

DOCKETED	
Docket Number:	24-BSTD-05
Project Title:	2025 Energy Code Compliance Initiatives
TN #:	266084
Document Title:	Surveys with Contractors and Installers, HERS Raters, and Acceptance Test Technicians
Description:	This report offers detailed insights into the concerns of the contractors and installers/technicians (contractors), Home Energy Rating System raters (HERS raters), and Acceptance Test Technicians and Employers (ATTs) involved in the California Energy Code (Energy Code) compliance process.
Filer:	Archana Etikala
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	9/19/2025 1:42:56 PM
Docketed Date:	9/19/2025



**CALIFORNIA
ENERGY COMMISSION**



**CALIFORNIA
NATURAL
RESOURCES
AGENCY**

Arup US, Inc.

CONSULTANT REPORT

Surveys with Contractors and Installers, HERS Raters, and Acceptance Test Technicians

Final Report

Prepared for: California Energy Commission

**Prepared by: Center for Sustainable Energy under direction of Arup
US, Inc.**

ARUP



Center for
Sustainable
Energy®



May 2025 | CEC-400-2025-014-AT2

Arup US, Inc.

Kara Crohn, Center for Sustainable Energy
Anjelica Thang, Center for Sustainable Energy
Amber Moore, Center for Sustainable Energy
Cecila De La Fuente Chavez, Center for Sustainable Energy
Christian Sheja, Center for Sustainable Energy
Crystal Price, KMEA

Primary Authors

Dema Tzamaras, Center for Sustainable Energy
Sahar Abbaszadeh, Arup

Project Managers

Arup US, Inc.
900 Wilshire Boulevard, 19th floor
Los Angeles, CA 90017
(310) 578-4400
[Arup US](http://www.arup.com) (www.arup.com)

Contract Number: 400-21-005

Elizabeth Butler
Commission Agreement Manager

Che Geiser
Branch Manager
Standards Compliance Branch

Archana Etikala
Work Authorization Manager

Chris Olvera
Work Authorization Manager

Cheng Moua
Daniel Wong
Joe Loyer
Yung Nguyen
Subject Matter Experts

Will Vicent
Deputy Director
Building Standards

Michael J. Sokol
Director
Efficiency Division

Drew Bohan
Executive Director

DISCLAIMER

This report was prepared as the result of work sponsored by the California Energy Commission (CEC). It does not necessarily represent the views of the CEC, its employees, or the State of California. The CEC, the State of California, its employees, contractors, and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the use of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the CEC nor has the CEC passed upon the accuracy or adequacy of the information in this report.

ACKNOWLEDGEMENTS

The report authors and California Energy Commission are grateful for the licensing boards and certifying bodies that made it possible to distribute this survey, including the California Department of Consumer Affairs Contractors State License Board, the Home Energy Rating System Providers, and the Acceptance Test Technician Providers. We are equally grateful for those contractors, installers/technicians, HERS raters, and Acceptance Testing Technicians and Employers who took time to respond to the surveys and share their insight on Energy Code compliance and permitting. We also appreciate the support of our Center for Sustainable Energy colleagues, including Jamie Orose, Latrice Puckett, and Janet Bowers, who performed survey testing and provided advice to the core research team.

ABSTRACT

This report offers detailed insights into the concerns of the contractors and installers/technicians (contractors), Home Energy Rating System raters (HERS raters), and Acceptance Test Technicians and Employers (ATTs) involved in the California Energy Code (Energy Code) compliance process. This report supports the California Energy Commission's task, as required by Senate Bill 1206 (Skinner, statutes of 2022), to conduct an analysis of issues preventing compliance with Energy Code requirements, with recommendations for strategies to improve permitting processes. While the Senate Bill has a broader purview, this report focuses on improvements in the Energy Code compliance process informed by those working in the field.

Information was gathered through surveys conducted with contractors, HERS raters, and ATTs. Surveys were distributed through the California State Licensing Board (CSLB), HERS Provider, and a select number of Acceptance Test Technician Certification Providers (ATTCs). Survey participants included those who worked in every region of the state, in residential and commercial sectors, and on a variety of building and equipment types.

Current issues mentioned among contractors, HERS raters, and ATTs that negatively affect Energy Code compliance include failure to apply for permits due to cost and competition pressures, lack of awareness of requirements, lack of early coordination with HERS raters, ATTs, and authorities having jurisdiction (AHJ) to ensure requirements are met prior to project completion, lack of consistent enforcement standards and pressures to falsify paperwork, and burdensome paperwork and processes.

Key recommendations for policymakers interested in improving Energy Code compliance include code compliance education and training, streamlining code compliance processes, and increased enforcement through incentives and penalties.

Keywords: Energy Code, permitting, contractor, installer, HERS rater, Acceptance Test Technician, Authority Having Jurisdiction, single-family, multifamily, new construction, addition, alteration, Energy Code compliance, streamlining permitting, Energy Code enforcement, falsification, Building Energy Efficiency Standards

Please use the following citation for this report: (required)

Crohn, Kara, Anjelica Thang, Amber Moore, Cecilia De La Fuente Chavez, Christian Sheja, and Crystal Price. 2025. *Surveys with Contractors and Installers, HERS raters, and Acceptance Test Technicians*. California Energy Commission. Publication Number: CEC-400-2025-014-AT2.

TABLE OF CONTENTS

	Page
Acknowledgements	i
Abstract	ii
Table of Contents.....	iv
List of Figures.....	vii
List of Tables	ix
Executive Summary.....	1
Purpose of Survey Research.....	1
Survey Research Methods.....	1
Survey Respondent Characteristics	1
Key Findings	1
Current Practices Among Contractors, HERS Raters, and ATTs That Affect Energy Code Compliance	2
Barriers to meeting Energy Code requirements.....	3
Improvements needed to help achieve code compliance	4
Conclusions and Recommendations	4
CHAPTER 1: Overview of Contractor, HERS Rater, and Acceptance Test Employer/Technician Surveys	7
Survey Purpose and Intended Use of Report Findings.....	7
Original scope of work	7
Overview of Survey Methods.....	8
Survey Design Approach	8
Survey Distribution Approach	8
Survey Analysis Approach	11
Report Chapter Structure.....	13
CHAPTER 2: Survey Respondent Characteristics.....	16
Contractor, HERS Rater, and ATT Survey Response Rate	16
Geographic Distribution of Survey Respondents	17
Contractor, HERS Rater, and ATT Survey Respondent Characteristics	21
Contractor Survey Respondent Characteristics.....	22
HERS Rater Survey Respondent Characteristics	27
ATT Survey Respondent Characteristics	30
Comparison of Project Types Worked on by Respondents	34
CHAPTER 3: Energy Code Compliance Practices in the Field.....	36
Varying definitions of what a “project” or “job” suggests that it is important to clarify language when describing the industry’s work	37
Some contractors’ decisions to apply for a permit are impacted by project cost and profit margin, and customer pressures	38
Factors that impact a contractor’s decision to pursue a permit	39
Conditions that impact ability to meet Energy Code requirements.....	42

Most contractors do not consult HERS Raters prior to installation	50
Contractors are likely to consult with ATTs at multiple phases of a project.....	55
Most contractors encounter code compliance issues in a quarter or fewer projects inspected by AHJs, HERS Raters, and ATTs.....	60
Contractors and HERS Raters believe a quarter or less alteration/retrofit projects in their region are permitted.....	62
Most contractors consult AHJs on a quarter or less of their projects, but a notable number consult AHJs on over 75% of projects	64
HERS raters are more likely to falsify test results due to cost and peer pressures; ATTs are more likely to falsify due to paperwork problems.....	72
Summary of Key Findings from Contractor, HERS Rater, and ATT Surveys on the Current Practices That Affect Energy Code Compliance.....	76
Definition of a project or job	76
Impact on decision to apply for a permit.....	76
Consultation/hiring of HERS raters and ATTs during project stages.....	77
Percent of addition or alteration/retrofit projects that are actually permitted	77
Frequency of encountering code compliance issues	77
Building department/AHJ consultation, knowledge, and inspection	77
HERS rater and ATT falsification.....	77
CHAPTER 4: Barriers to Energy Code Compliance.....	78
Top challenging aspects of the Energy Code include staying up to date, permit applications, and ensuring equipment installation meets requirements.....	79
Contractor and customer awareness of the need for Energy Code compliance	82
HERS Raters, ATTs, and AHJs Are Likely to Enforce Energy Code but Face Significant Challenges.....	88
Summary of Key Findings from Contractor, HERS Rater, and ATT surveys on the Barriers to Meeting Energy Code Requirements	92
Aspects of the code that are difficult to achieve due to technical challenges, awareness, and understanding	92
Specific points in workflows where compliance issues occur and how that differs among new construction, additions, alteration and repairs, and equipment replacement workflows	93
CHAPTER 5: Recommendations for Improving Energy Code Compliance.....	95
Reducing barriers and encouraging better documentation.....	96
HERS Rater process improvement	100
ATT inspection process improvement	104
Additional support from HERS Providers or ATTCPs	106
How to encourage contractors to ensure better Energy Code compliance	109
Summary of Key Findings from Contractor, HERS Rater, and ATT surveys on the Improvements Needed to Help Achieve Energy Code Compliance.....	114
Reducing barriers and encouraging better documentation.....	115
HERS rater process improvement	115
ATT inspection process improvement.....	115
Additional support from a HERS Provider or ATTCP	116
How to encourage contractors to ensure better Energy Code compliance.....	116

CHAPTER 6: Conclusions and Recommendations.....	117
Despite low response rates, survey respondents are inclusive of a breadth of perspectives	117
Competition and costs make it difficult to justify applying for a permit.....	118
Recommendations for future exploration.....	118
Clunky processes and burdensome paperwork make code compliance less likely across all parties.....	118
Recommendations for future exploration.....	118
Lack of enforcement and consistency undermines Energy Code goals.....	119
Recommendations for future exploration.....	119
Not consulting HERS Raters, ATTs, and AHJs early in the construction process may add cost and delay to Energy Code compliance process	119
Recommendations for future exploration.....	120
Energy Code compliance updates that occur every three years are too fast for entities to stay up to date.....	120
Recommendation for future exploration	121
Glossary	122
APPENDIX A: Survey Methodology	A-1
Survey Design Approach.....	A-1
Survey Distribution Approach and Limitations.....	A-1
Survey Analysis Approach and Limitations.....	A-3
APPENDIX B: Contractor Survey Questions	B-1
Survey Introduction.....	B-1
Section 0: Demographics/Firmographics	B-1
Section 1: Contractor training on Energy Code compliance and process.....	B-9
Section 2: Contractor awareness of Energy Code requirements.....	B-10
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	B-12
Section 4: Contractor and HERS Rater/ATT interactions with Building Departments.....	B-23
Section 5: How to improve Energy Code compliance	B-25
Section 6: Additional comments/feedback.....	B-25
Thank You Page.....	B-26
APPENDIX C: HERS Rater Survey Questions	C-1
Survey Introduction.....	C-1
Section 0: Demographics/Firmographics	C-1
Section 1: HERS rater training on Energy Code compliance and process	C-8
Section 2: HERS rater involvement in Energy Code compliance	C-8
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	C-9
Section 4: Experience with HERS Provider Quality Assurance Audits	C-18
Section 5: How to improve Energy Code compliance	C-19
Section 6: Additional comments/feedback.....	C-19
Thank You Page.....	C-20
APPENDIX D: ATT/ATE Survey Questions	D-1

Survey Introduction.....	D-1
Section 0: Demographics/Firmographics	D-1
Section 1: ATT training on Energy Code compliance and process	D-8
Section 2: ATT involvement in Energy Code compliance	D-9
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	D-10
Section 4: Experience with ATTCP Quality Assurance Audits.....	D-21
Section 5: How to improve Energy Code compliance	D-22
Section 6: Additional comments/feedback.....	D-23
Thank You Page.....	D-23
APPENDIX E: Contractor Survey Data Tables and Summary of Open End Responses.....	E-1
Section 0: Demographics/Firmographics	E-1
Section 1: Contractor training on Energy Code compliance and process.....	E-10
Section 2: Contractor awareness of Energy Code requirements	E-10
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	E-12
Section 4: Contractor and HERS Rater/ATT interactions with Building Departments.....	E-29
Section 5: How to improve Energy Code compliance	E-31
Section 6: Additional comments/feedback.....	E-41
APPENDIX F: HERS Rater Survey Data Tables and Summary of Open End Responses	F-1
Section 0: Demographics/Firmographics	F-1
Section 1: HERS rater training on Energy Code compliance and process	F-8
Section 2: HERS rater involvement in Energy Code compliance	F-8
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	F-10
Section 4: Experience with HERS Provider Quality Assurance Audits	F-28
Section 5: How to improve Energy Code compliance	F-29
Section 6: Additional comments/feedback.....	F-41
APPENDIX G: ATT/ATE Survey Data Tables and Summary of Open End Responses.....	G-1
Section 0: Demographics/Firmographics	G-1
Section 1: ATT training on Energy Code compliance and process	G-9
Section 2: ATT involvement in Energy Code compliance	G-10
Section 3: Challenges that affect comprehensive compliance with the Energy Code.....	G-10
Section 4: Experience with ATTCP Quality Assurance Audits.....	G-24
Section 5: How to improve Energy Code compliance	G-25
Section 6: Additional comments/feedback.....	G-29

LIST OF FIGURES

	Page
Figure 1: Contractor, HERS Rater, and ATT Survey Respondents by Region.....	18
Figure 2: Estimated Number of Single-family Home Projects HERS Rater Respondents’ Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]	29

Figure 3: Estimated Number of Low-rise Multifamily Buildings Projects HERS Rater Respondents' Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]	29
Figure 4: Estimated Number of High-rise Multifamily Buildings Projects HERS Rater Respondents' Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]	29
Figure 5: Definitions of "Project" or "Job" by Contractor, HERS Rater, and ATT Respondents [C8, H11, A12]	38
Figure 6: Percentage of Contractor Respondents' Company's Projects Affected by Conditions That Impacted Ability to Meet Energy Code Requirements [C30]	44
Figure 7: Percentage of Projects HERS Rater Respondents Found Affected by Conditions That Impacted Contractors' Ability to Meet Energy Code Requirements [H28]	45
Figure 8: Percentage of Projects ATT Respondents Found Affected By Conditions That Impacted Contractors' Ability to Meet Energy Code Requirements [A29]	46
Figure 9: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work on Other Building Trade Related Work and Energy Code Related Projects for New Construction and Additions [C19 & C4]	53
Figure 10: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work Only on Energy Code Related Projects for New Construction and Additions [C19 & C4]	54
Figure 11: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work on Energy Code Related Projects and Single-family Homes or Low-rise Multifamily Buildings for New Construction and Additions [C19 & C9 & C4]	55
Figure 12: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work on Other Building Trade Related Work and Energy Code Related Projects for New Construction and Additions [C18 & C4]	58
Figure 13: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work Only on Energy Code Related Projects for New Construction and Additions [C18 & C4]	59
Figure 14: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work on Energy Code Related Projects and High-rise Multifamily Buildings or Nonresidential Buildings for New Construction and Additions [C18 & C9 & C4]	60
Figure 15: Percentage of Contractor Respondents' Projects Where Building Departments/AHJs Enforce Having Certificates of Compliance, Installation, Verification, or Acceptance [C35]	69
Figure 16: Top Aspects of the Energy Code that are Challenging to Understand How To Do (Multiselect) [C17, H15, A16]	80
Figure 17: Energy Code Compliance Flow Diagram	81
Figure 18: Steps of the Energy Code Compliance Process that Contractors Find Challenging to Complete (Multiselect) [C27, H25, A26]	82

LIST OF TABLES

Page

Table 1: CSLB Members by License Type - Total Population and Survey Sample Size	9
Table 2: ATTCP Members – Estimated Total Population and Survey Sample Size.....	11
Table 3: Total Population, Survey Sample, and Survey Response Rate for Contractors, HERS Raters, and ATTs	12
Table 4: Contractor Respondents’ Regions of Work – Coastal, Inland, or Both	13
Table 5: Survey Research Topics Used to Develop and Categorize Survey Questions.....	14
Table 6: Contractor Response Rate Based on License Type [C4]	17
Table 7: Regions of California Where Respondents’ Work Has Taken Place Within [C15, H13, A14].....	18
Table 8: Proportion of Contractor Respondents’ Company’s Work in California Regions [C16]	20
Table 9: Proportion of HERS Rater Respondents’ Testing in California Regions [H14]	20
Table 10: Proportion of ATT Respondents’ Testing in California Regions [A15].....	21
Table 11: Survey Questions Analyzed to Address Survey Characteristics Analysis	22
Table 12: Contractor Respondents’ Work Based on Licenses (Multiselect) [C4]	22
Table 13: Contractor Respondents’ Work Based on License Type	23
Table 14: Contractor Respondents’ Roles in Organization [C5]	23
Table 15: Contractor Respondents’ Company Size [C6]	24
Table 16: Estimated Number of Projects Contractor Respondents’ Company Worked on in 2024 or in a Typical Year within California [C7]	24
Table 17: Property Types Worked on by Contractor Respondents (Multiselect) [C9]	25
Table 18: Contractor Respondents’ Work Based on License Type by Property Types Worked On	25
Table 19: Project Types Contractor Respondents’ Company Worked On [C11]	26
Table 20: Type of Project Work Contractor Respondents’ Company Worked On [C10]	27
Table 21: HERS Rater Respondents’ Training [H4]	28
Table 22: HERS Rater Respondents’ Certification Status [H5].....	28
Table 23: Property Types Worked on by HERS Rater Respondents (Multiselect) [H6]	28
Table 24: Type of Project Work HERS Rater Respondents Conducted HERS Testing On in 2024 or in a Typical Year within California[H7]	30
Table 25: ATT Respondents’ ATTCP Certifications (Multiselect) [A5].....	30
Table 26: ATT Respondents’ Roles in Organization [A6]	31
Table 27: ATT Respondents’ Company Size [A13]	31

