th><th>Q2 2022</th><th>Q1 2023</th></tr>
<tr><td>PTNZ</td><td>Up to 6</td><td>ASMAP</td></tr>
<tr><td>Whole Bldg</td><td>Up to 6</td><td>~10</td></tr>
<tr><td>Market Solutions</td><td>Up to 6</td><td>~10</td></tr>
<tr><td>Data Center</td><td>1</td><td>ASMAP</td></tr>
<tr><td>System with design assist or modeling assist</td><td>Up to 6</td><td>~10</td></tr>
<tr><td>System-based WITHOUT Design Assist or Modeling Assist</td><td>0</td><td>0</td></tr>
<tr><td>TOTAL</td><td>25</td><td>~35</td></tr>
</table>
</td></tr>
</table>

Contact List Source and Date	Contact data received from Dan Rubado on 12/21
Type of Sampling	Stratified random
Contact Sought	Architect, engineer, or other person familiar with project and Oregon energy codes
Fielding Firm	ADM
Incentive	$100 per completed interview

Research Objectives and Associated Questions

Research Themes from RFP	Associated Questions
How has the program influenced energy efficiency decisions on projects?	Q6, Q11, Q12, Q13, Q17, Q18, Q19, Q22, Q23, Q24, Q25, Q26, Q27 Q28, Q29, Q30, Q31, Q32
How has the program influenced code compliance pathway decisions?	Q10, Q13, Q14, Q15, Q16,
What program services do building designers use and how do they use them, especially training?	0, Q37
What are the benefits of using the program?	Q6, Q8, Q34, Q35, Q38, Q40, Q65
What are the challenges to using the program?	Q8, Q37, Q40, Q65
What percentage of market uses performance vs prescriptive code compliance paths?	Q10
What decisions, if any, are participants making in choosing a code compliance pathway? (current)	Q10, Q11, Q12
What changes in pathway compliance decisions, if any, do participants plan to make in the next few years? (forecast)	Q40, Q65
What measures and services should Energy Trust be supporting to drive beyond-code savings projects in the short term (1- 3 years) and long-term (4-10) Years?	Q19
How is the program progressing on its diversity, equity, and inclusion (DEI) goals	Q3, Q63
Background questions	Q1, Q2, Q3, Q4, Q5, Q9, Q21

Recruitment Scripts

Email Recruitment

Subject: We need your feedback about the Energy Trust of Oregon New Buildings program.

Hello [NAME],

My name is [ADM NAME] my firm, ADM, is working with Energy Trust on an evaluation of their New Buildings program. We understand you worked on a project that received support from Energy Trust for the building at [ADDRESS] in [CITY].

To ensure that the Energy Trust New Buildings program continues to serve the new construction market well during increasingly frequent changes to code, we need the help of people like you – those who have recently used Energy Trust services to support the design of high-performance buildings.

We would like to speak with you about your recent participation in the program and learn what you and your project team considered when you chose to participate, and during your participation in the program, as well as any changes you think would help the program serve the new construction market better. We anticipate this interview will last about 45-60 minutes.

Can you suggest a time when you would be available in the next couple of weeks to talk about your work with the Energy Trust program? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Thanks for your consideration. If we do not hear back from you in the next couple of days, we will follow up with a phone call.

Phone Recruitment Script

[Identify correct contact at firm]

Hello,

My name is [ADM NAME] and I work for ADM Associates. Energy Trust of Oregon hired ADM to conduct an evaluation of the New Buildings program. I am calling you today because we need the help of people like you – those that have recently used Energy Trust services to support the construction of energy-efficient buildings. We understand you worked on a building at [ADDRESS] that received support from Energy Trust. Is that right?

[ASK IF ADDRESS NOT CORRECT] Verify that respondent recently participated in a project that received Energy Trust support and record that address.

[ASK IF ADDRESS CORRECT] We are conducting this evaluation to help make sure the program is serving the needs of the building owners, architects, engineers, and contractors that use it. We would like to speak with you about the benefits and barriers your project team considered when you chose to participate, and during your participation in the program, as well

as any changes you think would help the program serve you better. We anticipate this interview will last about 45-60 minutes.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, I would be happy to send you a link to ADM's privacy policy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Can you suggest a time when you would be available in the next few weeks to talk about your participation? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

Introduction Script

Hello,

This is [ADM NAME] from ADM Associates, calling about the Energy Trust of Oregon New Buildings Market Research project.

To recap our previous [*email exchange or phone conversation*], we are conducting this interview today to help us understand your work with Energy Trust's New Buildings program for your project at [ADDRESS]. We want to learn about any successes or challenges you experienced in participating with the program. I anticipate this interview will last about 45-60 minutes.

I'll start with some introduction/background questions and then get into questions about the possible influence of the New Buildings program on your decisions, how you decide how to comply with energy code, and your satisfaction with the program.

Please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture your answers accurately. The recording is confidential. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes as best as possible

Screening

S1. First of all, can you confirm that your organization recently participated in Energy Trust of Oregon's New Buildings Program – that is that the project received assistance which could have included financial incentives, from Energy Trust to design or install energy efficient systems? [*If needed: This could have been financial incentives such as money for energy efficient upgrades or could have been technical assistance such as support for energy modeling or a design charrette*.]

1. Yes

2. No [ASK IF THERE IS SOMEONE ELSE THAT CAN HELP, IF NOT THANK AND TERMINATE]

98. Don't know [THANK AND TERMINATE]

99. Refused [THANK AND TERMINATE]

S2. To verify, we understand your recent project that received Energy Trust support is located at [ADDRESS] Is that correct?

1. Yes, address is correct.

2. No. *fill in correct address here.*_____

S3. We understand that the project at [ADDRESS] received the following types of services from Energy Trust?

[The boxes will be checked for the tracks and options they have experience with based on the program data. [Interviewer We are verifying program data here. So we will want to ask the respondent things like, "I see you received support from Energy Trust for doing energy modeling. Does that sound correct?" The interviewer can explain what we mean by energy modelling.]