Table 28: ATT Respondents’ Estimated Number of Projects Requiring at Least One Acceptance Test Worked on in 2024 or in a Typical Year within California [A11]	31
Table 29: Property Types Worked on by ATT Respondents [A8].....	32
Table 30: Type of Project Work ATT Respondents Typically Conducted Acceptance Testing for New Construction and Additions [A9]	32
Table 31: Type of Project Work ATT Respondents Typically Conducted Acceptance Testing for Alterations/Retrofits [A10]	33
Table 32: Project Type Worked on by Respondents (Multiselect) [C11, H7, A9, A10].....	35
Table 33: Survey Questions Analyzed to Understand Energy Code Compliance Practices in the Field.....	36
Table 34: Aspects That Typically Impact Contractors’ Decisions to Apply for a Permit Indicated by Respondents (Multiselect) [C23, H18, A20]	40
Table 35: Comparison of Factors That Impact Contractors’ Decisions to Apply for a Permit by the Type of Work Performed (New Construction, Addition, and Alteration/Retrofit Projects) [C23 & C11]	41
Table 36: Contractor Responses to Offering the Choice to Complete Work Without a Permit for Single-family Homes or Low-rise Multifamily Buildings [C24].....	42
Table 37: Contractor Responses - Other Conditions that Affect Company’s Ability to Build or Install Equipment in a Way That Meets Energy Code Requirements [C31]	49
Table 38: Measures Taken by Contractor Respondents’ Company to Ensure California Building Code and the Energy Code Compliance Without a Permit [C33]	50
Table 39: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects During Partial Construction Mock-up [C19, H16]	51
Table 40: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects Before Installation/Implementation [C19, H16].....	52
Table 41: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects During Installation/Implementation [C19, H16]	52
Table 42: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects After Installation/Implementation [C19, H16]	52
Table 43: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects During Partial Construction Mock-up [C18, A17].....	56
Table 44: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects Before Installation/Implementation [C18, A17].....	57
Table 45: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects During Installation/Implementation [C18, A17]	57
Table 46: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects After Installation/Implementation [C18].....	57
Table 47: Percentage of Projects Where Contractor Respondents Experienced Issues Complying with the Energy Code as Pointed Out by a Building Department/AHJ Inspector, HERS Rater, or ATT [C32]	61

Table 48: Percentage of Projects Not Meet Energy Code Compliance Upon Initial Review [H21, A22].....	61
Table 49: Percentage of the Addition or Alteration/Retrofit Projects Respondents Think are Actually Permitted [C26, H20, A21]	63
Table 50: Percentage of the Addition or Alteration/Retrofit Projects Contractor Respondents Think are Actually Permitted by Property Types Worked On [C26 & C9]	64
Table 51: Percent of Contractor Respondent Projects that are Consulted with the Building Departments/AHJs [C34]	65
Table 52: Contractor Respondent Themes for Ease of Working with Building Departments/AHJs [C29]	66
Table 53: Contractor Respondent Themes for Difficulty or Circumstance of Working with Building Departments/AHJs [C29]	67
Table 54: Responses to the Percentage of HERS Raters or ATTs that Skip Some Energy Code Compliance Requirements During Post-Installation Inspection [H22, A23]	70
Table 55: Responses to the Percentage of Building Department/AHJ Inspectors that Skip Some Energy Code Compliance Requirements During Post-Installation Inspection [H22, A23].....	70
Table 56: Percentage of Building Department/AHJ Inspectors That Do Not Know to Look for All the HERS Rater/ATT Test Forms [H23, A25]	71
Table 57: Likely Reasons to Falsify Energy Code Compliance Testing (Multiselect) [H24, A24]	72
Table 58: Percentage of HERS Rater Respondents' Projects Experienced Pressures to Pass Projects that Do Not Fully Meet Energy Code Requirements [H31]	74
Table 59: Percentage of ATT Respondents' Projects Experienced Pressures to Pass Projects that Do Not Fully Meet Energy Code Requirements [A32]	75
Table 60: Survey Questions Analyzed to Understand Barriers to Energy Code Compliance	78
Table 61: Percentage of Customer Types Who Are Aware of the Need to Comply with Energy Code Requirements Shared by Contractor Respondents [C20]	82
Table 62: Percentage of Contractors and Building Owners, Developers, or Managers HERS Rater Respondents Have Interacted With and Are Aware of the Need to Comply with HERS Testing Requirements [H17]	84
Table 63: Percentage of Contractors and Building Owners, Developers, or Managers ATT Respondents Have Interacted With and Are Aware of the Need to Comply with HERS Testing Requirements [A18]	85
Table 64: Contractor Respondents' Frequency of Experience with Customers Not Wanting to Comply [C25]	87
Table 65: HERS Rater Respondents' Frequency of Experience with Entities/Individuals Not Wanting to Comply [H19]	87
Table 66: ATT Respondents' Frequency of Experience with Entities/Individuals Not Wanting to Comply [A19]	88
Table 67: Contractor Responses to the Percentage of HERS Raters, ATTs, and Building Department/AHJ Inspectors that Do Not Enforce Energy Code Compliance [C28].....	89

Table 68: HERS Rater Respondents’ Biggest Challenges While Performing Field Verification and Diagnostic Testing [H26]	91
Table 69: ATT Respondents’ Biggest Challenges While Performing Acceptance Testing [A27]	92
Table 70: Survey Questions Analyzed to Address Chapter 5	95
Table 71: Contractor Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation [C36]	98
Table 72: HERS Rater Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation for Contractors [H34]	99
Table 73: ATT Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation for Contractors [A35]	100
Table 74: HERS Rater Respondents’ Selection to Effectiveness of the HERS Program [H35]	101
Table 75: Contractor Respondents’ Suggestions to Improve HERS Rater Processes [C37]	102
Table 76: HERS Rater Respondents’ Suggestions to Improve Their Processes [H36]	104
Table 77: ATT Respondents’ Selection to Effectiveness of Acceptance Testing [A36]	104
Table 78: ATT Respondents’ Suggestions to Improve Acceptance Testing Processes (Multiselect) [A37]	105
Table 79: Contractor Respondents’ Suggestions to Improve Acceptance Testing Processes [C38]	106
Table 80: HERS Rater Respondents’ Items of Support Would Like from a HERS Provider [H27]	108
Table 81: ATT Respondents’ Items of Support Would Like from an ATTCP [A28]	109
Table 82: Contractor Respondents’ Suggestions to Encouraging Contractors to Ensure Energy Code Compliance [C39]	110
Table 83: HERS Rater Respondents’ Suggestions to Encourage Contractors to Ensure Energy Code Compliance [H37]	111
Table 84: ATT Respondents’ Suggestions to Encouraging Contractors to Ensure Energy Code Compliance [A38]	113

EXECUTIVE SUMMARY

Center for Sustainable Energy (CSE) under the direction of Arup US, Inc. (Arup) led a survey research study as part of a broader study on the California Energy Code (Energy Code) for the California Energy Commission (CEC) between July 2024 and May 2025.

Purpose of Survey Research

The survey was designed to improve the CEC's understanding of contractor and installer (contractor), Home Energy Rating System rater (HERS rater), and Acceptance Test Employer and Acceptance Test Technician (ATT) compliance with the Energy Code, including current practices in the field, barriers to compliance, and ways to improve compliance. This survey is one aspect of a broader code compliance study and will inform recommendations for the CEC on potential ways to improve Energy Code compliance. Energy code is sometimes referred to as "code" in this report.

Survey Research Methods

Information was gathered through online surveys with contractors, HERS raters, and ATTs. Surveys were distributed through the California State Licensing Board (CSLB), the HERS Provider, and a select number of Acceptance Test Technician Certification Providers (ATTCs). The survey was also directly distributed to a number of ATTs, for whom CEC had their email addresses.

Survey Respondent Characteristics

Survey participants included those who worked in every region of the state, for a range of organization sizes in a variety of roles, in residential and commercial sectors, and on a variety of building and equipment types, and in new construction, additions, and alterations. However, due to challenges on the part of distributing entities, the survey was not distributed to the entire population of contractors and ATTs. Given limited survey distribution and the sensitive nature of asking practitioners about noncompliance, the response rates were very low: contractors (1.5%, n=230), HERS raters (4.2%, n=71), and ATTs (6.4%, n=23), so survey findings are not representative of the population of contractors, HERS raters, or ATTs. Among the contractor respondents, 84% (n=193) are likely to interact directly with the Energy Code as they indicated working on general contracting, HVAC and mechanical systems, or lighting and electrical systems (142 worked on one or more of these trades, 51 worked on other building trade related work as well as one or more of these trades). The remaining 16% (n=37) worked only on other building trade related work.

With the low survey response rates, the findings and trends reported should be interpreted with caution and should not be considered generalizable to the full populations of contractors, HERS raters, or ATTs. That said, the survey results provide meaningful insights worth further consideration.

Key Findings

The findings are organized into three chapters that address current practices, barriers to compliance, and recommended improvements.

Current Practices Among Contractors, HERS Raters, and ATTs That Affect Energy Code Compliance

The surveys covered current practices in permit application, factors affecting Energy Code compliance, contractor consultation with HERS raters, ATTs, and Authorities Having Jurisdiction (AHJ)s before final inspection, and Energy Code compliance testing practices and pressures.

Current Practices and Factors in Permitting Affecting Energy Code Compliance

Most contractors indicated that they do not have issues applying for permits and generally attempt to meet Energy Code compliance standards. However, many contractors, HERS raters, and ATTs concurred that project cost and profit margin are top reasons why a contractor may not apply for a permit. Survey respondents elaborated on additional issues that affect Energy Code compliance:

- **Navigating the permitting process and time pressures.** Contractors that worked on alterations and repairs were more likely than those working on new construction and retrofits to mention difficulty navigating the permitting process, but less likely to mention time pressures as a reason to avoid applying for a permit. In addition, contractors selected the response option “difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls ATT certification, North American Technician Excellence (NATE) certification, etc.)” as another top factor that impacted their ability to comply with the Energy Code.
- **Offering customers the choice to pursue a permit.** The vast majority (70%, n=129) of contractors said they never offer customers a choice not to apply for a permit, however (21%, n=39) sometimes or always do.
- **Perceived compliance in the industry.** In terms of their perception of industry practices in their region, almost half of HERS raters (n=32), a third of contractors (n=84), and a small number of ATTs (n=4) thought less than half of projects were permitted. Most ATTs (n=12) thought more than half of projects were permitted – ATTs are primarily involved in nonresidential projects, and ATTs may report higher permitting compliance due to the difference in the residential vs nonresidential construction markets.

Contractor Consultation and Testing with HERS Raters, ATTs, and AHJs

In terms of seeking advice, approximately two-thirds of contractors said they do not consult a HERS rater or ATT during any phase of the project prior to final building department inspection.

- Among those who do, some contractors said they are more likely to consult a HERS rater or ATT after installation but before field verification. This trend generally held true regardless of whether a contractor worked on single-family residential/low rise multifamily properties or high rise multifamily/nonresidential buildings.
- HERS raters and ATTs indicated that they thought they were consulted more often during project building phases than the contractors indicated.

When projects are tested by HERS raters and ATTs, 37% of contractors said they do not encounter issues complying with Energy Code as noted by an AHJ inspector, HERS rater, or ATT. Among those that do, most contractors said they experienced problems in less than a quarter of their projects with HERS raters (16%), ATTs (11%), and AHJs (20%). Most HERS

raters and ATTs also noted finding issues in a quarter or fewer projects. However, the lack of issues may also be due to inconsistent enforcement.

Energy Code Compliance Testing Practices and Pressures

Regarding trends in enforcement, over half of HERS raters and ATTs noted that AHJs do not review forms for accuracy or completeness on at least 25% of their projects. In contrast, a third of contractors said AHJs did not fail to enforce code or ask for forms. Another third of contractors indicated that they were either unsure if AHJs checked forms or thought it was not applicable.

- **AHJ enforcement.** Contractors reported a split experience in the reported percent of projects for which AHJs require specific certificates of compliance – some indicated little to no enforcement while others noted enforcement for the 75% or more projects.
- **Skipping requirements.** Most HERS raters and ATTs indicated that they skip requirements in less than half of projects, but a notable group indicated skipping compliance requirements in more than half of projects. Among those HERS raters and ATTs that said they skip some compliance requirements during testing:
 - Over a third of HERS raters indicated they were not paid enough to cover the time required for testing.
 - A third of HERS raters experienced company culture pressures.
 - ATTs were more likely to note problems with the forms and form submission process.
- **Rubber stamping.** HERS raters also warned that they are sometimes coerced into “rubber stamping” documents and could lose work if they do not cooperate.
 - Across all HERS raters, those that experienced pressure to pass projects that do not fully meet Energy Code requirements were most likely to note pressure from contractors to skip requirements or turn a blind eye, or that the test results were close enough to warrant a pass.

Barriers to meeting Energy Code requirements

The survey asked questions about the barriers that contractors, HERS raters, and ATTs face when attempting to meet Energy Code requirements. Contractors, HERS raters, and ATTs most frequently described the difficulty of staying up to date with the Energy Code and installing equipment to code.

- **Contractor experience with compliance process and level of awareness.** Regarding contractors’ experience with and level of awareness of the Energy Code compliance process:
 - A notable portion of contractors said no parts of the process were difficult to complete.
 - On the other extreme, a notable portion of contractors (21%) said they were not aware of the code compliance process.
 - Among those that identified challenges, contractors cited the permit application process and inspections most frequently.
- **HERS rater challenges with compliance process.** HERS raters noted challenges with the construction and installation step and acceptance testing or field verification step.

- **Customer awareness and understanding of Energy Code.** Customer awareness and understanding of the Energy Code can affect contractors' willingness to comply.
 - Contractors and HERS raters expressed split opinions on how aware they believe customers are about Energy Code compliance requirements. For example, while half of the contractor respondents believed 25% or less of single-family residential customers are aware of compliance requirements, a quarter of contractors thought that more than 75% of these customers were aware. Among HERS raters, 37% thought that 25% or less of single-family residential customers were aware, and 21% thought that more than 75% of these customers were aware.
 - ATTs were more likely to say that 25% or less of customers were aware.
- **Field verification.** Regarding field verification barriers, HERS raters and ATTs shared similar opinions.
 - HERS raters described the biggest challenges to performing field verification and testing is contractors not getting them involved soon enough in the process, equipment installation challenges, and lack of knowledge about the HERS rater role.
 - Similarly, ATTs cited lack of understanding Energy Code compliance on the contractors' part, on-site issues, and compliance form issues.

Improvements needed to help achieve code compliance

The survey asked contractors, HERS raters, and ATTs to describe improvements needed to help achieve Energy Code compliance. Many contractors, HERS raters, and ATTs who provided recommendations for improvements expressed similar sentiments about making improvements in these areas:

- Increasing and improving Energy Code education and training, including teaching contractors how to work with HERS raters and ATTs earlier in the process, marketing about HERS requirements and testing, and training for AHJs, HERS raters, and contractors.
- Simplifying and speeding up the code compliance process through streamlining processes, reducing paperwork, and adjusting the code to make it easier and faster to comply.
 - Truly enforcing the Energy Code with the support of incentives and penalties. HERS raters recommended that HERS Providers directly support compliance enforcement.
- Reducing costs to address competitive pressures.
- Improving webforms and website resources to help resolve discrepancies.

Although a minority opinion among contractor survey respondents, a group of respondents advocated for eliminating or drastically reducing Energy Code compliance requirements. In general, though, those who experienced issues with Energy Code compliance concur that improvements are warranted.

Conclusions and Recommendations

In summary, most survey respondents indicated they were not personally having difficulty with the Energy Code compliance process (which may be partly attributable to respondents not wanting to admit problems in the survey). Yet, most survey respondents also identified an interwoven set of issues that affect Energy Code compliance, including: awareness and understanding of the requirements and processes; multiple financial, labor, and peer or customer pressures to not comply; burdensome, inefficient, and inconsistent paperwork requirements; and inconsistent and potentially unethical enforcement practices that affect Energy Code compliance across all parties involved in enforcing compliance: contractors, HERS raters, ATTs, and AHJs. There was general consensus that improvements are needed to improve Energy Code compliance.