PROGRAM OFFERINGS	
1. Systems-Based (Provides incentives for single measures like upgrading HVAC equipment]	❑
2. Market Solutions (Provides a package of efficiency measures, suited to a specific industry or building type like multifamily)	❑
1. Whole Building/Path to Net Zero (Provides a suite of services to help owners achieve close to a net zero energy target)	❑
2. Energy Modeling or Technical Assistance (60% of approved costs for energy analysis study, up to $40,000)	❑
3. Early Design Assistance (Project can receive incentives for completing an energy-focused early design charrette)	❑
4. Data Center (Energy Trust provided financial incentives for a data center project]	❑

Introduction

[ASK ALL UNLESS OTHERWISE NOTED]

The first few questions ask you about your company, your role, and your experience in the industry.

Q1. To start, can you tell me a little bit more about your company? What type of firm is it? Who is your typical client? Where are your clients located (*PROBE FOR: national, regional, state, local*).

Q2. What is your current role at the company? What is your role as it relates to working with the Energy Trust?

Q3. Is your company certified by COBID (Certification Office for Business Inclusion and Diversity) in Oregon? [COBID aims "to level the playing field by providing certified firms a fair opportunity to compete for government contracts regardless of owner ethnicity, gender, disability, or firm size."]

a. Yes, we are certified by COBID.

b. No, we are not certified by COBID.

Program Awareness and Use

[ASK ALL UNLESS OTHERWISE NOTED]

The next couple of questions are about your general awareness and use of the program.

Q4. How did you first learn about the services and incentives Energy Trust offers (the program) for new construction and major renovations? How long have you been using the program?

Q5. About, how many projects that received program support have you been involved in?

Q6. How do you present Energy Trust incentives to your clients? Do you talk about the program with all clients who are eligible, or do you offer it more selectively? What sort of questions do clients have about the program when you present it to them?

Q7.

[ASK IF Q1Q1 INDICATES DESIGN PRO]

Q8. From your perspective, do different types of clients (*ex: office vs. schools vs. warehouse, etc)* choose to apply/not apply for Energy Trust incentives? Why do you think these differences in program interest exist?

Program Influence on Code Compliance and Recent Project

[ASK ALL UNLESS OTHERWISE NOTED]

Thanks for your responses so far. I would now like to talk about your recent work with Energy Trust at the project at [ADDRESS] and discuss decisions around complying with energy code.

Q9. What was your role in the process of designing the project at [ADDRESS]? Who else is/was involved?

Q10. I understand there are two ways for a new building in Oregon to comply with energy codes. There is the **prescriptive** pathway (based on certain features in the building) and the **performance** pathway (based on energy modeling)? Which code compliance pathway did you take for your project at [ADDRESS]? Why did you choose this compliance pathway?

Q11. How, if at all, have you had to adapt your work on this project to comply with the 2019/2021 building codes? (Probe for whether or not they were already designing buildings at this level or if the 2019/21 codes represented a step up for them).

Q12. What impacts did the changes to the building energy code in 2019 and 2021 have, if any, on building design decisions and selection of energy-using equipment? [*PROBE ABOUT: Design, equipment, code compliance pathways. For design and equipment specifically ask if the impacts are related to lighting, building envelope such as fenestration, or HVAC systems*]

Q13. How, if at all, has the Energy Trust program contributed to your ability to meet or exceed those codes for your recent project?

Q14. To what extent does participation in the New Buildings program influence your code compliance pathway decision making?

Q15. How, if at all, does the type of project influence which code compliance pathway you choose?

Q16. Do certain types of building components (*lighting, building envelope, HVAC system, etc.*) pose more challenges for meeting the new code? Please explain.

Q17. How would you assess the overall cost implications of participating in the Energy Trust program for the project at [ADDRESS]? Did the act of participating (e.g. coordination with Energy Trust, paperwork) lower the cost, not impact the cost much, increase the cost?

Q18. What design decisions would have been different if not for the incentives? (Probe for information regarding why they chose to continue even if cost increased)

Q19. Were there any major design features for your project at [ADDRESS] considered but not used in the end? If so, what were those features and why did you not use them?

Q20. If the project is over budget, how do you prioritize what to cut down/scale down? (Alternatively: What energy-using equipment is typically the first to get scaled back or cut completely?)

[ASK IF Q45.2.S3_3 =1, PTNZ PARTICIPANT]

Q21. What was your company's prior experience with net zero building construction? To what extent did participating in the Energy Trust Program enable you to design/construct a net zero or nearly net zero building?

[ASK IF Q45.2.S3_3 =1, PTNZ PARTICIPANT]

Q22. What are the challenges in constructing a near net zero building? How did the Energy Trust support help you overcome these challenges, if at all?

[ASK IF Q45.2.S3_5 =1, RECEIVED EARLY DESIGN ASSISTANCE]

Q23. You indicated that you received early design assistance as part of your participation in the New Buildings program. What, if anything, did you most appreciate about the early design assistance you received?

[ASK IF Q45.2.S3_5 =1, RECEIVED EARLY DESIGN ASSISTANCE]

Q24. What, if anything, could not have done with your building design without the early design assistance? [PROBES: What efficiency measures or designs would you not have done?]

[ASK IF Q45.2.S3_5 =1, RECEIVED EARLY DESIGN ASSISTANCE]

Q25. What, if anything, could be improved about the early design assistance you received?

[ASK IF Q45.2.S3_4 =1, RECEIVED ENERGY MODELING ASSISTANCE]

Q26. You indicated that you received energy modelling assistance as part of your participation in the new buildings program. This is the assistance Energy Trust provided to you to conduct a detailed energy study about efficient options available for your project. The modeling assistance incentives cover up to 60% of the cost of an energy study, up to $40,000 total. What, if anything, did you most appreciate about the early design assistance you received?

[ASK IF Q45.2.S3_5 =1, RECEIVED ENERGY MODELING ASSISTANCE]
Q27. What, if anything, could not have done with your building design without the energy modeling assistance? [PROBES: What efficiency measures or designs would you not have done?]

[ASK IF Q45.2.S3_4 =1, RECEIVED ENERGY MODELING ASSISTANCE]
Q28. What, if anything, could be improved about the energy modelling assistance you received?

Motivations and Barriers to Efficiency

[ASK ALL UNLESS OTHERWISE NOTED]

The next several questions are about the market for new commercial buildings in Oregon and your thoughts about what may motivate or inhibit construction of high efficiency buildings.

[ASK IF Q1 INDICATES DESIGN PRO]
Q29. What do you think motivates building owners to invest in energy efficiency? [If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.]

[ASK IF Q1 INDICATES BUILDING OWNER]
Q30. What motivates you to invest in energy efficiency in your buildings? [If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.]

Q31. What prevents owners from constructing energy efficient buildings? How big of a barrier is cost when compared to other factors? [*If "lack of interest," or "higher cost" ask "anything else?" IF NEEDED: Is it the time needed to design an efficient building compared to a code built building? Is it a lack of equipment availability? Is it a lack of trained professionals to help with design and construction? Something else? EE is*

defined as designing buildings to and specifying equipment that goes beyond code requirements.]

Q32. What percent of all your clients (not just Energy Trust incentive recipients) building only to code minimum and do not participate in Energy Trust programs or otherwise build above code?

Q33. What internal and external resources do you use to keep up with code? [IF NEEDED: By resources we mean any internal or external sources of information you rely on to keep you informed about code changes. This could be a trade association, regular contact with code officials, lunch-and-learns at your firm or anything else.]

Use of Renewables

[ASK ALL UNLESS OTHERWISE NOTED]

Q34. Have you considered or have you already installed solar photovoltaic (PV) panels to your building at [ADDRESS]? Why?

Program Satisfaction

[ASK ALL UNLESS OTHERWISE NOTED]

For the next few questions, I would like your perspective about any interactions you may have had with Energy Trust staff and any experience you may have with Energy Trust training.

Q35. What, if anything, did you most appreciate about the support and incentives you received for the project at [ADDRESS]?

Q36. What, if anything, could be improved about the support and incentives you received for the project at [ADDRESS]?

Q37. Have you ever attended training or educational events sponsored by Energy Trust in the last two years? What were the topics of those trainings?

[ASK IF Q33 INDICATES RESPONDENT ATTENDED TRAINING]

Q38. What was valuable, if anything about the training you received?

DEI Goals

[ASK ALL UNLESS OTHERWISE NOTED]

Q39. Energy Trust has specific goals to increase trade ally and program participation in their commercial programs, especially among MBE or WBE businesses. What, if anything, could Energy Trust do to better support and attract MBE and WBE businesses to the program?

Recommendations for Future

[ASK ALL UNLESS OTHERWISE NOTED]

Q40. What topics or considerations should Energy Trust be looking at to help the market develop and build high efficiency buildings, especially those exceeding code, over the next three to five years?

Q41. How is the program doing in addressing the needs of the current new construction market? Do you have any recommendations for improvement? Are there any future trends that the program should be thinking about?

Those are all those questions I have for you. Thanks for your time and feedback.

7.4 Appendix D: Nonparticipant Guide

Overview of Data Collection Activity

DESCRIPTOR	THIS INSTRUMENT
Instrument Type	In-depth interview
Estimated Time to Complete	15 minutes
Population Description	Representatives of projects subject to 2019-21 energy code and that did not participate in the New Buildings program
Sampling Strata Definitions	None
Population Size (projects)	~500
Contact List Size	~500
Completion Goal(s) (projects)	80
Contact List Source and Date	Dodge data on construction projects in Oregon
Type of Sampling	Random
Contact Sought	Key person responsible for project
Fielding Firm	ADM
Incentive	$100 per completed interview

Research Topics and Associated Questions

RESEARCH TOPIC	ASSOCIATED QUESTIONS
Firm characteristics	
New construction services provided	Q1, Q2, Q7
Major markets worked in	Q11, Q7
Number of Oregon projects by building type	Q7
Number of projects enrolled in Energy Trust program	Q9 to Q15
Code paths of projects	Q18 to Q28
Modelling software	Q8
Program awareness, reasons for nonparticipation, suggestions for improvements in program design, actions, and services	Q9 to Q16
Information on Program involvement, if applicable	Q9 to Q16
Challenges and concerns with new code, suggestions for changes	Q18 to Q28
Perceived short- and long-term trends in and affecting market	Q29 to Q30, Q64, Q65
Training and education	
General training needs	Q33 and Q34
Use/value of Energy Trust training and education resources	Q57 to Q60
Effect of trainings on energy efficiency decisions	Q57 to Q60

Recruitment Scripts

Email

Subject line: Energy Trust of Oregon will give you a $100 gift card for your input on new construction codes

Hello [NAME],

As part of Energy Trust of Oregon's continuing efforts to improve its services to the commercial new building market, it is seeking information on how the new commercial energy code affects decisions about design and equipment choice in new construction projects.

Energy Trust has asked us to talk to building owners, and member of the building trades who support them, about recent new commercial construction projects. We would like to speak with you about your new construction projects and learn a bit about what you and your design team considered when designing your project to meet code. We anticipate this discussion will last about 30 minutes.

Can you suggest a time when you would be available in the next few weeks to talk about your participation? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. If

you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Thanks for your consideration. If we do not hear back from you in the next couple of days, we will follow up with a phone call.

Phone

Hello,

My name is _____. I am calling from ADM Associates on behalf of Energy Trust of Oregon.

As part of Energy Trust's continuing efforts to improve services to the commercial new building market, it has hired ADM to talk to building owners, and member of the building trades who support them, about recent new commercial construction projects. The purpose is to find out how the new commercial energy code affects decisions about design and equipment choice in new construction projects.

We would like to speak with you about your new construction projects and learn a bit about what you and your design team considered when designing your project to meet code. We anticipate this interview will last about 30 minutes.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, I would be happy to send you a link to ADM's privacy policy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Can you suggest a time when you would be available in the next few weeks to talk about your participation? As a thank you for your assistance, we are providing a $100 gift card to all those that complete interviews.

Introduction

Hello,

My name is _____ and I work for ADM and am working on the Energy Trust New Buildings Market Research project.

As a recap to our previous [*email exchange or phone conversation*], we are conducting this interview today to help us understand how building owners and those in the building trades who support them are managing new construction and major renovation projects under the new commercial code. I anticipate this interview will last about 30 minutes.

I'll start with some introduction/background questions and then get into questions about how you're designing projects under the new code.

Please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. The recording is confidential. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes as best as possible

Screening

[ASK ALL]
S1. First, can you confirm that your organization recently carried out a new commercial construction or major renovation project that is subject to 2019 or 2021 energy codes at [ADDRESS]?