Given the low response rate and inability to generalize findings to the populations of contractors, HERS raters, and ATTs, the following recommendations should be treated as topics for further consideration based on feedback from the survey respondents as opposed to conclusive directives. The five concluding points and recommendations for investigation or action include:

- Competition, and time, paperwork, and inspection costs associated with the permitting process make it difficult to justify applying for a permit.
 - Conduct further research that can determine whether or not issuing rebates for permitting fees and testing fees after AHJs verify compliance would reduce barriers to permitting.
 - Consider exploring ways to radically simplify Energy Code forms and processes (online and offline) to reduce and align paperwork, and reduce processing time, especially for larger projects with multiple units.
- Clunky processes and burdensome paperwork make code compliance less likely across all parties.
 - Explore how Energy Code compliance requirements could be funneled down to what is applicable for a particular project once design and procurement decisions are made.
 - Since some ATTs and others working in the field find it difficult to access online NCRA forms when no Internet services are available, consider investing in a way to provide information and forms that could be used offline and uploaded later.
- Lack of enforcement and consistency undermines Energy Code goals.
 - Consider conducting further research to investigate whether enforced penalties lead to improved compliance and less pressure on HERS raters and ATTs to falsify documents. If so, determine who should pay a penalty.
 - Determine if it is feasible to identify and penalize those entities that “rubber stamp” permitting documentation or request falsified documents. Explore whether there should be a whistleblower system for HERS raters to combat rubber stamping.
 - Determine whether AHJs should be incentivized to enforce Energy Code. Investigate whether it would be feasible and effective to improve enforcement by adding a team of field verifiers to assist the AHJs with site visits and photo documentation, with the AHJ making the final ruling.

- Not consulting HERS Raters, ATTs, and AHJs early in the construction process may add cost and delay to Energy Code compliance process.
 - Explore how education and training programs could be improved to bring contractors, HERS raters, ATTs, and AHJs together to understand Energy Code requirements, forms, and processes. Consider researching whether or not improved training would lead to coordination earlier on in the process that could prevent costs and complications later, helping to reduce cost and time burdens for all involved.
 - Consider investigating how Energy Code compliance process modifications could better ensure that actions are taken at the appropriate time in order to avoid timing, cost, and paperwork problems being identified at the end of the project when those issues are no longer feasible to fix.
 - Consider conducting further research to determine whether contractors and their customers would value a recognition program that awarded contractors with a seal of approval for a strong Energy Code compliance track record. If so, determine if this approach could be coordinated with the insurance industry and utilities such that seals of approval carry benefits in terms of fee discounts, refund/pay for inspection equipment, or being listed on an approved vendor list.
 - Consider conducting further research to determine whether employers could be incentivized to offer vacation hours to contractors for submitting correct documentation and whether or not contractors would value this incentive.
- Energy Code compliance updates that occur every three years are too fast for entities to stay up to date.
 - Consider investigating how to create and train all parties on a set of tools that allow contractors, AHJs, HERS raters, and ATTs to reference the same set of code requirements for a given project, ensuring more consistent compliance and enforcement, e.g., create and enforce the use of a central database for code compliance rules that would allow contractors, HERS raters, ATTs, and AHJs to quickly and easily query code requirements relevant to a specific project.

CHAPTER 1:

Overview of Contractor, HERS Rater, and Acceptance Test Employer/Technician Surveys

Survey Purpose and Intended Use of Report Findings

The survey was designed to improve the CEC's understanding of contractor and installer/technician (contractor), Home Energy Rating System (HERS) Rater, and Acceptance Test Technician (ATT) compliance with the California Energy Code (Energy Code), including current practices in the field, barriers to compliance, and ways to improve compliance. Under the California Energy Code, contractors are responsible for installations adhering to Energy Code standards, and HERS raters and ATTs test and verify installed systems to ensure that the systems meet Energy Code requirements in residential and nonresidential projects, respectively. This survey is one aspect of a broader code compliance study and will inform recommendations for the CEC on potential ways to improve Energy Code compliance.

Given the sensitivity of the topic and limitations on survey distribution and response rates, the report findings should not be considered generalizable to the full population of contractors, HERS raters, or ATTs. Rather, the findings should be used to inform discussion of potential approaches to Energy Code compliance improvements in relation to findings from the broader code compliance study. Energy Code is sometimes referred to as "Code" in this report.

Original scope of work

The original scope of work for the surveys outlined three main topical goals for the surveys:

1. Develop targeted survey materials regarding issues, barriers, effective measures, new tools innovation, and evolving practices for improved Energy Code compliance and energy efficiency measure installations at the local level.
2. In collaboration with CEC staff, conduct surveys of contractors and other parties involved with local Code enforcement regarding best practices, resource requirements, emerging trends, and issues associated with Energy Code compliance.
3. Prepare analyses and reports regarding survey results, as well as analyses of new and emerging tools, trends, industry practices, and methods to improve Energy Code compliance and energy efficiency measure installations.

Work on this subtask included, but not limited to, the following:

- Develop a minimum of one (1) survey for contractors to include issues and challenges to Energy Code compliance, existing processes and tools being used, HERS Provider and Acceptance Test Technician Certification Provider (ATTCP) programs, and enforcement in the field.
- Develop a minimum of one (1) survey for ATTs to include issues and challenges for their role in the compliance process, suggestions for improvements, and enforcement in the field.
- Develop a minimum of one (1) survey for HERS raters to include issues and challenges for their role in the compliance process, suggestions for improvements, and enforcement in the field.

- Collect responses. Summarize, analyze, and prepare conclusions.

Overview of Survey Methods

Under the direction of Arup and CEC, CSE led the survey design and analysis. CEC and Arup worked with licensing boards and certifying bodies to help distribute the surveys. Appendix A includes the full description of the survey design, distribution plan, and analysis plan.

Survey Design Approach

Arup and CSE worked closely with CEC staff to develop a list of priority topic categories and topics used to inform the survey design for three surveys: (1) contractors and installers/technicians (referred to as “contractors” in this report), (2) HERS raters, and (3) ATTs and Acceptance Test Employers (ATE)s (referred to as “ATTs” in this report unless there is a clear reference specifically to ATEs).

CSE took into consideration the contractor survey would be taken by those who serve as an owner/co-owner of the company, work in operations, or work in the field as installers, technicians, or field supervisors. We used the term “technician” instead of “installer” in the survey because the term technician is used widely in the industry to refer to those who may install or maintain equipment, and we wanted respondents to consider this broader group when reading the survey questions. CSE facilitated a series of conversations and iterative rounds of survey document review with Arup and CEC to transform the initial scope of work topics into a prioritized list of topic categories and topics, and the topics into survey questions for each of the three surveys.

CSE tested the surveys through interviews with two contractors, a HERS rater, an ATT, and an ATE. CSE used feedback from the interviews to further refine question language, response options, and prioritization of questions. Given the breadth of topics, the draft surveys would have required over 30 minutes to complete. Based on the prioritized topic category list and interview feedback, CSE recommended, and Arup and CEC approved, survey revisions that reduced the expected time to complete the surveys.

CSE collected survey responses in two rounds, in November 2024 and again in January 2025, as the survey did not reach all identified populations during its initial launch. After the first round of survey administration, CSE reviewed the parts of the survey where respondents exited most frequently to determine if a revision was feasible to increase the response rate. CSE identified the first question to have the highest drop-off rate, which asked respondents to identify the specific CSLB licenses, HERS rater certification, or acceptance test certifications they held at the time of taking the survey. CSE proposed to shorten this question and, after approval from Arup and the CEC, revised the question prior to launching the second round of survey administration. As a thank you for their time, participants were offered the option to enter a drawing for a \$500 gift card after completing the survey. Participants who entered the drawing were asked to provide an email address so that Arup could contact them if they won the drawing. Email addresses were stored separately, not in conjunction with the survey results. The drawing took place prior to this written report.

Survey Distribution Approach

Surveys were distributed via email by a licensing board and certifying bodies to a portion of their membership. The survey was also directly distributed to 359 ATTs, for whom CEC had their email addresses. The licensing board and certifying bodies contacted to distribute the survey included:

- Contractors: California Department of Consumer Affairs Contractors State License Board
 - Distributed to members associated with the following licensure categories: (see Table 1 for contractor population and survey sample size)
 - CSLB Class A – General Engineering Contractor
 - CSLB Class B – General Building Contractor
 - CSLB C-2 – Insulation and Acoustical Contractor
 - CSLB C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor
 - CSLB C-8 – Concrete Contractor
 - CSLB C-10 – Electrical Contractor
 - CSLB C-11 – Elevator Contractor
 - CSLB C-20 – Warm-Air Heating, Ventilating and Air-Conditioning Contractor
 - CSLB C-27 – Landscaping Contractor
 - CSLB C-36 – Plumbing Contractor
 - CSLB C-38 – Refrigeration Contractor
 - CSLB C-39 – Roofing Contractor
 - CSLB C-46 – Solar Contractor
 - CSLB C-47 – General Manufactured Housing Contractor
 - CSLB C-51 – Structural Steel Contractor
 - CSLB C-53 – Swimming Pool Contractor
- HERS raters: California Home Energy Efficiency Rating Service
 - Distributed to all 1,694 members.
- ATTs: Acceptance Test Technician Certification Providers (ATTCPs) (see Table 2 for estimated ATT population and survey sample size)
 - National Lighting Contractors Association of America
 - California Advanced Lighting Controls Training Program
 - California State Pipe Trades Council
 - National Energy Management Institute Committee
 - National Environmental Balancing Bureau
 - Refrigeration Service Engineers Society

Table 1: CSLB Members by License Type - Total Population and Survey Sample Size

CLSB Licenses	Total Licensed at the Time of Initial Survey Launch (n=137,746)	Total Who Received the Survey (n=14,653)
CSLB Class A – General Engineering Contractor	15,169	1,500
CSLB Class B – General Building Contractor	41,081	2,500

CLSB Licenses	Total Licensed at the Time of Initial Survey Launch (n=137,746)	Total Who Received the Survey (n=14,653)
CSLB Class B-2 – Residential Remodeling Contractor	n/a	n/a
CSLB C-2 – Insulation and Acoustical Contractor	975	500
CSLB C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor	651	548
CSLB C-5 – Framing and Rough Carpentry Contractor	n/a	n/a
CSLB C-8 – Concrete Contractor	3,469	969
CSLB C-9 – Drywall Contractor	n/a	n/a
CSLB C-10 – Electrical Contractor	27,278	1,500
CSLB C-11 – Elevator Contractor	149	149
CSLB C-17 – Glazing Contractor	n/a	n/a
CSLB C-20 – Warm-Air Heating, Ventilating and Air-Conditioning Contractor	10,357	1,495
CSLB C-27 – Landscaping Contractor	12,341	500
CSLB C-29 – Masonry Contractor	n/a	n/a
CSLB C-36 – Plumbing Contractor	14,632	500
CSLB C-38 – Refrigeration Contractor	1,446	1,414
CSLB C-39 – Roofing Contractor	4,639	496
CSLB C-43 – Sheet Metal Contractor	n/a	n/a
CSLB C-45 – Sign Contractor	n/a	n/a
CSLB C-46 – Solar Contractor	1,106	500
CSLB C-47 – General Manufactured Housing Contractor	406	351
CSLB C-51 – Structural Steel Contractor	1,585	1,265
CSLB C-53 – Swimming Pool Contractor	2,462	466

Table 2: ATTCP Members – Estimated Total Population and Survey Sample Size

ATTCPs	Estimated Total Certified at the Time of Initial Survey Launch^a (n=2,418)	Total Who Received the Survey^b (n=359)
National Lighting Contractors Association of America	239	135
California Advanced Lighting Controls Training Program	870	18
California State Pipe Trades Council	198	0
National Energy Management Institute Committee	924	57
National Environmental Balancing Bureau	38	0
Refrigeration Service Engineers Society	149	149

^a The number of members listed are provided by the CEC and represent active ATT and ATE memberships as of December 31, 2023. These numbers serve as estimates for gauging the total population size of ATTs and ATEs.

^b Except for Refrigeration Service Engineers Society (RSES), the other ATTCPs did not distribute the survey to their members: National Lighting Contractors Association of America (NLCAA), California Advanced Lighting Controls Training Program (CALCTP), California State Pipe Trades Council (CSPTC), National Energy Management Institute Committee (NEMIC), and National Environmental Balancing Bureau (NEBB). Arup and CSE discussed with the CEC alternative methods to reach these ATTCPs' members. The CEC decided and approved to send the survey to members of these ATTCPs directly. Arup and CSE received contact lists from the CEC for CALCTP, NEMIC, NLCAA members. After removing duplicate emails from the list, the numbers of contacts invited to take the survey are listed in the table. CSE distributed the survey using Alchemer, an online survey platform.

Survey Analysis Approach

The results of each survey question were summarized in frequency tables found in Appendices E-G. If appropriate and meaningful, CSE analyzed responses to some questions in relation to demographic and firmographic characteristics such as geographic territory served, or property types served. The decision to conduct cross tabular analysis depended on the frequency of response per question and the extent to which CSE could effectively categorize respondents into distinct groups for comparison.

Due to the sensitivity of the topic and limitations on survey distribution options, CSE anticipated very low response rates (less than 5%) across the target populations. Thus, CSE prepared to take several steps to reduce misinterpretation of findings during analysis, including:

- Refraining from using percentages when reporting on results based on low frequencies.
- Only reporting on cross tabular analyses if there was a sufficient number of responses per group and if trends were strongly evident.
- Reporting conclusions and recommendations as topics for further exploration as opposed to findings that confirm a generalizable trend.

Across all three surveys, response rates were between 1-7% (see Table 3 for response rates). After review of the number of survey responses from the ATT survey, administered to both ATTs and ATEs, CSE concluded¹ to group both respondent groups together due to the low number of responses and significant number of respondents that were both ATT and ATE (see Table 26 for results of ATT respondents' role within the organization). As such, any reference to the ATT and ATE population and survey is referred to as "ATT" in this report.

With the low survey response rates, the findings and trends in this report should be interpreted with caution and should not be considered generalizable to the full populations of contractors, HERS raters, or ATTs.² That said, the survey responses indicated meaningful trends that will be useful for policy makers and the industry when exploring ways to improve Energy Code compliance.

Given the low number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages, and deemed cross tabular analyses generally infeasible.³ The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages, and CSE deemed some cross tabular analyses feasible. Table 3 below shows the total population, sample size, and response rate by survey respondent group.

Table 3: Total Population, Survey Sample, and Survey Response Rate for Contractors, HERS Raters, and ATTs

Survey Details	Contractor	HERS Rater	ATT
Total population ^a	137,746	1,694	2,418
Survey sample size	14,653	1,694	359
Survey response rate after removing duplicate responses, including complete and partial responses	1.5%	4.2%	6.4%
Number of survey responses included in survey analysis	206 complete, 24 partially complete	70 complete, 1 partially complete	22 complete, 1 partially complete

^a Population size listed for ATTs is the estimated total provided by the CEC and represent active ATT and ATE memberships as of December 31, 2023. These numbers serve as estimates for gauging the total

¹ Respondents taking the survey as an ATT or ATE were asked to indicate the role they held at the company: ATE, ATT, or both roles. Sixteen of the 23 respondents indicated they held both roles while three and four indicated they only held an acceptance test employer/supervisor (ATE) or acceptance test technician (ATT) role, respectively. With this distribution, CSE made the decision to refer to the group as an ATT for ease of reference.

² Standard practice is to achieve a sample size that will result in a 95% confidence level with a 5% margin of error. To meet this standard, [using a sample size calculator](#), we would have needed at least 384 contractor responses (even when grouping a variety of contractor populations together), 314 HERS rater responses, and 332 ATT responses.

³ A group of 30 responses is deemed reasonable to provide meaningful insights, however, results may not indicate trends if the data are distributed sparsely across response options. With only 23 ATT responses received, reporting distributions in percentages may misrepresent the actual population size.

With a limited sample size across the Contractor, HERS rater, and ATT survey, and a sparse distribution of responses in specific geographic regions, we were unable to compare responses by geography across surveys with certainty (see Table 7 for geographic distribution by survey respondent group). There were enough responses, however, to the Contractor survey that we were able to categorize geographic regions into three groups for comparison: those who work only in coastal regions, only in inland regions, and both coastal and inland regions.

- Coastal regions: Bay Area, Central Coast, Los Angeles & Ventura Counties, Orange County, Redwood Coast, San Diego County
- Inland regions: Greater Central Valley, Central & Eastern Sierras, Imperial County, Inland Empire including High Desert and Coachella Valley areas, Shasta & Cascades, Greater Sacramento

These groupings provided an adequate sample size when segmenting data by another question. Table 4 below shows the number of respondents that indicated they worked only in coastal regions, only in inland regions, or both coastal and inland regions. This comparison had the potential to highlight differences between those who work in regions that have more temperate climates versus climates with more severe swings in temperature. However, we understand this comparison limits insights into the large urban coastal jurisdictions from the more suburban/rural inland jurisdictions. Trends associated with different building types in different climate regions may also be masked. As mentioned in chapter two, there were limited findings that suggested geographic trends.

Table 4: Contractor Respondents' Regions of Work – Coastal, Inland, or Both

Regions of Work	Number of Respondents (n=230)
Work only in coastal regions	128
Work only in inland regions	49
Work in both coastal and inland regions	53

Report Chapter Structure

CSE organized the survey analysis into the following chapters to facilitate reading about natural groupings of topics:

- Chapter 2: Survey Respondent Characteristics
- Chapter 3: Energy Code Compliance Practices in the Field
- Chapter 4: Barriers to Energy Code Compliance
- Chapter 5: Recommendations for Improving Energy Code Compliance
- Chapter 6: Conclusions and Recommendations

Chapters two to five each begin with a mapping of the research topic categories to the specific survey questions used to address the topic category, and a refined list of topics. Table titles include references to the specific question number on the respective contractor, HERS rater, or ATT survey. These question references are listed inside square brackets and are denoted with a capital letter followed by a number (e.g., C1). The letter “C” references the contractor survey, “H” for the HERS rater survey, and “A” for the ATT survey.

Table 5 includes the approved list of topic categories and topics used to develop and categorize the survey questions and the report chapter where the topics are addressed.

Table 5: Survey Research Topics Used to Develop and Categorize Survey Questions

Priority Level and Approved Topic Category*	Approved Topics to Inform Survey Development	Contractor	HERS Rater	ATT	Report Chapter
Demographics/ Firmographics	Licensing, role in organization, company size, company location, project work characteristics	X	X	X	2
1. Code compliance challenges	Factors affecting decision to apply for a permit, Ability to follow Code compliance process, Ability to complete installation according to Code in the field, Aspects of quality installation and energy efficiency standards contractors typically adhere to and not, Experience with HERS Provider/ATTCP Quality Assurance Audits	X	X	X	3, 4
2. Code compliance improvement	How to reduce contractors’ barriers to permitting, How to improve HERS raters’ and ATT’s inspection process and the effectiveness in improving Code compliance, How to improve energy efficiency and performance of equipment installed by contractors	X	X	X	5

Priority Level and Approved Topic Category*	Approved Topics to Inform Survey Development	Contractor	HERS Rater	ATT	Report Chapter
3. Interactions with AHJs	Whether the contractor consults with AHJ prior to submitting building permit application, Extent to which building departments are enforcing Code at plan review and at field inspection/consistency in practice across building departments; Enforcement of certificate of compliance (CF1R)	X			3,4
4. Contractor, HERS, and ATT training	Whether staff are knowledgeable about Energy Code and compliance requirements	X	X	X	3,4
5. Contractor awareness of requirements	Contractor awareness of field verification and diagnostic testing by HERS raters and acceptance testing by ATTs	X	X	X	3,4

* A sixth priority was identified but was not addressed in the survey due to the survey length: Contractor awareness that the installing contractor for lighting controls and heating, ventilation, and air conditioning may also perform the required acceptance tests for nonresidential and multifamily properties if they are also a certified ATT.

CHAPTER 2:

Survey Respondent Characteristics

This section includes descriptions of the contractor, HERS rater, and ATT survey respondents, including survey response rate and demographic and firmographic characteristics.

As a reminder:

- As with interpretation of findings in other chapters, it is important to note that the trends reported should be interpreted with caution given the low survey response rates. Please note that both contractors and technicians responded to the contractor survey, and that both ATTs and ATEs responded to the ATT survey.
- All responses are anonymous, respondents were not asked survey questions that could identify their company or themselves, and no distinguishing characteristics were reported. Email addresses for respondents who opted in to the gift card drawing were kept in a separate file that had no link to their survey responses.
- Given the small number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages. The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages.
- Table titles may include references to the specific question number on the respective contractor, HERS rater, or ATT survey. These question references are listed inside square brackets and denoted with a capital letter followed by a number (e.g., C1). The letter "C" references the contractor survey, "H" for the HERS rater survey, and "A" for the ATT survey.

Contractor, HERS Rater, and ATT Survey Response Rate

Survey response rates were under 5% for contractor and HERS rater surveys. Despite the ATT survey having more than a 5% response rate, the total number of responses is low. The specific response rate by survey respondent group can be found in Table 3. Caution should be taken when interpreting the results for the larger population.

The contractor population is comprised of people who hold a variety of different licenses.

Table 6 below shows the response rate of CSLB members by groups of license types⁴.

Response rates by groups of license types are also low, thus caution should also be exercised during interpretation of contractor survey findings.

⁴ CSLB licenses were categorized into four groups to match the survey question: general contractor, HVAC and mechanical systems, lighting and electrical systems, and other building trade related work. See Appendix A for details on the grouping structure.

Table 6: Contractor Response Rate Based on License Type [C4]

Contractor Work Based on License	Total Who Received the Survey (n=14,653)	Count of Respondents (n=230)	Response Rate
General contractor	4,351	109	3%
HVAC and mechanical systems ^a	3,457	82	2%
Lighting and electrical systems ^b	2,149	62	3%
Other building trade related work ^c	4,696	88	2%

^a Including refrigeration and sheet metal

^b Including elevator, signage, and solar

^c Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.

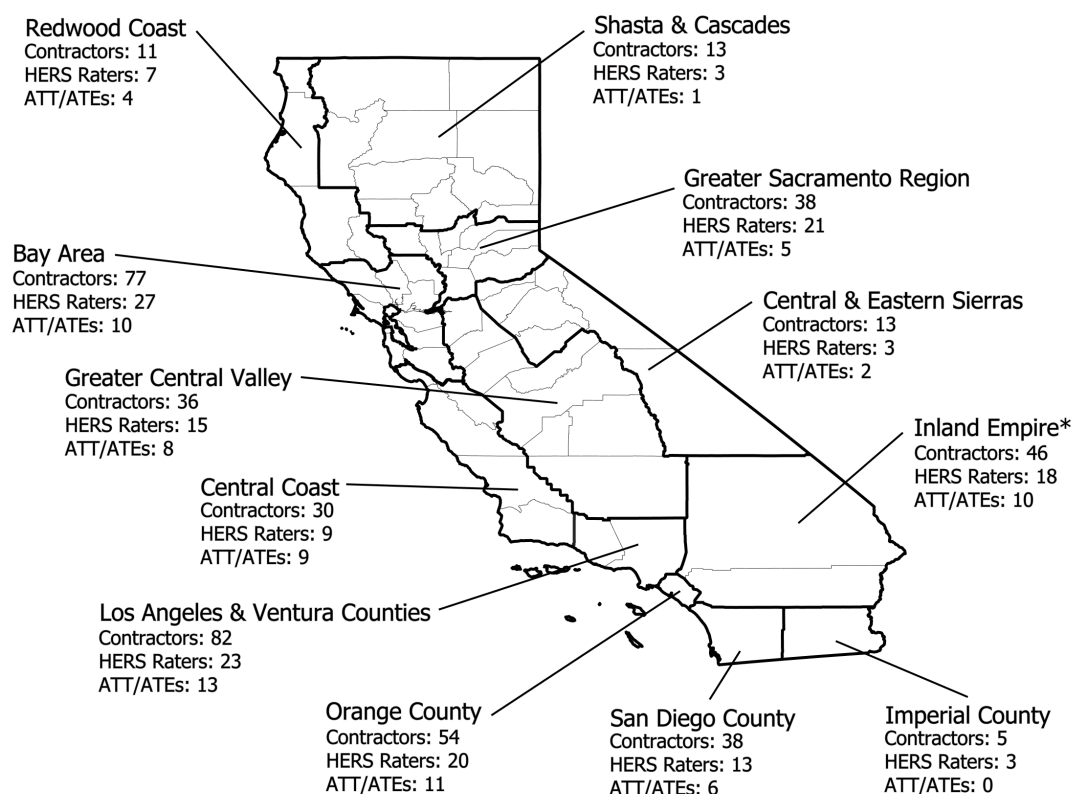
Survey respondents were asked questions related to: licensing, certification, and their role in the organization; company characteristics such as organization size and location; and project work characteristics including the number of projects performed in 2024, how a project is defined, types of properties, types of projects (new construction, additions, or alterations).

Geographic Distribution of Survey Respondents

Twelve regions were identified and created into a visual presented on the survey as a visual cue. The regions were based off the California Community & Place-Based Solutions Regional Profiles map⁵ and slightly modified to align with the feedback received from discussions with the CEC and from survey beta testers. Survey respondents were asked to identify the areas in California where their work has taken place. Figure 1 shows the map presented in the survey with modifications to include the number of respondents that indicated their work took place within a particular region. Table 7 includes data presented in the visual.

⁵ [California Community & Place-Based Solutions, Regional Profiles](https://economicdevelopment.business.ca.gov/regional-profiles/). California Community & Place-Based Solutions. (n.d.). <https://economicdevelopment.business.ca.gov/regional-profiles/>

Figure 1: Contractor, HERS Rater, and ATT Survey Respondents by Region



*Including High Desert and Coachella Valley areas

A moderate portion of Contractor, HERS rater and ATT respondents work in Los Angeles & Ventura Counties and Bay Area, the two most popular regions across the three groups (Los Angeles & Ventura Counties: 36% (n=82) Contractors, 32% (n=32) HERS raters, 13 ATTs; Bay Area: 33% (n=77) Contractors, 38% (n=27) HERS raters, 10 ATTs). In contrast, Imperial County was the least popular region where all three respondent groups work within, with 2% (n=5) of Contractors, 4% (n=3) of HERS raters, and none from ATTs. Due to the limited number of responses for each group, the frequencies listed may not be generalizable nor an accurate representation of the workforce in each region and caution should be taken with interpretation.

Table 7: Regions of California Where Respondents' Work Has Taken Place Within [C15, H13, A14]

Region	Contractor # (%) of responses (n=230)	HERS Rater # (%) of responses (n=71)	ATT # of responses* (n=23)
Bay Area	77 (33%)	27 (38%)	10
Central Coast	30 (13%)	9 (13%)	9
Greater Central Valley	36 (16%)	15 (21%)	8
Central & Eastern Sierras	13 (6%)	3 (4%)	2

Region	Contractor # (%) of responses (n=230)	HERS Rater # (%) of responses (n=71)	ATT # of responses* (n=23)
Imperial County	5 (2%)	3 (4%)	0
Inland Empire including High Desert and Coachella Valley areas	46 (20%)	18 (25%)	10
Los Angeles & Ventura Counties	82 (36%)	23 (32%)	13
Orange County	54 (23%)	20 (28%)	11
Redwood Coast	11 (5%)	7 (10%)	4
Shasta & Cascades	13 (6%)	3 (4%)	1
Greater Sacramento	38 (17%)	21 (30%)	5
San Diego County	38 (17%)	13 (18%)	6

* ATT survey frequencies not described in percentages due to a low number of responses.

As Contractors, HERS raters and ATTs may work across multiple regions, the proportion of work that takes place within a specific region may vary. Thus, respondents were asked a follow-up question to gain insight on the distribution of projects across the different regions.

- Contractor: "What proportion of your company's work has taken place in each of the following areas of California?"
- HERS rater: "What proportion of the HERS testing you have conducted took place in each of the following areas of California?"
- ATT: "What proportion of the acceptance testing you have conducted took place in each of the following areas of California?"

Respondents were asked to enter a numeric value for each region they indicated they or their company worked in and during analysis, the values were grouped into percentage ranges of 0%, 1-9%, 10-99%, and 100%. Table 8, Table 9, and Table 10 show the distribution for proportion of work taken place in each region for Contractor, HERS rater and ATT respondents, respectively.

Contractor respondents that indicated they or their company worked in the Bay Area were likely to work there for 100% of their projects, while those that worked in Greater Central Valley, Inland Empire including High Desert and Coachella Valley areas, Los Angeles & Ventura Counties, Orange County, and Greater Sacramento regions were likely to work in multiple regions (Table 8). HERS rater and ATT respondents follow a similar trend where they were likely to conduct HERS or acceptance testing across different regions as they entered values between 10-99% (Table 9, Table 10). This is expected as HERS raters and ATTs likely need to travel to support construction projects, which may not be centralized within a specific region.

Table 8: Proportion of Contractor Respondents' Company's Work in California Regions [C16]

Regions	0%*	1-9%	10-99%	100%
Bay Area (n=77)	1	7	26	43
Central Coast (n=30)	1	11	8	10
Greater Central Valley (n=36)	0	5	20	11
Central & Eastern Sierras (n=13)	1	5	6	1
Imperial County (n=5)	0	2	2	1
Inland Empire including High Desert and Coachella Valley areas (n=46)	1	8	23	14
Los Angeles & Ventura Counties (n=82)	0	6	50	26
Orange County (n=54)	1	10	38	5
Redwood Coast (n=11)	0	7	1	3
Shasta & Cascades (n=13)	0	6	4	3
Greater Sacramento (n=38)	0	8	17	13
San Diego County (n=38)	1	16	11	10

* Regions in this question were populated based on the selections to question C15. Some contractor respondents selected a region but entered 0% in response to question C16.

Table 9: Proportion of HERS Rater Respondents' Testing in California Regions [H14]

Regions	1-9%	10-99%	100%
Bay Area (n=27)	4	15	8
Central Coast (n=9)	3	4	2
Greater Central Valley (n=15)	2	10	3
Central & Eastern Sierras (n=3)	1	2	0
Imperial County (n=3)	3	0	0
Inland Empire including High Desert and Coachella Valley areas (n=18)	3	10	5
Los Angeles & Ventura Counties (n=23)	5	15	3
Orange County (n=20)	4	16	0
Redwood Coast (n=7)	3	2	2
Shasta & Cascades (n=3)	0	2	1
Greater Sacramento (n=21)	4	15	2
San Diego County (n=13)	6	4	3

Table 10: Proportion of ATT Respondents' Testing in California Regions [A15]

Regions	0%*	1-9%	10-99%	100%
Bay Area (n=10)	0	3	6	1
Central Coast (n=9)	0	4	4	1
Greater Central Valley (n=8)	1	4	3	0
Central & Eastern Sierras (n=2)	0	2	0	0
Imperial County (n=0)	0	0	0	0
Inland Empire including High Desert and Coachella Valley areas (n=10)	0	3	6	1
Los Angeles & Ventura Counties (n=13)	0	2	9	2
Orange County (n=11)	0	0	11	0
Redwood Coast (n=4)	0	3	1	0
Shasta & Cascades (n=1)	0	1	0	0
Greater Sacramento (n=5)	0	1	4	0
San Diego County (n=6)	0	1	5	0

* Regions in this question were populated based on the selections to question A14. One ATT respondent selected a region but entered 0% in response to question A15.

Contractor, HERS Rater, and ATT Survey Respondent Characteristics

Across all three survey groups, survey respondents include a wide range of respondents from every region in the state. Generally, contractor, HERS rater, and ATT work rates are higher in regions with higher population, but HERS raters and ATTs seem to cover a wider variety of areas than their contractor counterparts. Contractors generally hold multiple roles within their organization. This makes sense when considering most contractors surveyed also indicated they work at an organization with fewer than ten employees.

Most respondents in all three surveys cover a wide variety of project types. Most contractors surveyed work in single-family homes and conduct project work surrounding heating, ventilation, and air conditioning (HVAC) equipment and general construction. Most HERS raters conduct field verification and diagnostic testing in single-family homes as well, while most ATTs surveyed conduct tests in nonresidential buildings. While half of HERS raters surveyed have received training from CalCERTS, most HERS raters are now certified through CHEERS. Most ATTs hold both an ATT and ATE role.

Table 11 lists the survey question numbers used to analyze contractor, HERS rater, and ATT survey respondent characteristics.

Table 11: Survey Questions Analyzed to Address Survey Characteristics Analysis

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Licensing	4	4	4, 5
Role in organization	5	n/a	6
Company size	6	n/a	13
Project work characteristics	7, 9, 10, 11, 12, 13, 14	6, 7, 9, 10, 12	7, 8, 9, 10, 11

Contractor Survey Respondent Characteristics

Table 12 shows the contractor respondents' range of work based on their licenses. Out of 230 responding contractors, 47% (n=109) hold at least a general contractor license. Thirty-six percent (36%, n=82) and 27% (n=62) of contractors hold at least HVAC and mechanical systems licenses or lighting and electrical systems licenses, respectively. Thirty-eight percent (38%, n=88) of contractors had licensure that didn't belong in any of the three previous categories. Several contractors held licenses in multiple categories. These numbers also include four previously licensed contractors, two of which held general contractor licenses and one having held HVAC and mechanical or a lighting and electrical systems license, respectively.

Table 12: Contractor Respondents' Work Based on Licenses (Multiselect) [C4]

Contractor Work Based on License	Count (%) of Respondents (n=230)
General contractor	109 (47%)
HVAC and mechanical systems ^a	82 (36%)
Lighting and electrical systems ^b	62 (27%)
Other building trade related work ^c	88 (38%)

^a Including refrigeration and sheet metal

^b Including elevator, signage, and solar

^c Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.

Not all contractors' work requires adhering to the Energy Code, such as working with concrete, framing, or landscaping. Thus, we looked at the distribution of contractor respondents by the license or work specified from their responses and identified three groups:

- Respondents that indicated they work only on general contracting, HVAC and mechanical systems, or lighting and electrical systems.

- Respondents that indicated they work on other building trade related work in addition to general contracting, HVAC and mechanical systems, or lighting and electrical systems.
- Respondents that indicated they work only on other building trade related work.

These groupings provided insight into the proportion of contractor respondents that answered the survey and have work that is likely to require compliance with the Energy Code. Table 13 below shows the distribution of contractor respondents within these groupings. Of the 230 contractor respondents, 84% (n=193) had licensure or identified they worked on general contracting, HVAC and mechanical systems, or lighting and electrical systems.

Table 13: Contractor Respondents' Work Based on License Type

Contractor Work	Count (%) of Respondents (n=230)
Work only on general contracting, HVAC and mechanical systems, or lighting and electrical systems	142 (62%)
Work on general contracting, HVAC and mechanical systems, or lighting and electrical systems, and other building trade related work	51 (22%)
Work only on other building trade related work	37 (16%)

Contractors reported holding multiple roles within their organizations, as seen in Table 14. Out of 230 contractors, all but 18 own their company, and all but 18 work in operations. Similarly, all but 39 contractors work as project managers, and only 60 do not work as field technicians or supervisors.