[SINGLE RESPONSE]

[Do not read:]
1. Yes
2. No [ASK IF THERE IS SOMEONE ELSE THAT CAN HELP, IF NOT THANK AND TERMINATE]
3. Don't know [THANK AND TERMINATE]
4. Refused [THANK AND TERMINATE]

[ASK ALL]
S2. Did the project at [ADDRESS] have conditioned space? [If needed: Was it a project in a building as opposed to an outside facility like a baseball field or parking lot]

[SINGLE RESPONSE]

[Do not read:]
1. Yes, it was in a building with conditioned space
2. No, it was a project like a baseball field, parking lot, etc.
3. Don't know [THANK AND TERMINATE]
4. Refused [THANK AND TERMINATE]

[ASK ALL]
S3. Did you apply for Energy Trust incentives for this project?

[SINGLE RESPONSE]

[Do not read:]
1. Yes
2. No
3. Don't know [THANK AND TERMINATE]
4. Refused [THANK AND TERMINATE]

[ASK IF S3 = 1]
S4. Did you receive Energy Trust incentives for this project?

[SINGLE RESPONSE]

[Do not read:]
1. Yes
2. No
3. Don't know [THANK AND TERMINATE]
4. Refused [THANK AND TERMINATE]

[ASK IF S4 = 2]
S5. Why did you not receive incentives?

Thanks for answering those first few questions. I would not like to ask a few more questions about the project located at [ADDRESS].

Introduction and Background

My first few questions are about your company, your role in the company, and your background in the industry. So, to start….

[ASK ALL]
Q1. Which of the following best describes your role in the design and construction of new buildings and major renovations?

[SINGLE RESPONSE]
5. Building owner or developer
6. Owner representative
7. Design professional (e.g., architect, engineer, or energy analyst)
8. Green building/sustainability consultant
9. Construction project manager
10. Contractor (e.g., general contractor or specialty contractor involved in construction)
11. Other_____

[ASK IF Q1 ≠ 1]
Q2. My understanding is that you work for a [*fill in information call list that identifies firm type*] Is that correct? [*Select firm type reported by respondent*]

[MULTIPLE RESPONSE]
1. Architecture firm
2. Engineering firm
3. General contractor
4. Design-Build firm (Involved in design through construction phase))
5. Commercial developer
6. Building owner
7. Green building/sustainability consultant
8. Other_____

[ASK ALL]
Q3. Is your company certified by COBID (Certification Office for Business Inclusion and Diversity) in Oregon? [*COBID aims "to level the playing field by providing certified firms a fair opportunity to compete for government contracts regardless of owner ethnicity, gender, disability, or firm size."]*

[SINGLE RESPONSE]
1. Yes, we are certified by COBID
2. No, we are not certified by COBID

[ASK ALL]
Q4. What is your job title at your organization?

[ASK ALL]
Q5. How long have you personally been involved in the construction of new commercial buildings and major renovations?

[ASK ALL]
Q6. What portion of all your new commercial construction work in Oregon is in …?

[Interviewer: These values should add to 100%.]

[NUMERIC RESPONSE]
1. Portland metro area (Multnomah, Washington, Clackamas Counties) [FORCE NUMERIC RESPONSE]
2. Other areas in Oregon [FORCE NUMERIC RESPONSE]

[ASK ALL]
Q7. How many of each of the following types of construction projects have you worked on in the last year in Oregon?

[MULTIPLE RESPONSE]

[Do not read, probe to code:]
1. Office
2. Retail (shops, grocery, car dealer)
3. School
4. Warehouse
5. Multifamily
6. Government/Institution
7. Industrial
8. Other, please specify: [OPEN-ENDED RESPONSE]
9. Not applicable
10. Don't know
11. Refused

[ASK ALL]
Q8. What types of energy modelling software do you or your design team use when constructing new buildings?

Program Awareness and Use

[ASK ALL]
Q9. Prior to this call, how familiar, if at all, were you with the Energy Trust of Oregon and its program to support new commercial buildings? (*If needed: The New Buildings program provides technical and financial support for the construction of energy efficient new buildings and major renovations*).

1. Never heard of the program
2. Knew the program name but not much else
3. Somewhat familiar with the program

4. Very familiar with the program

[ASK IF Q9=1]

Q10. Have you ever worked on a new construction project that received incentives or support from Energy Trust of Oregon?

1. Yes, worked on a project that received Energy Trust support.
2. No, never worked on project that received Energy Trust support

[ASK IF Q10=1]

Q11. Over the course of your career in new construction, how many projects that received Energy Trust support have you been involved in?

[SINGLE RESPONSE]

1. 1 project
2. 2-3 projects
3. 4-5 projects
4. 6-7 projects
5. 8 or more projects
6. Don't know
7. Refused

[ASK IFQ10=1]

Q12. What types of buildings, if any, have you worked on that received Energy Trust support in the last year? [If needed: Is it office space, retail, schools, etc.]

[MULTIPLE RESPONSE]

[Do not read, probe to code:]

1. Office
2. Retail (shops, grocery, car dealer)
3. School
4. Warehouse
5. Multifamily
6. Government/Institution
7. Industrial
8. Other, please specify: [OPEN-ENDED RESPONSE]
9. Not applicable
10. Don't know
11. Refused

[ASK IFQ10=1]

Q13. For the project located at [ADDRESS] why did you not pursue Energy Trust incentives or support? [*Probes: Was the project too small to bother with the program, was the type of building not suited to the program for some reason…etc*.]

[ASK IFQ10=1]

Q14. When did you first learn about the services and incentives Energy Trust offers (the program) for new construction and major renovations?

[SINGLE RESPONSE]
1. Less than 1 year ago
2. 1-3 years
3. 4-6 years
4. 7-9 years
5. 10 or more years
6. Don't know
7. Refused

[ASK IFQ10=1]
Q15. How did you first learn about this program?

[Do not read, probe to code:]

[MULTIPLE RESPONSE]
1. Outreach contact from Program
2. Energy Trust training
3. Client
4. Colleagues/Word of Mouth
5. Online
6. Other, please specify: [OPEN-ENDED RESPONSE]
7. Don't know
8. Refused

[ASK IFQ10=1]
Q16. How long ago did you first participate the program?

[SINGLE RESPONSE]
1. Less than 1 year
2. 1-3 years
3. 4-6 years
4. 7-9 years
5. 10 or more years
6. Don't know
7. Refused

[ASK IF Q1 ≠ 1 or Q1 ≠2, NOT A BUILDING OWNER]
Q17. Do you tell all potential clients (building owners/managers) that you work with about Energy Trust services and incentives for new construction projects, or do you offer them more selectively? How do you present the Energy Trust services and incentives to your clients?