Table 14: Contractor Respondents' Roles in Organization [C5]

Roles Held Within Organization	I hold this role	I do not hold this role
Work as a field technician/equipment installer or field supervisor/superintendent (n=230)	170	60
Work as part of operations (executive management, operations/staff management, estimator, sales, etc.) (n=230)	212	18
Work as a project manager (n=230)	191	39
Own/co-own the company (n=230)	212	18
Hold the CSLB license for the company (responsible managing employee) (n=230)	189	41

Organizational Characteristics

High numbers of contractors sporting multiple roles make sense when considering company size among survey respondents. Table 15 shows the varied ranges of company sizes reported by contractor respondents. Over half (57%, n=131) of contractor respondents work in companies with fewer than four employees. Eighty-seven percent (87%) or 201 respondents work in companies with under 50 employees. Presumably, smaller organizations are more likely to have employees that serve multiple roles, which would explain high numbers in each role category.

Table 15: Contractor Respondents' Company Size [C6]

Company Size	Number (%) of Respondents (n=230)
1-4	131 (57%)
5-9	21 (9%)
10-49	49 (21%)
50-99	7 (3%)
100+	3 (1%)
Unsure	16 (7%)
Prefer not to answer	3 (1%)

Organizational Project Work Characteristics

Table 16 shows the estimated number of projects that contractor respondents worked on in 2024 or in a typical year. Nearly half of contractor respondents (49%, n=112) work on 20 or fewer projects per year. Notably, however, definitions of what a singular project entails differs greatly between respondents. We explore the variations and frequencies of these definitions in Chapter 3.

Table 16: Estimated Number of Projects Contractor Respondents' Company Worked on in 2024 or in a Typical Year within California [C7]

Estimated Number of Projects	Number (%) of Respondents (n=230)
1-10	70 (30%)
11-20	42 (18%)
21-50	35 (15%)
51-100	32 (14%)
101-500	27 (12%)
501+	8 (3%)
Unsure	7 (3%)
Prefer not to answer	9 (4%)

The 230 contractor respondents work on a variety of property types, with the distribution of responses shown in Table 17. Most contractor respondents work on single-family homes⁶ (77%, n=176) or other nonresidential buildings (42%, n=97). Fewer numbers of contractor respondents work on multifamily buildings (both low-rise⁷ and high-rise⁸) or hotels/motels.

Table 17: Property Types Worked on by Contractor Respondents (Multiselect) [C9]

Property Types	Number (%) of Respondents (n=230)
Single-family homes	176 (77%)
Low-rise multifamily buildings	51 (22%)
High-rise multifamily buildings	22 (10%)
Hotels/motels	27 (12%)
Other nonresidential buildings	97 (42%)

When looking at the contractor respondents' work based on license type and the property types they worked on, there is a notable difference between the contractor work groupings which can be seen in Table 18 below. Contractor respondents that work on general contracting, HVAC and mechanical systems, or lighting and electrical systems, and other building trade related work were nearly equally likely to work only on single-family homes and low-rise multifamily buildings, only on high-rise multifamily buildings, hotels/motels, and other nonresidential buildings, or all property types. Whereas contractor respondents that work only on general contracting, HVAC and mechanical systems, or lighting and electrical systems, or only on other building trade related work had similar distributions, with nearly 60% of each respective group working on all property types.

Table 18: Contractor Respondents' Work Based on License Type by Property Types Worked On

Contractor Work	Worked on single-family homes and low-rise multifamily buildings	Worked on high-rise multifamily buildings, hotels/motels, and other nonresidential buildings	Worked on all property types
Work only on general contracting, HVAC and mechanical systems, or lighting and electrical systems (n=142)	37 (26%)	24 (17%)	81 (57%)

⁶ Includes detached homes, townhomes, duplexes, or triplexes.

⁷ Defined as three habitable stories or fewer excluding the underground parking garage.

⁸ Defined as four habitable stories or more excluding the underground parking garage.

Contractor Work	Worked on single-family homes and low-rise multifamily buildings	Worked on high-rise multifamily buildings, hotels/motels, and other nonresidential buildings	Worked on all property types
Work on general contracting, HVAC and mechanical systems, or lighting and electrical systems, and other building trade related work (n=51)	19 (37%)	16 (31%)	16 (31%)
Work only on other building trade related work (n=37)	8 (22%)	7 (19%)	22 (59%)

Contractor respondents were asked to indicate whether they worked on new construction⁹, addition¹⁰, or alteration/retrofit¹¹ projects, with results presented in Table 19. Most contractors work in each of the three project types provided, suggesting it is quite common for contractors to do multiple types of project work. Out of the three project types, alterations and retrofit work is represented most by survey respondents, with 87% of contractor respondents indicating they work on these types of projects.

Table 19: Project Types Contractor Respondents' Company Worked On [C11]

Project Type	Number (%) of Respondents (n=230)
New construction	138 (60%)
Additions	130 (57%)
Alterations/retrofits	199 (87%)

Table 20 shows the results on the type of project work that the contractor respondents' company has worked on, and results indicate respondents' companies conducted a wide range of project work. Every work category listed in the survey had at least ten contractor respondents whose company conducted such a project in the past five years. The most common project work for the group includes HVAC equipment and general construction, with 41% (n=94) and 40% (n=91) working on such projects, respectively.

⁹ Defined as a ground-up build.

¹⁰ Defined as any change to a building that increases conditioned floor area and conditioned volume.

¹¹ Project type includes repairs and replacements.

Table 20: Type of Project Work Contractor Respondents' Company Worked On [C10]

Type of Project Work	Number (%) of Respondents (n=230)
Ductwork	66 (29%)
HVAC equipment	94 (41%)
Electric power distribution system ^a	74 (32%)
Indoor or outdoor lighting, or lighting controls	58 (25%)
Building envelope	43 (19%)
Water heating or general plumbing	67 (29%)
Solar ready, photovoltaic, or battery storage	48 (21%)
Pools or spas	28 (12%)
Powered outdoor signs	10 (4%)
Specialized installations ^b	21 (9%)
General construction	91 (40%)
Other, please specify	39 (17%)

^a Examples include electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls.

^b Such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods.

HERS Rater Survey Respondent Characteristics

More than half of HERS rater respondents (58%, n=41) received training through both CalCERTS and CHEERS. Twenty percent (20%, n=14) of HERS rater respondents were solely trained through CalCERTS, and a similar percentage, 23% (n=16), were solely trained through CHEERS. Table 21 shows the distribution of respondents' training from the HERS Providers.

At the time of taking the survey, the vast majority (72%, n=50) of HERS raters noted they were previously certified with CalCERTS¹² and had an active certification through CHEERS. It is important to note, however, that this number does not specify the respondents certified through both organizations while both were in operation. A small number (7%, n=5) had yet to transition to CHEERS from CalCERTS, although two noted they were not planning to do so. Table 22 shows the certification status of HERS rater respondents at the time of taking the survey.

¹² CalCERTS closed operations prior to the survey launch.

Table 21: HERS Rater Respondents' Training [H4]

HERS Provider Training	Number (%) of Respondents (n=71)
Both HERS Providers	41 (58%)
CalCERTS	14 (20%)
CHEERS	16 (23%)

Table 22: HERS Rater Respondents' Certification Status [H5]

HERS Certification Status	Number (%) of Respondents (n=69)
I am only certified with CHEERS	14 (20%)
I was certified with CalCERTS and am currently certified with CHEERS	50 (72%)
I was only certified with CalCERTS and am NOT going to transition to CHEERS	2 (3%)
I was only certified with CalCERTS and am transitioning to CHEERS	3 (4%)

Organizational Characteristics

All HERS rater respondents work on at least single-family homes, as seen in Table 23 which shows the property types that respondents have worked on. Roughly half (54%, n=38) work on low-rise multifamily buildings and less than a third (24%, n=17) work on high-rise multifamily buildings.

Table 23: Property Types Worked on by HERS Rater Respondents (Multiselect) [H6]

Property Types	Number (%) of Respondents (n=71)
Single-family homes	71 (100%)
Low-rise multifamily buildings	38 (54%)
High-rise multifamily buildings	17 (24%)

Organizational Project Work Characteristics

A plurality of HERS rater respondents (n=27) said they conducted between 100-499 HERS tests on single-family homes in 2024 or in a typical year. For low-rise and high-rise multifamily buildings, the most popular range drops to between 1-20 tests conducted per year. Figure 2, Figure 3, and Figure 4 shows the distribution of HERS testing done by property type in 2024 or in a typical year.

Figure 2: Estimated Number of Single-family Home Projects HERS Rater Respondents' Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]

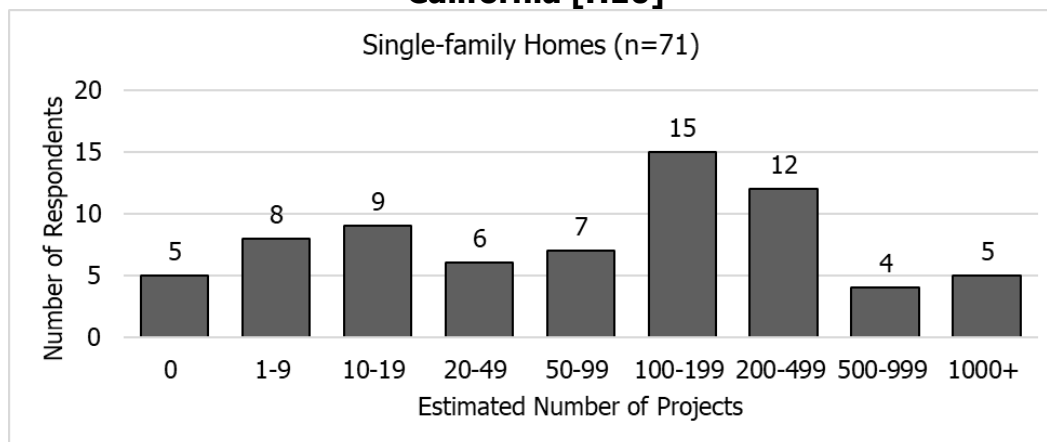


Figure 3: Estimated Number of Low-rise Multifamily Buildings Projects HERS Rater Respondents' Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]

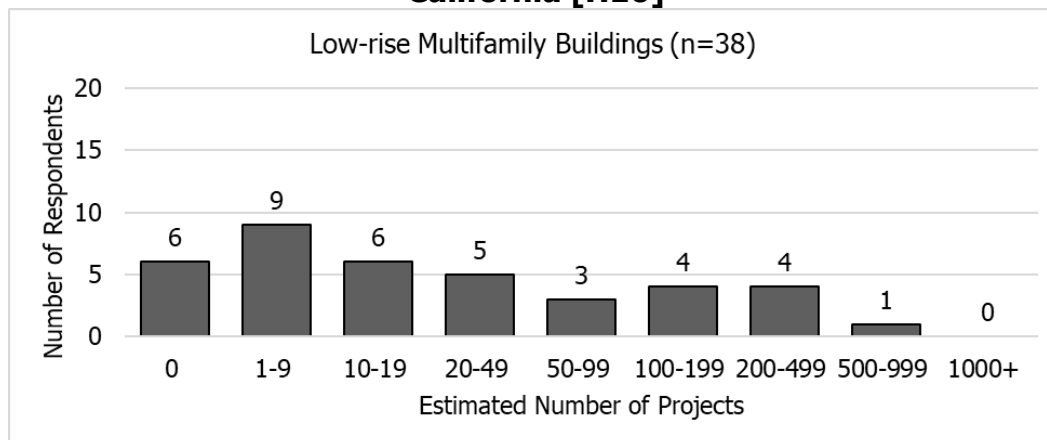


Figure 4: Estimated Number of High-rise Multifamily Buildings Projects HERS Rater Respondents' Conducted HERS Testing On in 2024 or in a Typical Year within California [H10]

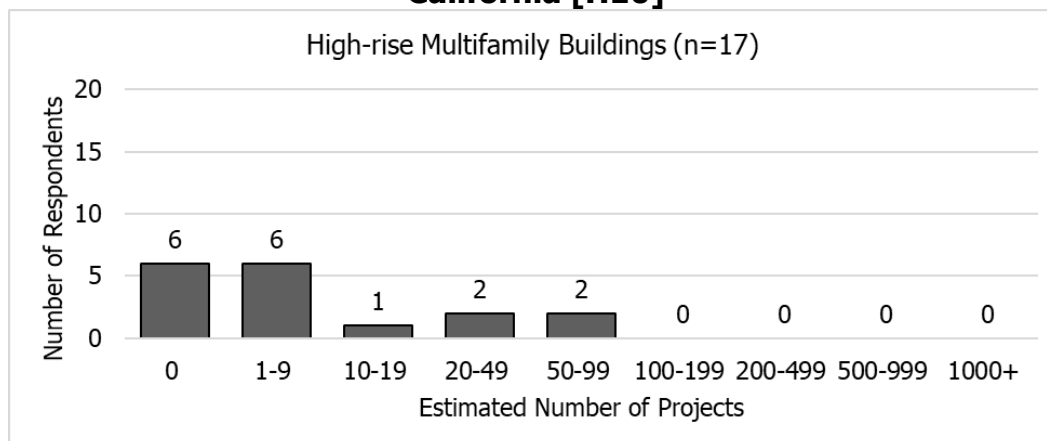


Table 24 presents the results for the project types that HERS raters conduct testing on by new construction, addition, and alteration/retrofit projects. Most HERS rater respondents seem to conduct most types of HERS tests on all property types. This majority slips when we look at

alterations/retrofits but, aside from other unmentioned testing categories, only domestic hot water tests for alterations/retrofits see less than half of HERS raters (32 out of 71) conducting tests on this type of work.

Table 24: Type of Project Work HERS Rater Respondents Conducted HERS Testing On in 2024 or in a Typical Year within California[H7]

Type of Project Work	Ducts (n=69)	Heating and cooling equipment (n=69)	Mechanical Ventilation (n=68)	Building Envelope (n=58)	Domestic hot water (n=51)	Others (n=30)
New construction (ground-up build)	59 (86%)	59 (86%)	59 (87%)	52 (90%)	47 (92%)	29 (97%)
Additions	56 (81%)	56 (81%)	48 (71%)	45 (78%)	38 (75%)	23 (77%)
Alterations/ retrofit (including repairs and replacements)	58 (84%)	60 (87%)	44 (65%)	37 (64%)	32 (63%)	22 (73%)

ATT Survey Respondent Characteristics

Five ATT respondents selected more than one ATTCP that they are currently certified with or were certified with in the past five years. The ATT certification referenced most, granted this was a small sample, was the National Lighting Contractors Association of America certification held by nine ATT survey respondents. Table 25 shows the distribution of ATTCPs that respondents indicated they were certified with in the past five years. Table 26 presents the results of ATT respondents' role in their organization. Interestingly, over two-thirds (n=16) of ATT respondents noted they hold both ATT and ATE roles within their organization.

Table 25: ATT Respondents' ATTCP Certifications (Multiselect) [A5]

ATTCPs	Number of Respondents (n=23)
National Lighting Contractors Association of America (NLCAA)	9
California Advanced Lighting Controls Training Program (CALCTP)	3
California State Pipe Trades Council (CSPTC)	1
National Energy Management Institute Committee (NEMIC) (also referred to as The Testing, Adjusting, and Balancing Bureau (TABB))	5
National Environmental Balancing Bureau (NEBB)	3

ATTCPs	Number of Respondents (n=23)
Refrigeration Service Engineers Society (RSES)	7

Table 26: ATT Respondents' Roles in Organization [A6]

Role in Organization	Number of Respondents (n=23)
Acceptance test employer/supervisor (ATE)	3
Acceptance test technician (ATT)	4
I hold both roles	16

Organizational Characteristics

Two-thirds (n=15) of ATT respondents work in organizations with fewer than 50 employees, as seen in Table 27.

Table 27: ATT Respondents' Company Size [A13]

Company Size	Number of Respondents (n=23)
1-4	5
5-9	5
10-49	5
50-99	1
100+	4
Prefer not to answer	3

Organizational Project Work Characteristics

Most ATT respondents conduct testing on fewer than 20 projects in any given property type within a typical year (seen in Table 28, which shows the distribution of the estimated number of projects that ATT respondents worked on that required at least one acceptance test that was conducted in 2024 or in a typical year).

Table 28: ATT Respondents' Estimated Number of Projects Requiring at Least One Acceptance Test Worked on in 2024 or in a Typical Year within California [A11]

Number of Project Ranges	Low-rise multifamily buildings (n=11)	High-rise multifamily buildings (n=6)	Hotels/motels (n=7)	Other nonresidential buildings (n=21)
0-20	7	3	6	15

Number of Project Ranges	Low-rise multifamily buildings (n=11)	High-rise multifamily buildings (n=6)	Hotels/motels (n=7)	Other nonresidential buildings (n=21)
21-50	4	3	0	3
51-100	0	0	1	1
101-500	0	0	0	2
501 or more	0	0	0	0

Although the sample size is low, among this group of ATT respondents, other nonresidential buildings were the most popular testing property type, with 21 conducting some range of tests on such buildings within a given year. This can be seen in Table 29 that shows the property types that ATT respondents have worked on.

Table 29: Property Types Worked on by ATT Respondents [A8]

Property Types	Number of Respondents (n=23)
Low-rise multifamily buildings	11
High-rise multifamily buildings	6
Hotels/motels	7
Other nonresidential buildings	21

The types of tests conducted also ranged broadly within the ATT respondent group. Table 30 and Table 31 which show the type of work respondents conducted acceptance testing on for new construction/additions and alterations/retrofits respectively. ATT respondents most frequently performed acceptance tests for HVAC equipment and fan controls categorized as new construction (n=12), alterations/retrofits (n=12), and simple HVAC unit replacement for additions (n=11) and alterations/retrofits (n=12).

Table 30: Type of Project Work ATT Respondents Typically Conducted Acceptance Testing for New Construction and Additions [A9]

Type of Project Work	New construction	Additions
Building envelope (fenestration thermal performance, envelope leakage blower door test) (n=9)	9	4
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems) (n=12)	9	6
Outdoor lighting controls (n=11)	9	4

Type of Project Work	New construction	Additions
Simple HVAC replacements without duct alterations/retrofits (n=12)	5	11
New or altered duct systems (n=12)	11	9
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery) (n=14)	11	10
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD)) (n=14)	12	8
Hydronic systems (including variable flow, temperature reset, and water chillers) (n=7)	5	5
Energy storage systems (n=4)	3	1
Mechanical Energy management control system (EMCS) (including automatic demand shed) (n=9)	8	3
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD) (n=5)	5	3

Table 31: Type of Project Work ATT Respondents Typically Conducted Acceptance Testing for Alterations/Retrofits [A10]

Type of Project Work	Number of Respondents* (n=21)
Building envelope (fenestration thermal performance, envelope leakage blower door test)	3
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems)	10
Outdoor lighting controls	5
Simple HVAC replacements without duct alterations/retrofits	12
New or altered duct systems	9
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery)	11

Type of Project Work	Number of Respondents* (n=21)
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD))	12
Hydronic systems (including variable flow, temperature reset, and water chillers)	6
Energy storage systems	1
Mechanical Energy management control system (EMCS) (including automatic demand shed)	5
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD)	2

* Two out of 23 ATT respondents indicated that they do not conduct acceptance testing for alterations/retrofit projects.

Comparison of Project Types Worked on by Respondents

Contractors were asked, "Which of the following does your company work on? (Select all that apply)," and to indicate whether they worked on new construction, addition, or alteration/retrofit projects. HERS raters and ATTs were asked to indicate the building features or measures they conducted testing on and whether the testing was for new construction, addition, or alteration/retrofit. The specific questions are listed below. The distribution of responses to these questions are included in Appendix E.

- HERS rater: "Please indicate the type(s) of new construction, addition, or alteration/retrofit in which you have typically conducted HERS testing for. (Select all that apply)."
- ATT: "Please indicate the type(s) of new construction or addition projects [technician: you; employer: you or ATTs reporting to you] have typically conducted acceptance testing for."
- ATT: "Which of the following types of alterations/retrofits (including repairs and replacements) have [technician: you; employer: you or the ATTs reporting to you] conducted acceptance testing on? You may select both required ATT tests and other tasks you are asked to complete. (Select all that apply)."

HERS rater and ATT respondents that indicated they tested on one or more of the building features or measures for new construction, addition, or alteration/retrofit projects are summarized and included in Table 32. Results from the contractor respondents are included in the table for comparison. Majority of contractors (87%) work on alteration/retrofit projects while approximately 60% work on new construction or addition projects. HERS raters and ATTs were nearly equal in verifying and testing on new construction, addition, or alteration/retrofit projects.

Table 32: Project Type Worked on by Respondents (Multiselect) [C11, H7, A9, A10]

Project Types	Contractor # (%) of responses (n=230)	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
New construction (ground-up build)	138 (60%)	60 (85%)	19
Additions (any change to a building that increases conditioned floor area and conditioned volume)	130 (57%)	57 (80%)	18
Alterations/retrofit (including repairs and replacements)	199 (87%)	61 (86%)	21

* ATT survey frequencies not described in percentages due to a low number of responses.

CHAPTER 3:

Energy Code Compliance Practices in the Field

This section summarizes findings from contractor and installer (referred to as contractors throughout the chapter), HERS rater, and ATT surveys regarding their current practices that affect Energy Code compliance.

As a reminder:

- As with interpretation of findings in other chapters, it is important to note that the trends reported should be interpreted with caution given the low survey response rates. Please note that both contractors and technicians responded to the contractor survey, and that both ATTs and ATEs responded to the ATT survey.
- All responses are anonymous, respondents were not asked survey questions that could identify their company or themselves, and no distinguishing characteristics were reported. Email addresses for respondents who opted in to the gift card drawing were kept in a separate file that had no link to their survey responses.
- Given the small number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages. The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages.
- Table titles may include references to the specific question number on the respective contractor, HERS rater, or ATT survey. These question references are listed inside square brackets and denoted with a capital letter followed by a number (e.g., C1). The letter "C" references the contractor survey, "H" for the HERS rater survey, and "A" for the ATT survey.

Table 33 lists the survey question numbers explored within this chapter. Each topic and related findings from the surveys are defined in a header. A summary of findings is listed at the end of this chapter.

Table 33: Survey Questions Analyzed to Understand Energy Code Compliance Practices in the Field

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Definition of a project or job	8	11	12
Impact on decision to apply for a permit	23, 24, 30, 31, 33 Crosstab: 23&11	18, 28	20, 29

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Consultation/hiring of HERS raters and ATTs during project stages	18, 19, 11 Crosstab: 18&4, 18&9&4, 19&4, 19&9&4	7, 16	9, 10, 17
Percent of addition or alteration/retrofit projects that are actually permitted	26 Crosstab: 26&9	20	21
Frequency of encountering Code compliance issues	32	21, 29	22, 30
Building department/AHJ consultation, knowledge, and inspection	34, 35	22, 23	23, 25
HERS rater and ATT falsification	n/a	24, 30, 31	24, 31, 32

Survey questions are in appendices B-D, and survey response frequency tables are in appendices E-G.

Cross tabular analyses did not yield notable differences in responses across geographic regions.

Varying definitions of what a “project” or “job” suggests that it is important to clarify language when describing the industry’s work

Across contractors, HERS raters, and ATTs, survey respondents defined a project or a job in a variety of ways:

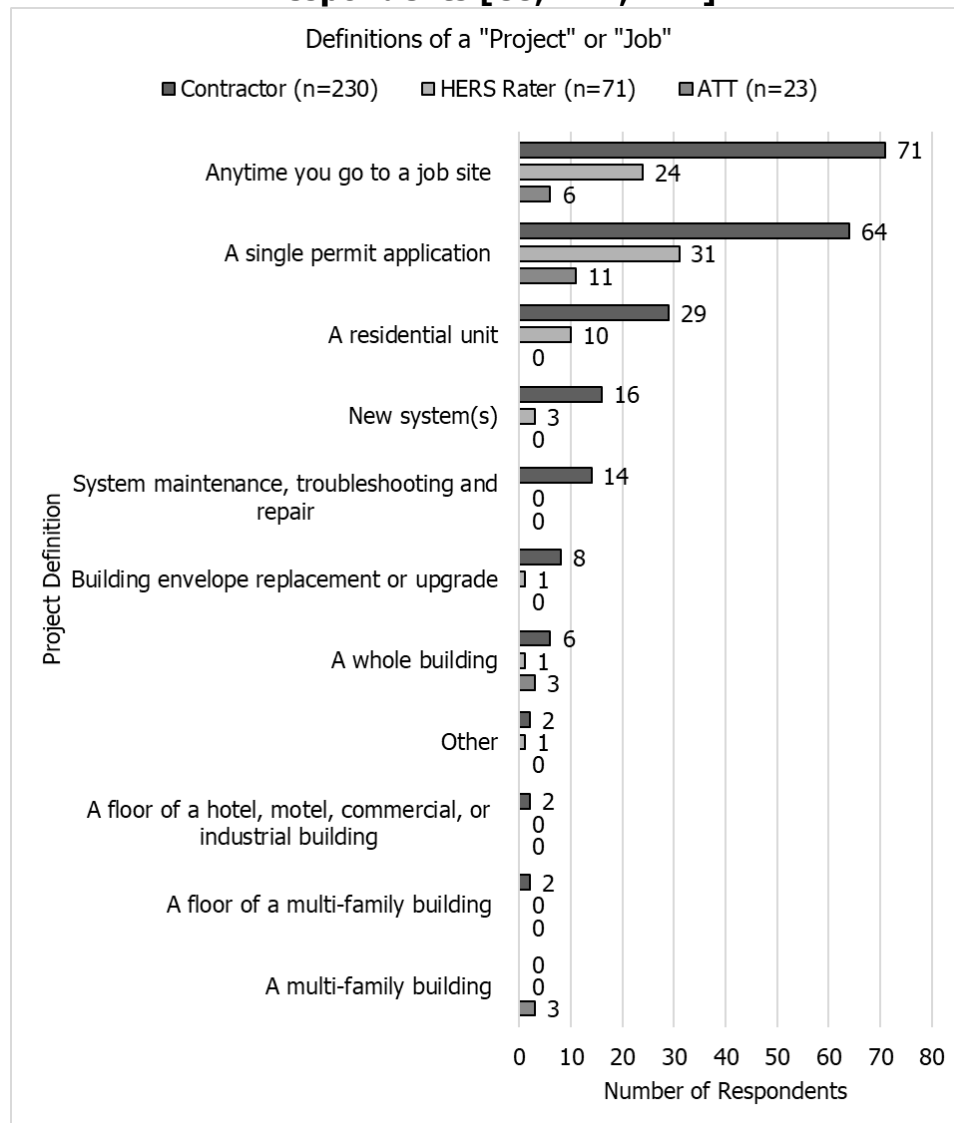
- The most common response among contractor respondents were “anytime you go to a job site” (31%, n=71), “a single permit application” (28%, n=64), and “a residential unit” (13%, n=29).
- HERS rater respondents tended to define a project by “a single permit application” (44%, n=31), “anytime you go to a job site” (34%, n=24), and “a residential unit (such as an apartment or single-family home)” (14%, n=10).
- ATT respondents tended to define projects by “a single permit application” (n=11), and “anytime you go to a job site” (n=6).

For both HERS rater and ATT respondents, the most common response to define a project was “a single permit application” while for contractor respondents it was “anytime you go to a job site.”

The responsibilities of HERS raters and ATTs involve ensuring compliance with the Energy Code which aligns with their definition of a project or job as “a single permit application.” For contractors whose responsibilities are more tied to working directly in the field, most respondents (64%, n=148) defined a project or job in relation to the building structure and equipment they work with rather than in relation to the permitting process. In addition to

“anytime you go to a jobsite,” some contractor respondents defined jobs as “a floor of a multifamily building” (1%, n=2), “system maintenance, troubleshooting and repair (HVAC or electrical)” (6%, n=14), “building envelope replacement or upgrade (such as windows, roof, etc.)” (3%, n=8); few to no HERS rater and ATT respondents selected these options. This difference may suggest a need to clarify terminology used on permitting paperwork and in discussions. Figure 5 shows the distribution of responses to how contractor, HERS rater, and ATT respondents define a “project” or a “job”.

Figure 5: Definitions of “Project” or “Job” by Contractor, HERS Rater, and ATT Respondents [C8, H11, A12]



Some contractors’ decisions to apply for a permit are impacted by project cost and profit margin, and customer pressures

This section discusses several questions that aimed to answer what factors impact a contractor’s decision to apply for a permit. When interpreting the answers to these questions, there is a risk of social desirability bias given the sensitivity of the topic, meaning that contractors or other survey groups may have responded in a way that reflects what they expected the CEC would like to hear rather than their true experiences. The most popular

response to this group of questions suggests that most contractor survey respondents never go without a permit or never face pressure to break the rules. Many survey respondents, however, described a variety of pressures they see in the field or personally face when deciding whether to apply for a permit in accordance with the Energy Code.

Factors that impact a contractor's decision to pursue a permit

To better understand the factors that impact a contractor's decision to apply for a permit, each group was asked to respond to the following questions:

- Contractor: "Which of the following typically impacts your company's decision to apply for a permit? (Select all that apply)"
- HERS rater: "In your personal experience, which of the following typically impacts contractors' decisions to apply for a permit to construct? (Select all that apply)"
- ATT: "In your personal experience, which of the following typically impacts contractors' decision to apply for a permit? (Select all that apply)"

Table 34 presents the results to these questions excluding those that answered the following options: "I typically apply for permits and none of these issues impact my decision", "I am not sure", and "Prefer not to answer". See Appendix E, F, and G for the full frequency of responses for contractor, HERS rater, and ATT respondents, respectively.

Among the contractor survey respondents, roughly half (48%, n=110) said that they typically apply for a permit and are not affected by the issues we asked about, and 6% (n=13) of respondents stated that they prefer not to answer. Among the remaining 107 respondents, the most common response was that project cost and profit margin were an issue (38%, n=41), and respondents cited other reasons in nearly equal frequency (28-35 responses per reason).

For HERS rater¹³ and ATT¹⁴ survey groups, excluding those who answered they were unsure or prefer not to answer, "project cost and profit margins" were the top issues, chosen by 46 (73%) of HERS rater respondents and over half (n=8) of ATT respondents. While contractor respondents chose from the remaining four options relatively equally, HERS rater respondents gravitated more towards "competition from contractors performing unpermitted work" rather than "customer pressures for unpermitted work" and "deadlines and time pressures." The overall low number of responses to this question from ATT respondents does not present a meaningful difference between the remaining four options, though the distribution is relatively equal. Results can be seen in Table 34 below.

¹³ Eight HERS rater respondents selected "I am not sure" (n=7) or "Prefer not to answer" (n=1).

¹⁴ Nine ATT respondents selected "I am not sure" (n=8) or "Prefer not to answer" (n=1).

Table 34: Aspects That Typically Impact Contractors' Decisions to Apply for a Permit Indicated by Respondents (Multiselect) [C23, H18, A20]

Factors that Impact Contractors' Decision to Apply for a Permit	Contractor # (%) of responses (n=107)	HERS Rater # (%) responses (n=63)	ATT # of responses* (n=14)
Project cost and profit margins (includes offering competitive pricing)	41 (38%)	46 (73%)	8
Competition from contractors performing unpermitted work	33 (31%)	40 (63%)	7
Deadlines and time pressures	28 (26%)	18 (29%)	3
Customer pressures for unpermitted work	30 (28%)	25 (40%)	5
Difficulty navigating permitting system	35 (33%)	29 (46%)	3
Other, please specify	32 (30%)	9 (14%)	5

* ATT survey frequencies not described in percentages due to a low number of responses.

We looked at the distribution of contractor responses to the question on factors that impact a contractor's decision to apply for a permit against the responses to, "Which of the following does your company work on? (Select all that apply)", where respondents selected whether they worked on new construction, addition, or alteration/retrofit (results shown in Table 35). A similar trend is found here amongst the groups, where approximately half of contractor respondents who worked on either new construction (50%, n=69), addition (47%, n=61), or alteration/retrofit (49%, n=98) said that they typically apply for a permit and are not affected by the issues we asked about. Additional trends include:

- "Project cost and profit margins" is the top reason selected for not applying for a permit for those who work in new construction and addition (n=24 each). Whereas both "project cost and profit margins" and "difficulty navigating permitting system" were the top two aspects for those that work on alteration/retrofit projects, with the same number of selections (17%, n=33).
- For those working on alterations/retrofits, fewer respondents selected "deadlines and time pressures" (12%, n=24) and this may be because of lower scope of work and variability of tasks. Time from construction start to occupancy might be more predictable, or occupancy may not even be interrupted.

Table 35: Comparison of Factors That Impact Contractors' Decisions to Apply for a Permit by the Type of Work Performed (New Construction, Addition, and Alteration/Retrofit Projects) [C23 & C11]

Factors that Impact Contractors' Decision to Apply for a Permit*	New Construction (n=138)	Addition (n=130)	Alteration/Retrofit (n=199)
Project cost and profit margins (includes offering competitive pricing) (n=41)	24 (17%)	24 (18%)	33 (17%)
Competition from contractors performing unpermitted work (n=33)	19 (14%)	21 (16%)	31 (16%)
Deadlines and time pressures (n=28)	20 (14%)	18 (14%)	24 (12%)
Customer pressures for unpermitted work (n=30)	15 (11%)	20 (15%)	30 (15%)
Difficulty navigating permitting system (n=35)	18 (13%)	17 (13%)	33 (17%)
Other, please specify (n=32)	17 (12%)	16 (12%)	27 (14%)
I typically apply for permits and none of these issues impact my decision (n=110)	69 (50%)	61 (47%)	98 (49%)
Prefer not to answer (n=13)	9 (7%)	9 (7%)	11 (6%)

* The number of responses (n=#) for each column header indicates the number of contractor survey respondents who indicated they work on new construction, additions, and/or alteration/retrofit projects (C11). Percentages are calculated based on the column total number of responses. The number of responses in each row header indicates the number of contractors who selected that response option for question C23. Multiple responses were allowed for both questions C23 and C11, thus the percentages will not total to 100%.

To gain insight on the scale of unpermitted work, contractor respondents who work on single-family homes or low-rise multifamily buildings were asked the question, "Do you offer customers who are homeowners/property owners the choice to complete the work without a permit?" Table 36 shows the distribution of results to this question. Out of the 183 contractors who responded to this question, 70% (n=129) noted that they never offer customers the choice to complete work without a permit, and 8% (n=15) preferred not to answer. A small minority of contractors, 5% (n=9), noted always offering customers the choice to do work without a permit, while 16% (n=30) sometimes do. Despite the sensitive nature of this question and the potential for social desirability bias, it is notable that 39 contractor

respondents (21%) said that they offered customers a choice on obtaining a permit for the project.