2019 and 2021 Energy Code

[ASK ALL]

Q18. As you may be aware, there were changes to energy code in Oregon in 2019 and 2021. About how many new building projects have you been part of that were subject to the 2019 or 2021 code.

[NUMERIC RESPONSE]

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5 or more
7. Don't know
8. Refused

[ASK IF Q18 >0]

Q19. Did the new building code change how you approach design and construction of new buildings in Oregon?

1. Yes
2. No

[ASK IF Q19 =1]

Q20. What impacts did the changes to the building energy code in 2019 and 2021 have, on your building design decisions and selection of energy-using equipment? [PROBE ABOUT: Design, equipment, code compliance pathways. For design and equipment specifically ask if the impacts are related to lighting, building envelope such as fenestration, or HVAC systems]

[ASK IF Q18 >0]

Q21. What, if any, are the challenges for meeting or exceeding the new code for…?

Make sure to tease out nuance between meeting/exceeding

1. …Lighting
2. …Building Envelope – Mostly Fenestration
3. …HVAC Systems
4. …Other, specify.____

[ASK IF Q21 =1Q18]

Q22. How much of a challenge is meeting the new code for lighting? [Probe: Does it delay the project timeline, increase cost significantly, something else]

[ASK IF Q21 =2Q18]

Q23. How much of a challenge is meeting the new code for building envelope? [Probe: Does it delay the project timeline, increase cost significantly, something else]

[ASK IF Q21 =3Q18]

Q24. How much of a challenge is meeting the new code for HVAC systems? [Probe: Does it delay the project timeline, increase cost significantly, something else]

[ASK IF Q21 =4Q18]

Q25. How much of a challenge is meeting the new code for lighting? [Probe: Does it delay the project timeline, increase cost significantly, something else]

[ASK IF Q18 >0]
Q26. How, if at all, did these changes to energy code positively affect any recent building projects?

[ASK IF Q18 >0]
Q27. What changes, if any, would you like to see made to the energy code? Why?

[ASK ALL]
Q28. What internal (your company) and external (trade associations etc.) resources do you use to keep up with code?
[*IF NEEDED: By resources we mean any internal or external sources of information you rely on to keep you informed about code changes. This could be a trade association, regular contact with code officials, lunch-and-learns at your firm or anything else*.]

Market Trends: Motivations and Barriers to Efficiency

The next several questions are about the market for new commercial buildings in Oregon and your thoughts about what may motivate or inhibit construction of high efficiency buildings.

[ASK ALL]
Q29. Who are the key decision makers in new building projects you worked on and what are their key roles? [*If needed: Key decision makers may be an architect, building owner, corporate headquarter staff, or someone else.*]

[ASK IF Q1 ≠ 1, NOT A BUILDING OWNER]
Q30. What do you think motivates building owners to invest in energy efficiency (eg high efficient HVAC, building envelopes, water heaters, and lighting)? [*If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.*]

[ASK IF Q1= 1, BUILDING OWNER]
Q31. What motivates you to invest in energy efficiency in your buildings? [*If needed: Is it demand from potential tenants, long term energy savings, increasing the comfort level of building's occupants, improving building control and operation systems, certain official sustainability recognition certifications such as LEED used as a selling point and for marketing purposes etc. EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.*]

[ASK ALL]
Q32. What prevents owners [IF Q1=1 "Such as yourself"] from constructing energy efficient buildings beyond code? How big of a barrier is cost when compared to other factors? [*If "lack of interest," or "higher cost" ask "anything else?" If needed: Is it the time needed to design an efficient building compared to a code built building? Is it a lack of equipment availability? Is it a lack of trained professionals or expertise to help with*

design and construction? Something else? EE is defined as designing buildings to and specifying equipment that goes beyond code requirements.]

Training and Education

[ASK ALL]
Q33. What types of training and education, if any, in commercial construction have you received in the last few years? *[If needed: By training this could be additional certifications, lunch-and-learns, trade association meetings, conferences, etc.]*

[ASK ALL]
Q34. What types of training and education, if any, in commercial construction would you like to see provided to you or firms like yours? *[If needed: This could be technical training, program specific training, training about code changes, etc.]*

[ASK ALL]
Q35. Have you attended any training or educational events sponsored by Energy Trust in the last two years?

1. Yes
2. No

[ASK IF Q57= YES]
Q36. How useful were those events to you and why?

[ASK IF Q57= YES]
Q37. What, if any, training or assistance did you receive from Energy Trust to help you understand code changes?

[ASK IF Q57= YES]
Q38. What other topics did Energy Trust cover in the training or educational events?

Recommendations for Future

[ASK ALL]
Q39. What topics or considerations should Energy Trust be looking at to help the market develop and build high efficiency buildings exceeding code, over the next three to five years?

[ASK ALL]
Q40. Are there any future trends in the construction of energy efficient new buildings that Energy Trust should be thinking about?

1. [OPEN-ENDED RESPONSE]

Thank you for taking the time to complete this important interview! Have a great day!

7.5 Appendix E: Code Officials Guide

Overview of Data Collection Activity

DESCRIPTOR	THIS INSTRUMENT
Instrument Type	In-depth interview guide
Estimated Time to Complete	20-30 minutes
Population Description	Oregon Code Officials
Sampling Strata Definitions	None
Population Size (projects)	NA
Contact List Size	~80
Completion Goal(s) (projects)	10 interviews
Contact List Source and Date	Lists of code officials from government website
Type of Sampling	Random
Contact Sought	Commercial Code Officials
Fielding Firm	JCG
Incentive	None- City/Government Officials not allowed to receive incentives

Recruitment Scripts

Email

Hello [NAME],

As part of Energy Trust of Oregon's continuing efforts to improve its services to the commercial new building market, it is seeking information on how the new commercial energy code affects decisions about design and equipment choice in new construction projects.

Energy Trust has asked us to talk to code officials, like yourself, to better understand how the new code changes have affected commercial building operations in Oregon.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Thanks for your consideration. If we do not hear back from you in the next couple of days, we will follow up with a phone call.