Table 36: Contractor Responses to Offering the Choice to Complete Work Without a Permit for Single-family Homes or Low-rise Multifamily Buildings [C24]

Frequency of Offering Choice to Complete Work Without a Permit	Contractor # (%) of responses (n=183)
Always	9 (5%)
Sometimes	30 (16%)
Never	129 (70%)
Prefer not to answer	15 (8%)

Conditions that impact ability to meet Energy Code requirements

This survey explored conditions that may impact contractors' ability to meet Energy Code requirements. To study this, survey groups were asked the following questions:

- Contractor: "What percentage of your company's projects have been affected by the following conditions to the extent that it impacted your company's ability to meet Energy Code requirements?"
- HERS rater: "Thinking about the HERS tests you conducted, in your experience as a HERS rater, what percentage of the projects have been affected by the following conditions to the extent that it impacted the contractors' ability to meet Energy Code requirements?"
- ATT: "Thinking about the projects requiring at least one acceptance test that you conducted, in your experience as an ATT, what percentage of projects have been affected by the following conditions to the extent that it impacted the contractors' ability to meet Energy Code requirements?"

For most reasons provided, contractors respond in an expected skewed distribution towards lower values with the most responses saying "Never," the reasons listed in the question are never an issue, followed by those that selected 1-25% of projects. There are, however, a few key exceptions to this pattern. Responses to the three conditions:

- "Difficulty finding qualified trade partners/skilled workers" (n=36)
- "Difficulty finding workers or subcontractors with specific certifications" (n=30)
- "Energy Code is complicated to understand and difficult to comply with" (n=34)

Contractor responses to these conditions deviate from this skewed distribution and there is more variation in responses. Aside from "Never" and "Not applicable," more contractors also chose the option "76-100%" of projects than any other percentage range for these conditions. This pattern may suggest these issues are a more consistent issue for contractors than the other conditions listed.

More contractors expressed that they were unsure about two conditions more so than others: "Energy Code is not enforced by building departments/AHJs" (n=40) and "Building

departments/AHJs do not review forms for accuracy/completeness" (n=50). This uncertainty may indicate that some contractors are unaware of building department/AHJ procedures.

HERS rater respondents, who have an outside perspective of contractor's behavior, also generally follow a skewed distribution of responses but are more likely to say a condition affects "1-25%" of projects than no projects at all. HERS raters note more uncertainty in three areas:

- "Difficulty finding workers or subcontractors with specific certifications" (n=14)
- "Pressure from other responsible parties" (n=13)
- "Building departments/AHJs do not review forms for accuracy/completeness" (n=12)

Each of these conditions is less likely to be witnessed by a HERS rater, which may impact their certainty on how frequently these issues occur.

ATT respondents only deviate from the general stepwise pattern for two key issues:

- "Energy Code is not enforced by building departments/AHJs (don't ask for forms)"
- "Building departments/AHJs do not review forms for accuracy/completeness"

Contractors responded to these options with greater level of uncertainty while most ATT respondents noted these issues impacted "76-100%" of projects (n=8 each). Although low number of ATT responses may be the ultimate cause of this trend, this may indicate that ATTs have greater insight into building department/AHJ processes than contractors.

Figure 6, Figure 7, and Figure 8 show the results of contractor, HERS rater, and ATT respondents' choices, respectively, for the percentage of their company's projects that were affected by certain conditions and impacted their ability to meet Energy Code requirements. Note that contractors who do not need to follow Energy Code requirements for their work may account for the large number of "Never" responses.

Figure 6: Percentage of Contractor Respondents' Company's Projects Affected by Conditions That Impacted Ability to Meet Energy Code Requirements [C30]

Contractor Perspectives: Conditions Impacted Contractor's Ability to Meet Energy Code Requirements (n=227)

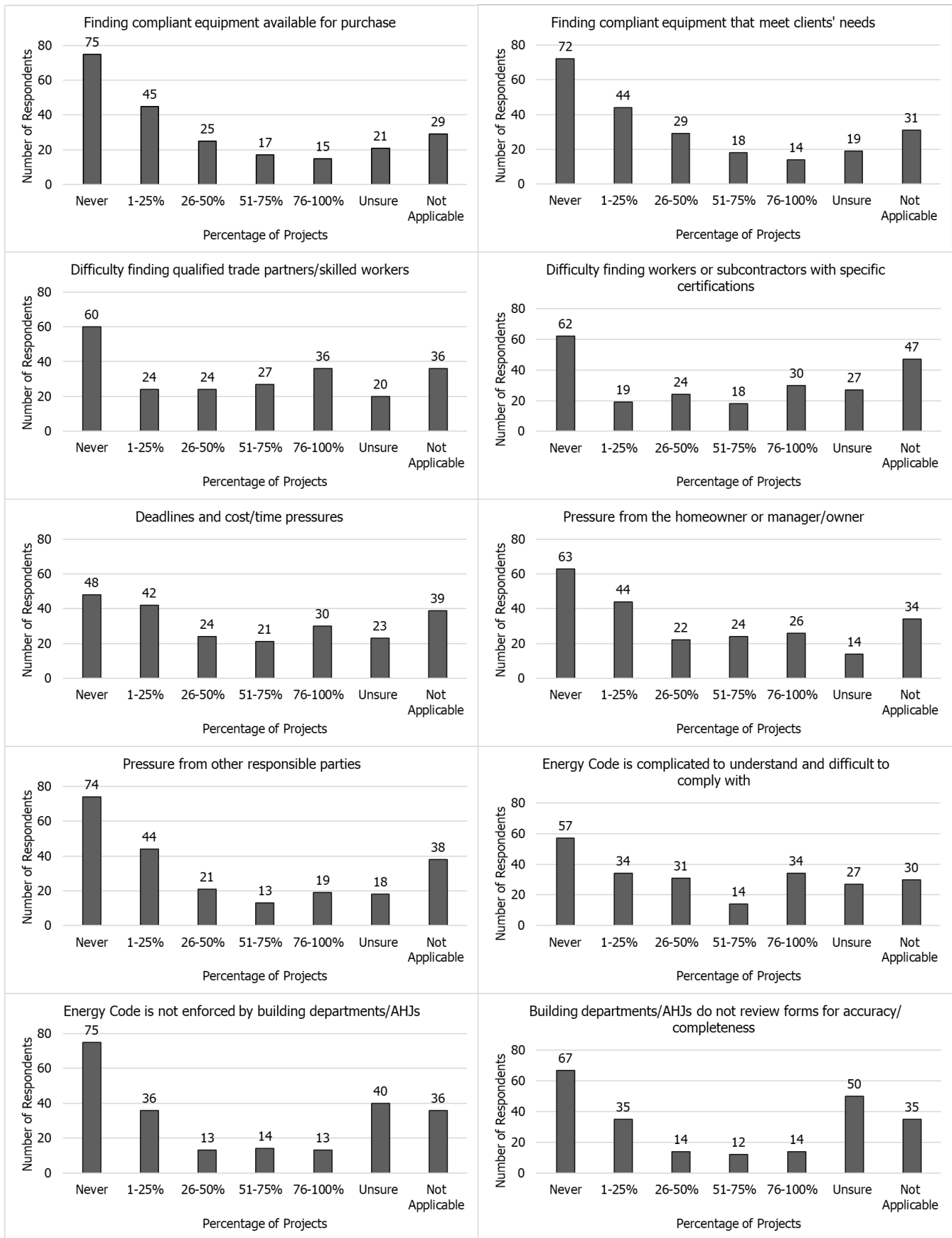


Figure 7: Percentage of Projects HERS Rater Respondents Found Affected by Conditions That Impacted Contractors' Ability to Meet Energy Code Requirements [H28]

HERS Rater Perspectives: Conditions Impacted Contractor's Ability to Meet Energy Code Requirements (n=71)

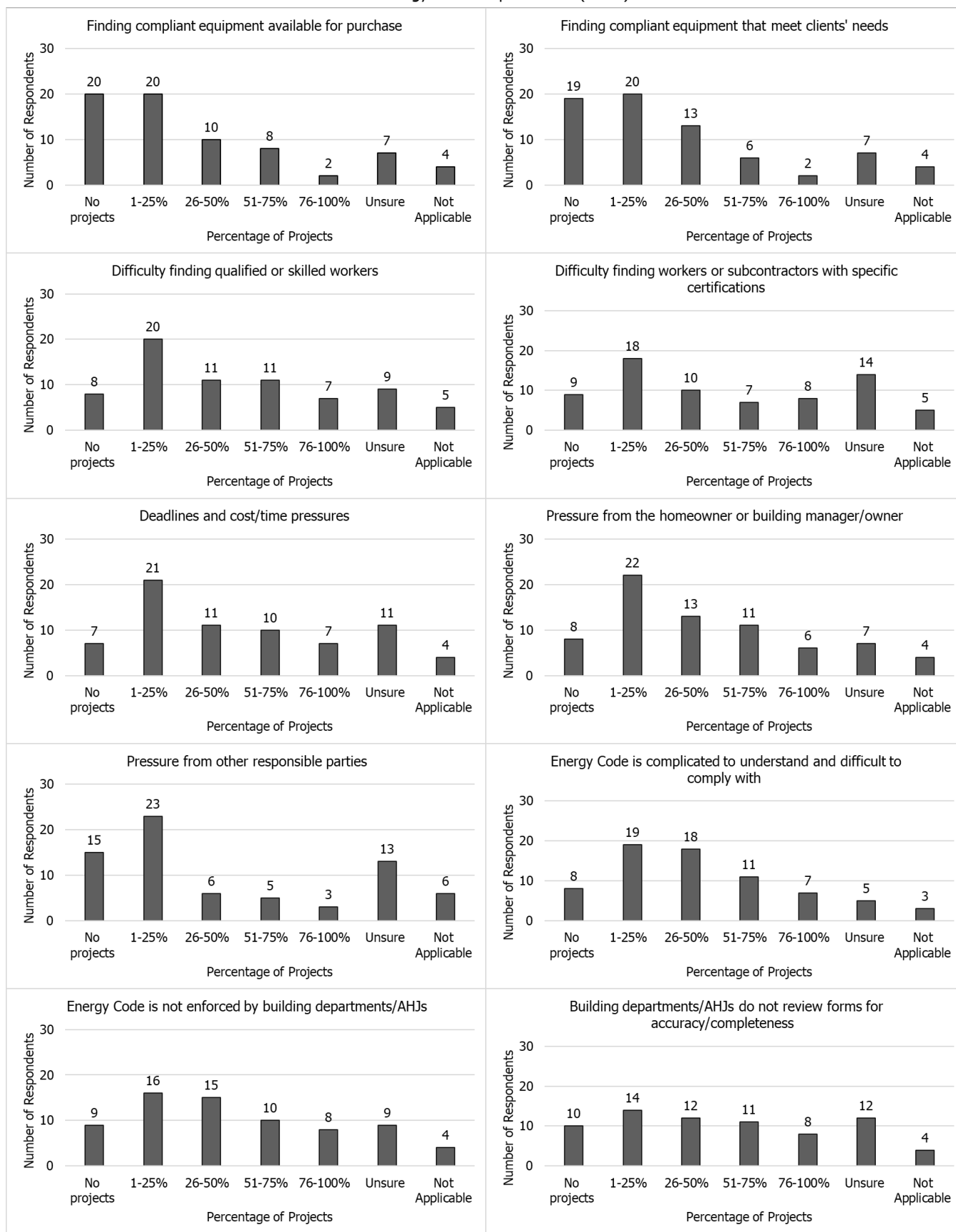
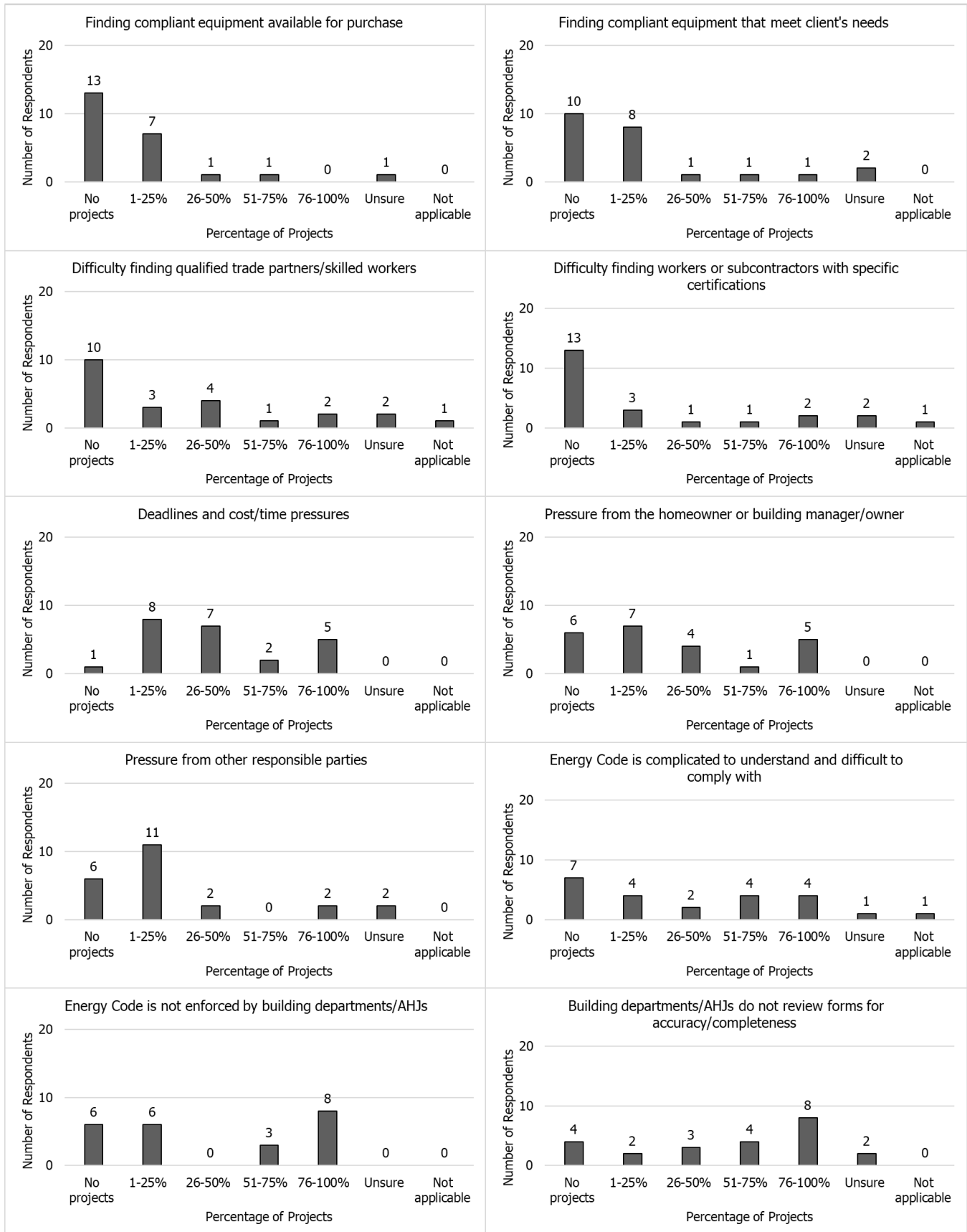


Figure 8: Percentage of Projects ATT Respondents Found Affected By Conditions That Impacted Contractors' Ability to Meet Energy Code Requirements [A29]

ATT Perspectives: Conditions Impacted Contractor's Ability to Meet Energy Code Requirements (n=23)



At the end of this section investigating a contractor's Energy Code compliance, contractors were asked if any other conditions affected their ability to meet Energy Code compliance ("What are the other conditions, if any, that affect your company's ability to build or install equipment in a way that meets Energy Code requirements?", open response question). Of the 223 contractor respondents who saw the question, over half (56%, n=128) did not list additional conditions that affected their company's ability to meet Energy Code compliance.¹⁵

Contractors who responded to this question (n=95) predominately elaborated on issues from the previous question. Most themes teased out in this question were conditions noted throughout the previous several questions. Nonetheless, the most frequently mentioned conditions fall into these categories: Code knowledge and interpretation issues (n=26), equipment access issues (n=23), cost issues (n=15), coordination issues (n=13), and inspector issues (n=10). Summaries of the written responses are included below. Full responses to this question can be found in Appendix E.

Table 37 outlines the frequency of mentions from contractor respondents for all the themes found on the topic of other conditions that affected their company's ability to build or install equipment to meet Energy Code requirements.

- Code knowledge and interpretation issues
 - Thirteen contractor respondents noted some type of difficulty with Code knowledge and reasoning and seven noted they had trouble understanding the Energy Code or its impact. One contractor suggested simplifying Code language to better ensure mutual understanding: "Code complexities, many of us do not understand how the Code is written or applies to a building or installation, members of the energy commission and consultants should be smarter and think about simplifying it as field persons are not that sophisticated." Six contractors noted they had difficulty keeping up with or understanding changes to the Code.
 - The second most common issue presented by this group of contractors tended to be a frustration with one or more aspects of the Energy Code. These frustrations were wide ranging, covering ideas from "[the Code] conflicts between adopted codes by other trades" and "all of these forms are too complicated and ask for too much" to issues around ducts in conditioned spaces and difficulties with fully electric systems in Los Angeles. A full list of these grievances can be found in Appendix E.
 - Two others noted the knowledge discrepancies came from further up the chain on their projects, where project designs weren't designed with the Code in mind: "architects design to form over function which inhibits our installation clearances and affects our Code compliance."
- Equipment access issues
 - Twenty-three contractors experienced some type of issue regarding access to compliant equipment. Fifteen of this group experienced a shortage or high cost of compliant materials. As one contractor lamented, "[it's] hard to find the right equipment that meets everything." Another noted "[It's] Mainly just supply

¹⁵ Of the 128 contractor respondents, 67 noted they had no conditions in mind, 10 were unsure of other conditions, and 51 shared the question did not apply to them.