Phone

Hello, my name is _____ from Johnson Consulting Group. My firm has been hired by the Energy Trust of Oregon . We're talking to code officials like yourself to better understand how the code changes have affected commercial building operation . If you have time, I'd like to schedule a time to talk with you about the pumps market. This interview will take about 20 minutes.

When is a convenient time to talk?

1. Day:
2. Time:
3. Link:

Schedule call back. I understand you're busy. When would be a good time to call back to schedule this interview?

4. Contact Name:
5. City/County:
6. Contact Email:
7. Telephone Number:
8. Interview Date:
9. City:

Type of Organization:

1. City Code Official
2. County Code Official
3. State Code Official

Introduction

Hello. Thanks for talking with me today. Would it be alright if I recorded this interview? All your responses will be kept confidential. (*Proceed and record if permission is granted; If decline*

recording, continue interview with notes only). First, I'd like to get a little bit of information about your organization.

Qualifying Questions

[ASK ALL]
Q1. Are you currently involved in conducting code inspections for commercial buildings?

1. Yes
2. No
3. Don't Know

[ASK IF Q1 =2]
Q2. Who would be the right person for me to talk to about commercial code building enforcement in your city/county?

1. _____alternative contact name- [THANK AND TERMINATE]

Code Changes from 2019 and 2021

[ASK ALL]
Q3. On average, about how many commercial buildings did you inspect/review in 2021? An estimate is fine.

[ASK ALL]
Q4. What percent of these were for new construction of commercial buildings and what percent were for retrofit/existing buildings?

1. _____% new construction
2. _____% existing/retrofits

[ASK ALL]
Q5. About what percentage are buildings going through the performance pathway?

[ASK ALL]
Q6. About what percentage are buildings going through the prescriptive pathway?

[ASK ALL]
Q7. Exploring the pathways more fully, what are the challenges for building owners/managers in achieving compliance for buildings going through the performance pathway?

[ASK ALL]
Q8. What are the challenges for building owners/managers in achieving compliance for buildings going through the prescriptive pathway?

[ASK ALL]
Q9. Are either of these pathways easier for building owners/managers? Why?

[ASK ALL]
Q10. Are projects in your area choosing one pathway more than the other? Why?

[ASK ALL]
Q11. What patterns, if any do you see in project types choosing one pathway over another? For example, are schools choosing the performance pathway towards compliance and multifamily selecting prescriptive paths? Why do you say that?

[ASK ALL]
Q12. Were all of these commercial buildings affected by the changes in the Oregon Building Codes in 2019 and 2021?

1. Yes
2. No
3. Don't Know

[ASK IF Q12=2]
Q13. Why were some buildings not affected by changes in the energy codes?

[ASK ALL]
Q14. What impacts did the changes in the energy code have in the building's design or operation? [PROBE ABOUT: Design, equipment, code compliance pathways. For design and equipment specifically ask if the impacts are related to lighting, building envelopes such as fenestration, or HVAC systems]

[ASK ALL]
Q15. What types of feedback, if any, have you received from building owners and managers about these new code requirements? (Probe on following building systems)

1. Lighting
2. Building Envelope – Mostly Fenestration
3. HVAC Systems
4. Other, specify.____
5. No direct feedback from building owners/managers

[ASK ALL]
Q16. How, if at all, has feedback differed based on the type of building owner/manager? For example, have owners of government buildings like schools differed from those constructing retail or multifamily?

[ASK ALL]
Q17. Have these code changes caused delays in completing the commercial building projects?

1. Yes
2. No

3. Don't Know

[ASK ALL]
Q18. In your opinion, how, if at all, did these energy code changes code positively affect any recent building projects?

[ASK ALL]
Q19. In your opinion, how, if at all, did these energy code changes negatively affect any recent building projects?

[ASK ALL]
Q20. What changes, if any, would you like to see made to the energy code? Why?

Program Awareness and Use

[ASK ALL]
Q21. Prior to this call, how familiar, if at all, were you with the Energy Trust of Oregon and its program to support new commercial buildings? (*If needed: The New Buildings program provides technical and financial support for the construction of energy efficient new buildings and major renovations*).

1. Never heard of the program
2. Knew the program name but not much else
3. Somewhat familiar with the program
4. Very familiar with the program

[ASK ALL]
Q22. Are you aware of any other (non-Energy Trust) codes programs?

[ASK ALL]
Q23. Please tell me about those programs?

[ASK ALL]
Q24. How do they compare to the Energy Trust Codes Programs?

[ASK ALL]
Q25. What internal (your company) and external (trade associations etc.) resources do you use to keep up with code? [IF NEEDED: By resources we mean any internal or external sources of information you rely on to keep you informed about code changes. This could be a trade association, regular contact with code officials, lunch-and-learns at your firm or anything else.]

[ASK ALL]

Q26. What types of training and education, if any, in commercial construction would you like to see provided to organizations like yours? *[If needed: This could be technical training, program specific training, training about code changes, etc.]*

[ASK ALL]
Q27. Have you attended any training or educational events sponsored by Energy Trust in the last two years?

1. Yes
2. No

[ASK IF Q27=1]
Q28. How useful were those events to you and why?

[ASK ALL]
Q29. What, if any, training, or assistance did you receive from Energy Trust to help you understand code changes?

Recommendations for Future

[ASK ALL]
Q30. What topics or considerations should Energy Trust be looking at to help the market develop and build high-efficiency buildings exceeding code, over the next three to five years? *Probe for:* How will moves to electrification affect building codes going forward? *Probe for*: What, if any, emerging technologies will drive energy efficiency in buildings? *Probe f*or: How, if at all, will on-site renewables affect energy codes in the next five-ten years?

[ASK ALL]
Q31. Are there any future trends in the construction of energy efficient new buildings that Energy Trust should be thinking about?

[ASK ALL]
Q32. Is there anything else you would like to add to what we've discussed today?

7.6 Appendix F: Market Expert Guide

Overview of Data Collection Activity

DESCRIPTOR	THIS INSTRUMENT
Instrument Type	In-depth interview guide
Estimated Time to Complete	20
Population Description	Market Actors (Commercial Building Experts, Building Services and Technologies Suppliers)
Sampling Strata Definitions	None
Population Size (projects)	NA
Contact List Size	~300
Completion Goal(s) (projects)	14 interviews- 8 experts; 6 Cx agents
Contact List Source and Date	Lists of code officials, building experts, commissioning agents, etc.
Type of Sampling	Random
Contact Sought	Familiar with Oregon Code Changes
Fielding Firm	JCG
Incentive	$100.00

Recruitment Scripts

Email

Hello [NAME],

As part of Energy Trust of Oregon's continuing efforts to improve its services to the commercial new building market, it is seeking information on how the new commercial energy code affects decisions about design and equipment choice in new construction projects.

Energy Trust has asked us to talk to commercial building experts like yourself to understand how the new code changes have affected commercial building operations in Oregon.

We will treat all data collected in this study confidentially. If you have questions about how we treat collected data, please see ADM's privacy policy at https://www.admenergy.com/privacy. If you have questions about the study purposes, please contact Dan Rubado at Energy Trust at dan.rubado@energytrust.org.

Thanks for your consideration. This interview will take about 20 minutes and in exchange your participation, we will send you an email gift card worth $100.00. If we do not hear back from you in the next couple of days, we will follow up with a phone call.

Phone

Hello, my name is _____ from Johnson Consulting Group. Energy Trust of Oregon has hired my firm. We're talking to building professionals like yourself about the code changes in Oregon. If you have time, I'd like to schedule a time to speak with you about Oregon energy code changes. This interview will take about 20 minutes and in exchange your participation, we will send you an email gift card worth $100.00.

When is a convenient time to talk?

1. Day:
2. Time:
3. Link:

Schedule call back. I understand you're busy. When would be a good time to call back to schedule this interview?

1. Contact Name:
2. City/County:
3. Contact Email:
4. Telephone Number:
5. Interview Date:
6. City:

Type of Organization

1. Commercial Building Experts ($100 stipend)
2. Building Services/Technologies Experts ($100 stipend)

Hello. Thanks for talking with me today. Would it be all right if I recorded this interview? All your responses will be kept confidential. **(Proceed and record if permission is granted; If decline recording, continue the interview with notes only).** First, I'd like to get a little bit of information about your organization.

Qualifying Questions

[ASK ALL]
Q1. Are you currently involved in the commercial buildings market in Oregon?

1. Yes
2. No
3. Don't Know

[ASK IF Q1 =2]
Q2. Who would be the right person for me to talk to about commercial buildings market in your organization?

1. Alternative contact name:_____[THANK AND TERMINATE]
2. Don't Know [THANK AND TERMINATE]

[ASK ALL]
Q3. What is your firm's primary business in terms of your work in the commercial and/or industrial market?

1. Building engineer
2. Commissioning agent
3. Other, please specify:_____

Firmographic Questions

[ASK ALL]
Q4. How long has your organization been providing these services?

[ASK ALL]
Q5. What percentage of your work each year is related to the Commercial Buildings Market?

[ASK ALL]
Q6. What portion of all your new commercial construction work in Oregon is in …?
[Interviewer: These values should add to 100%.]

1. Portland metro area (Multnomah, Washington, Clackamas Counties) [FORCE NUMERIC RESPONSE]
2. Other areas in Oregon [FORCE NUMERIC RESPONSE]

Program Awareness and Use

[ASK ALL]
Q7. Prior to this call, how familiar, if at all, were you with the Energy Trust of Oregon and its program to support new commercial buildings? (*If needed: The New Buildings program*

provides technical and financial support for the construction of energy-efficient new buildings and major renovations).

1. Never heard of the program -
2. Knew the program name but not much else-
3. Somewhat familiar with the program
4. Very familiar with the program

[ASK IF Q7>2]
Q8. How would you describe your experience with the Energy Trust Program?

[ASK IF Q7>2]
Q9. Did the program provide guidance regarding the program pathways?

[ASK IF Q7>2]
Q10. Did the program provide guidance on how to effectively exceed the 2019/2021 code requirements? Why?

[ASK ALL]
Q11. Are there particular hurdles for major renovations to exceed 2019-21 code that new construction projects do not face? If so, what are the hurdles?

[ASK IF Q7>2]
Q12. How can Energy Trust reduce those hurdles? (OPEN END)

[ASK ALL]
Q13. What internal (your company) and external (trade associations etc.) resources do you use to keep up with code? [*IF NEEDED: By resources, we mean any internal or external sources of information you rely on to keep you informed about code changes. This could be a trade association, regular contact with code officials, lunch-and-learns at your firm or anything else*.]

[ASK ALL]
Q14. What types of training and education in commercial construction would you like to see provided to you or firms like yours? *[If needed: This could be technical training, program-specific training, training about code changes, etc.]*

[ASK ALL]
Q15. Have you attended any training or educational events sponsored by Energy Trust in the last two years?

[ASK IF Q15 INDICATES THEY RECEIVED TRAINING]
Q16. How valuable were those events to you and why?

[ASK ALL]

Q17. What training or assistance, if any, did you receive from Energy Trust to help you understand code changes?

2019 and 2021 Energy Code

[ASK ALL]
Q18. As you may be aware, there were changes to the energy code in Oregon in 2019 and 2021. About how many new building projects have you been part of that were subject to the 2019 or 2021 code?

1. 0
2. 1
3. 2
4. 3
5. 4
6. 5 or more
7. Don't know
8. Refused

[ASK ALL]
Q19. Did the new building code change your approach to specifying or commissioning new buildings in Oregon?

[ASK ALL]
Q20. Are you aware of the different pathways for commercial buildings (i.e., prescriptive vs. performance?)

[ASK ALL]
Q21. Exploring the pathways more fully, what are the challenges do you face in achieving compliance for buildings going through the performance pathway?

[ASK ALL]
Q22. What are the challenges do you face in achieving compliance for buildings going through the prescriptive pathway?

[ASK ALL]
Q23. Are either of these pathways easier? Why?

[ASK ALL]
Q24. Are projects in your area choosing one pathway more than the other? Why?

[ASK ALL]
Q25. What impacts did the changes to the building energy code in 2019 and 2021 have on your building design decisions and selection of energy-using equipment?
[PROBE ABOUT: Design, equipment, code compliance pathways. For design and

equipment, specifically ask if the impacts are related to lighting, building envelopes such as fenestration, or HVAC systems]

[ASK ALL]
Q26. What are the challenges for meeting or exceeding the new code for…?
[*Interviewer note: Make sure to tease out nuance between meeting/exceeding*]

1. …Lighting
2. …Building Envelope – Mostly Fenestration
3. …HVAC Systems
4. …Other, specify.____

[ASK ALL]
Q27. How much of a challenge is meeting the new code for lighting for the projects you worked on? [Probe: Does it delay the project timeline, increase the cost significantly, or something else]

[ASK ALL]
Q28. How much of a challenge is meeting the new code for building an envelope for the projects you worked on? [Probe: Does it delay the project timeline, increase the cost significantly, or something else]

[ASK ALL]
Q29. For the projects that you've worked on, how much of a challenge is meeting the new code for HVAC systems? [Probe: Does it delay the project timeline, increase the cost significantly, or something else]

[ASK ALL]
Q30. How much of a challenge is meeting the new code for any other energy using equipment? [Probe: Does it delay the project timeline, increase the cost significantly, something else]

[ASK ALL]
Q31. How, if at all, did these changes to the energy code positively affect any recent building projects]

[ASK ALL]
Q32. What changes, if any, would you like to see made to the energy code? Why?

Incremental Costs from the Oregon Energy Code Changes

[ASK ALL]
Q33. Considering construction costs alone and excluding any incentives, does it cost more, less, or about the same to construct a highly efficient (e.g., NZ) building as a code-built building due to these code changes?

[ASK IF Q33 = MORE]
Q34. As a percentage of the cost of a code-built building, how much more does it cost?

[ASK IF Q33 = MORE]

Q35. On average, how long does it take to recoup the extra cost of the highly efficient building in energy savings?

[ASK IF Q33 = LESS]
Q36. As a percentage of the cost of a code-built building, how much less does it cost?

[ASK ALL]
Q37. Now, including incentives from Energy Trust, on average, how long does it take to recoup the extra cost of the highly efficient building in energy savings?

Recommendations for Future

[ASK ALL]
Q38. What topics or considerations should Energy Trust be looking at to help the market develop and build high-efficiency buildings exceeding code, over the next three to five years? *Probe for: How will moves to electrification affect building codes going forward? Probe for: What, if any, emerging technologies will drive energy efficiency in buildings? Probe for: How, if at all, will on-site renewables affect energy codes in the next five-ten years?*

[ASK ALL]
Q39. Are there any future trends in the construction of energy efficient new buildings that Energy Trust should be thinking about?

[ASK ALL]
Q40. Is there anything else you would like to add to what we've discussed today?

Thank you for taking the time to complete this important interview! Have a great day! I want to confirm your email so we can send you the $100 electronic gift card.

Confirm email_____

7.7 Appendix G: CoStar and CBSA Analysis

The CoStar database shows there were 896 buildings, constituting 44.9M square feet of rentable space, built in the years 2019-21 across nine building types. The types of buildings reported by CoStar reflect CoStar's purpose of serving as a resource for the commercial leasing market. For example, there are no government or religious buildings reported in this dataset, likely because municipalities and congregations own, not rent, those building types (Table 1).

Table 1: CoStar Building Type Projects and Square Footage

Building Type	Projects		Square Feet	
	Projects	Percent	Sum	Percent
Multifamily	410	46%	25,638,924	57%
Stores and Restaurants	217	24%	2,131,215	5%
Offices and Bank Buildings	110	12%	5,879,662	13%
Specialty	54	6%	3,886,925	9%
Hotels and Motels	51	6%	2,838,533	6%
Flex	33	4%	1,812,929	4%
Hospitals and Other Health	10	1%	1,196,974	3%
Schools	7	1%	993,481	2%
Amusement, Social, and Rec.	4	0%	472,778	1%
Total	896	100%	44,851,421	100%

Examining the CoStar database building types with the corresponding building types in the Dodge database shows notable differences in estimates of projects and square footage. For instance, the CoStar database shows 896 projects completed from 2019 to 2021, whereas the Dodge database shows 3,597 projects in the same time frame, 4.4 times more projects than CoStar. The difference is less pronounced when examined by total square footage – 61.4M square feet in Dodge and 39.1M square feet in CoStar – but the difference is still notable. Specific building types, like the stores and restaurants category, align more closely but, in most cases, there are large discrepancies seen when we examine the ratio of the two data sources, especially for the count of projects (

Table 2).

Table 2: Comparison of Dodge to CoStar for Building Types that Align, 2019 to 2021

Building Type	Dodge		CoStar		Ratio (Dodge/CoStar)	
	Projects	Sq. Feet	Projects	Sq. Feet	Projects	Sq. Feet
Multifamily	1,197	36,979,034	410	25,638,924	2.9	1.4
Office and Bank Buildings	950	10,949,748	110	5,879,662	8.6	1.9
Schools	555	6,776,884	7	993,481	79.3	6.8
Stores and Restaurants	513	2,038,793	217	2,131,215	2.4	1.0
Amusement, Social and Rec.	185	934,099	4	472,778	46.3	2.0
Hospitals and Other Health	166	3,177,256	10	1,196,974	16.6	2.7
Hotels and Motels	31	592,468	51	2,838,533	0.6	0.2
Total	3,597	61,448,282	809	39,151,567	4.4	1.6

The 2019 CBSA report shows an increase of about 71M square feet of building space in Oregon from 2014 to 2019, a number notably lower than what we estimate using Dodge data. If the market added an equal amount of square footage per year, there was almost 11.9M square feet of space constructed each year from 2014 to 2019. The Dodge database shows the market added about 119M square feet of space from 2014 to 2019, however, as noted in the report body 4.1, the Dodge square footage data is incomplete. Only about one-third (32%) of records in Dodge have square footage data listed. Adjusting for this missing data by assuming that the two-thirds of records without square footage data would have a similar distribution of square footage across building types shows there was about 371M square feet of space constructed from 2014 to 2019, an amount 5.2 times greater than the CBSA estimate (Table 3).

Table 3: CBSA Compared to Dodge by Year

Year	CBSA	Reported Dodge Sq. Ft	Estimated Dodge Sq. Ft
2014	11,867,212	13,703,000	42,821,875
2015	11,867,212	13,427,000	41,959,375
2016	11,867,212	20,453,000	63,915,625
2017	11,867,212	19,829,472	61,967,101
2018	11,867,212	19,829,472	61,967,101
2019	11,867,212	31,734,889	99,171,528
Total	71,203,271	118,976,834	371,802,605