- issues from time to time.” In contrast, eight contractors noted frustration with compliant equipment, and equipment that had worked well previously that was no longer compliant. One explained, “Certain Energy Code requirements at the end user level aren't convenient or functional and are often anecdotally replaced after final inspections.”
- Cost issues
 - Fifteen contractors noted that costs were a key issue that impacted their Code compliance. Two noted that homeowners especially find the cost of Code compliance frustrating: One mentioned, “Homeowners do not understand the complexity of today's Code requirements. Even though they receive the long- and short-term benefits of compliance. The cost of investment makes them look elsewhere for non-permit pulling non-compliant contractors,” while the other noted “Explaining to owners that they have to spend 2X on equipment and installation and will most likely not see a return on investment. Most of the time we just say, ‘Welcome to CA.’”
 - While most others mentioned general costs of complying with the Energy Code, one elaborated on the high burden of permit costs: “Permits and compliance costs have gone through the roof making it unaffordable for most homeowners to comply. Not to mention the exorbitant property tax assessment that comes with the completion of the work. Most people would be happy to comply but can't afford the extortion-based fees and endless hoops to jump through required by the counties to comply.”
 - Coordination and third-party issues
 - Fourteen contractors mentioned having scheduling issues impact their Code compliance. While ten of these contractors did not elaborate on this issue, four went on to say their frustration stemmed from coordinating with third parties like HERS raters or AHJs. As one exclaimed, “The only issue I see is when the plan check is given to a third party to complete. Each AHJ has their different focuses, and the third party generally asks for minutiae that the AHJ would not concern itself with, completely bogging down the process” Another simply mentioned, “Scheduling third party testing services.”
 - Inspector issues
 - Out of the nine contractors who mentioned inspector issues contributing to their Code compliance decisions, two mentioned being frustrated by the inconsistency between inspectors. As one noted, “You people really need to get into the field more to see what is going on out here. The goal is to standardize the Code but every single inspector we deal with has different criteria, so you get 50 different answers on what needs to be done to meet Code.”
 - Seven out of the nine contractors mentioned issues with inspectors lacking knowledge of the Energy Code. As one mentioned, “Fine if AHJs don't review forms, this makes it easier. When they do review forms, they don't know what they are looking at and they get stuck on things that are not actually issues, causing more problems for everyone.” Another explained, “Many inspectors do not know what the Energy Code is and isn't required. Many scenarios are not addressed on what is and is not to be compliant.”

Table 37: Contractor Responses - Other Conditions that Affect Company's Ability to Build or Install Equipment in a Way That Meets Energy Code Requirements [C31]

Themes	Number of Mentions in Responses (n=95)
Code knowledge and interpretation issues	26
Equipment access issues	23
Cost issues	15
Coordination issues	14
Inspector issues	9
Other	9
Unclear or Vague Response	7

Most questions in this section, "Conditions that impact ability to meet Energy Code requirements," have a plurality of contractor respondents defaulting to the response that contractors would never break rules or do not face difficulties or pushback in permitting. Results from the question, "If it is not feasible to get a permit for a project, which of the following measure(s) would your company take to ensure the work meets the standards for the California Building Code and the Energy Code?" follows the same trend.

Nearly half of the contractor responses (49%, n=113) selected the exclusive response options¹⁶ "If the company cannot secure a permit, then we would not attempt to meet the Energy Code standards but proceed with the project" (n=7), "If the company cannot secure a permit, then we would not do the project" (n=77), or "Prefer not to answer" (n=29). The other half (51%, n=117) selected at least one action they would take to ensure the work met Energy Code requirements.

Of the 117 Contractor responses to this question, 73% (n=85) noted that they would "purchase the same equipment/material as a Code compliant permitted project". The next two common measures taken indicated by respondents align with the goals of the Energy Code – 53% (n=62) and 51% (n=60) of respondents to this question said they'd "be responsible for making sure design/build documents align with Code standards" and/or "install equipment in alignment with Code requirements", respectively. Table 38 shows the distribution of responses for those that did not select the exclusive response options. Notably, 24% (n=28) of contractor respondents mentioned that they would attempt to test for what HERS raters/ATTs would test except with their company staff. This response likely merits further exploration as it is unclear if contractors did not select this option due to a lack of understanding of what HERS raters/ATTs do or a lack of desire or the proper materials to conduct similar tests.

The trend of contractor respondents indicating they try to follow the rules remains strong when we look at the least popular option – only seven respondents (3% of the contractor

¹⁶ Respondents that selected an exclusive response option were unable to select other options in the question.

respondent group) noted they would proceed with the project with no attempt to follow the Energy Code if they cannot secure a permit. Despite such a poignant question that could be subject to significant social desirability bias, or mistrust that the survey would truly be anonymous, it is notable that a large majority of contractor respondents indicated a desire to meet the standards of the Energy Code even if permits were not secured.

Table 38: Measures Taken by Contractor Respondents' Company to Ensure California Building Code and the Energy Code Compliance Without a Permit [C33]

Response Options	Contractor # (%) of responses (n=117)
Purchase the same equipment/material as a Code compliant permitted project	85 (73%)
Install equipment in alignment with Code requirements (but without permit and documentation)	60 (51%)
Test for what HERS raters/ATTs would do but test it with company staff	28 (24%)
Be responsible for making sure design/build documents and installation comply with the Building Code and Energy Code standards	62 (53%)
Other, please specify	13 (11%)

Most contractors do not consult HERS Raters prior to installation

To better understand the stages in which contractors consult with HERS raters for new construction and additions projects, each group was asked to respond to the following questions:

- Contractor: "What percentage of new construction/additions projects [supervisor: do you consult or hire / technician: does your company interact with] a Home Energy Rating System (HERS) rater during the following project stages?"
- HERS rater: "Thinking about the new construction/addition projects where you were involved as a HERS rater, what percent of those projects included consultation at the following stages?"

While beta testing survey questions with HERS raters and ATTs/ATEs prior to distributing the survey, we heard that these groups can only report on the projects for which they were hired for the job. There may be additional projects where contractors have not brought in a HERS rater or ATT for verification or testing, and these groups cannot speak on those projects.

There appear to be a few meaningful trends across the survey respondents' answers:

- Approximately two thirds of contractors said they do not consult a HERS rater in the partial construction mock-up phase, or before or during installation/implementation. However, fewer contractors (45%) said they do not consult a HERS rater after installation but before field verification and diagnostic testing.

- Among those contractors who do consult a HERS rater during some phase of the project for new construction and additions projects, there appears to be a group of contractors that consult HERS raters on 1%-25% of their projects, and a group that consults HERS raters on 75%-100% of their projects.
- HERS raters responded that they were consulted more often during project building phases for new construction and additions projects than the contractors indicated. In general, HERS raters indicated that they were consulted more frequently before and during the installation stages of projects.
 - During mockup phase, 41% of HERS rater respondents said that they were not consulted on any projects, while 38% of HERS raters said that they were consulted for 1%-25% of their projects.
 - Before installation, 27% of HERS rater respondents said they were not consulted on any projects.
 - During installation, 15% of HERS rater respondents said they were not consulted on any projects.
- After installation for new construction and additions projects but before field verification and diagnostic testing, 16% of HERS raters said that they were not consulted on any projects and 41% said that they were consulted for 76%-100% of their projects.

Table 39, Table 40, Table 41, and Table 42 show the percentage of projects that contractor and HERS rater respondents indicate a HERS rater is consulted for new construction and additions projects during the following stages, listed in the respective table order: partial construction mock-up, before installation or implementation stage, during installation or implementation, and after installation or implementation but before field verification and diagnostic testing. Note that contractors who do not need to follow Energy Code requirements for their work may account for a portion of the “No projects” responses.

Table 39: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects During Partial Construction Mock-up [C19, H16]

Partial Construction Mock-up (Design Phase) But Before Installation/Implementation	Contractor # (%) of responses (n=123)	HERS Rater # (%) responses (n=61)
No projects	81 (66%)	25 (41%)
1-25% of projects	13 (11%)	23 (38%)
26-50% of projects	6 (5%)	1 (2%)
51-75% of projects	2 (2%)	3 (5%)
76-100% of projects	16 (13%)	5 (8%)
Unsure	5 (4%)	4 (7%)

Table 40: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects Before Installation/Implementation [C19, H16]

Before Installation/Implementation	Contractor # (%) of responses (n=123)	HERS Rater # (%) responses (n=62)
No projects	75 (61%)	17 (27%)
1-25% of projects	16 (13%)	27 (44%)
26-50% of projects	4 (3%)	9 (15%)
51-75% of projects	1 (1%)	2 (3%)
76-100% of projects	19 (15%)	5 (8%)
Unsure	8 (7%)	2 (3%)

Table 41: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects During Installation/Implementation [C19, H16]

During Installation/Implementation	Contractor # (%) of responses (n=124)	HERS Rater # (%) responses (n=61)
No projects	73 (59%)	9 (15%)
1-25% of projects	13 (10%)	22 (36%)
26-50% of projects	7 (6%)	8 (13%)
51-75% of projects	4 (3%)	11 (18%)
76-100% of projects	20 (16%)	10 (16%)
Unsure	7 (6%)	1 (2%)

Table 42: Percentage of Projects that HERS Raters are Consulted for New Construction and Additions Projects After Installation/Implementation [C19, H16]

After Installation/Implementation But Before Field Verification and Diagnostic Testing	Contractor # (%) of responses (n=132)	HERS Rater # (%) responses (n=63)
No projects	60 (45%)	10 (16%)
1-25% of projects	14 (11%)	10 (16%)
26-50% of projects	6 (5%)	6 (10%)

After Installation/Implementation But Before Field Verification and Diagnostic Testing	Contractor # (%) of responses (n=132)	HERS Rater # (%) responses (n=63)
51-75% of projects	2 (2%)	10 (16%)
76-100% of projects	42 (32%)	26 (41%)
Unsure	8 (6%)	1 (2%)

Contractor respondents who worked only Energy Code related projects (i.e., worked on general contracting, HVAC and mechanical systems, or lighting and electrical systems) were more likely to contact a HERS rater post-installation but before inspection than those who also work on other building trade related work. Otherwise, similar trends are seen across the grouped license type in other stages of the project, and there seems to be distinct groups of respondents – those who only reach out for a small percentage of projects and those who reach out for most projects. Figure 9 and Figure 10 show the distribution of responses by these two contractor respondent groups on the percentage of projects they consult with a HERS rater for new construction and addition projects.

Figure 9: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work on Other Building Trade Related Work and Energy Code Related Projects for New Construction and Additions [C19 & C4]

New Construction and Additions Project Stages that HERS Raters are Consulted by Contractor Respondents Who Work on Other Building Trade Related Work and Energy Code Related Projects

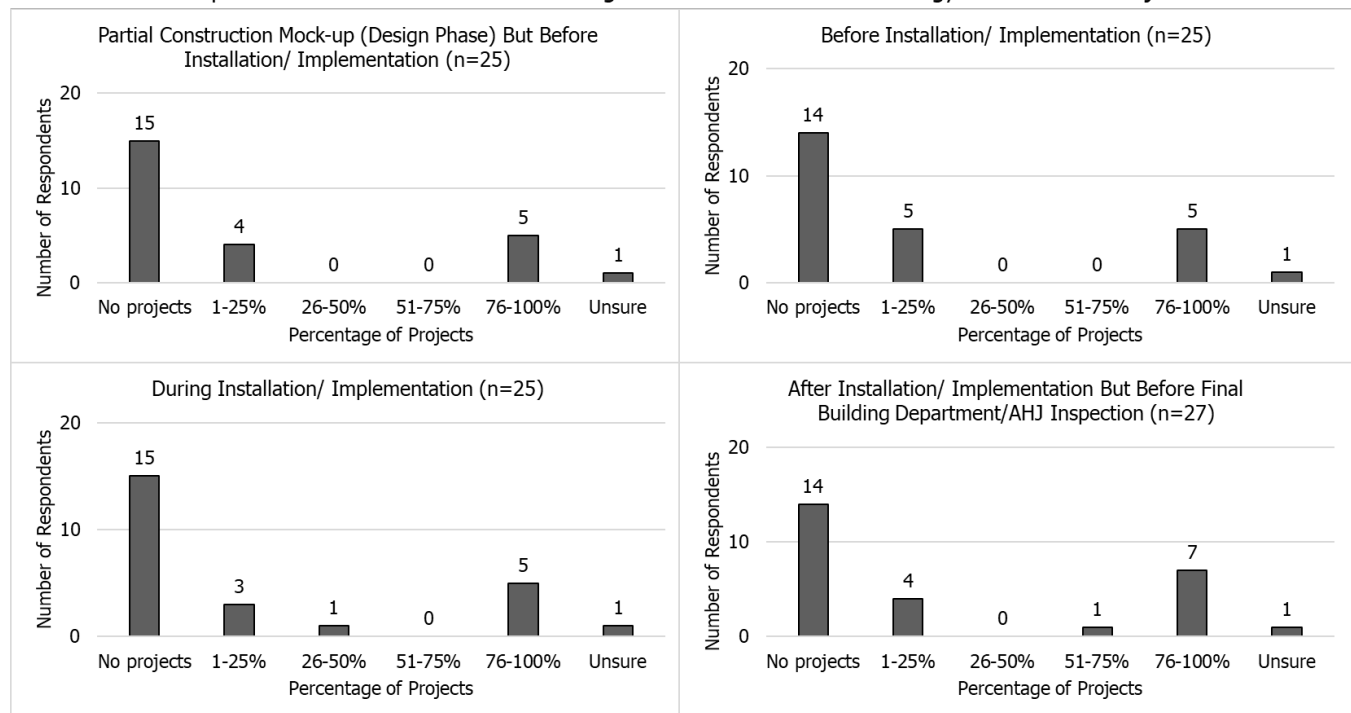
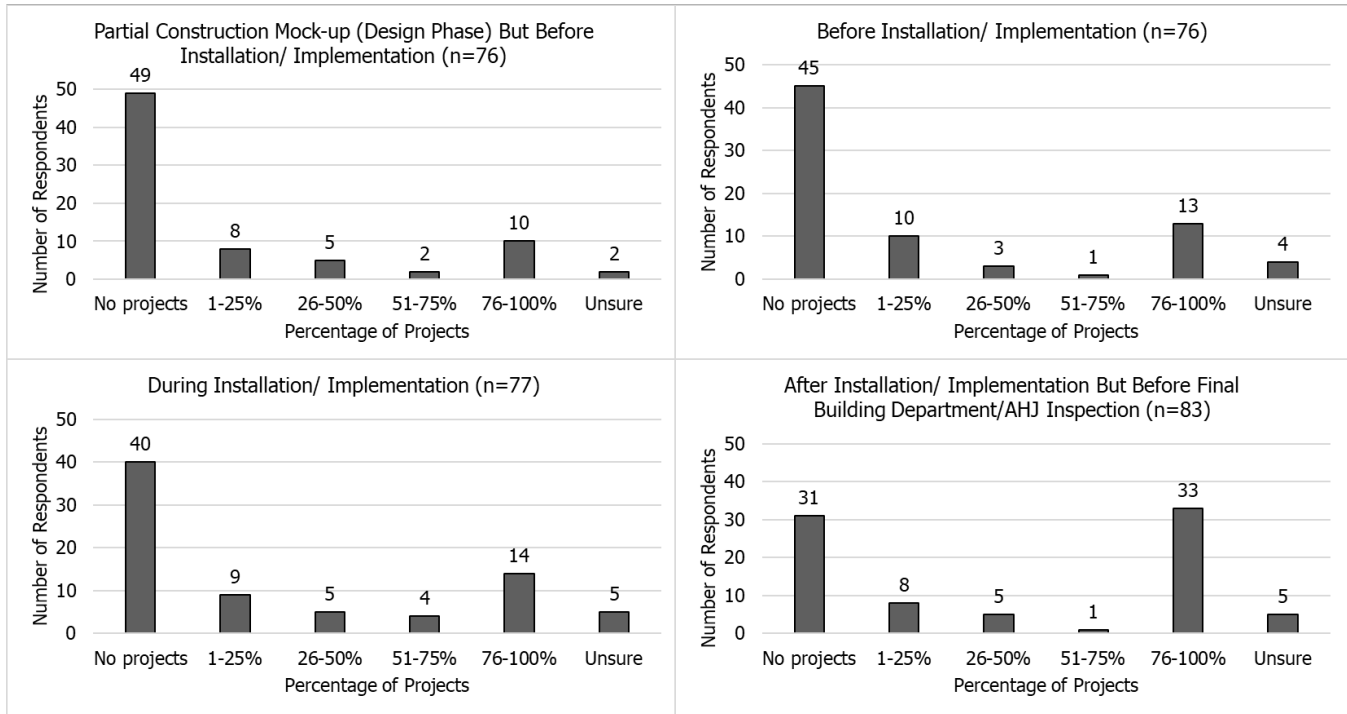


Figure 10: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work Only on Energy Code Related Projects for New Construction and Additions [C19 & C4]

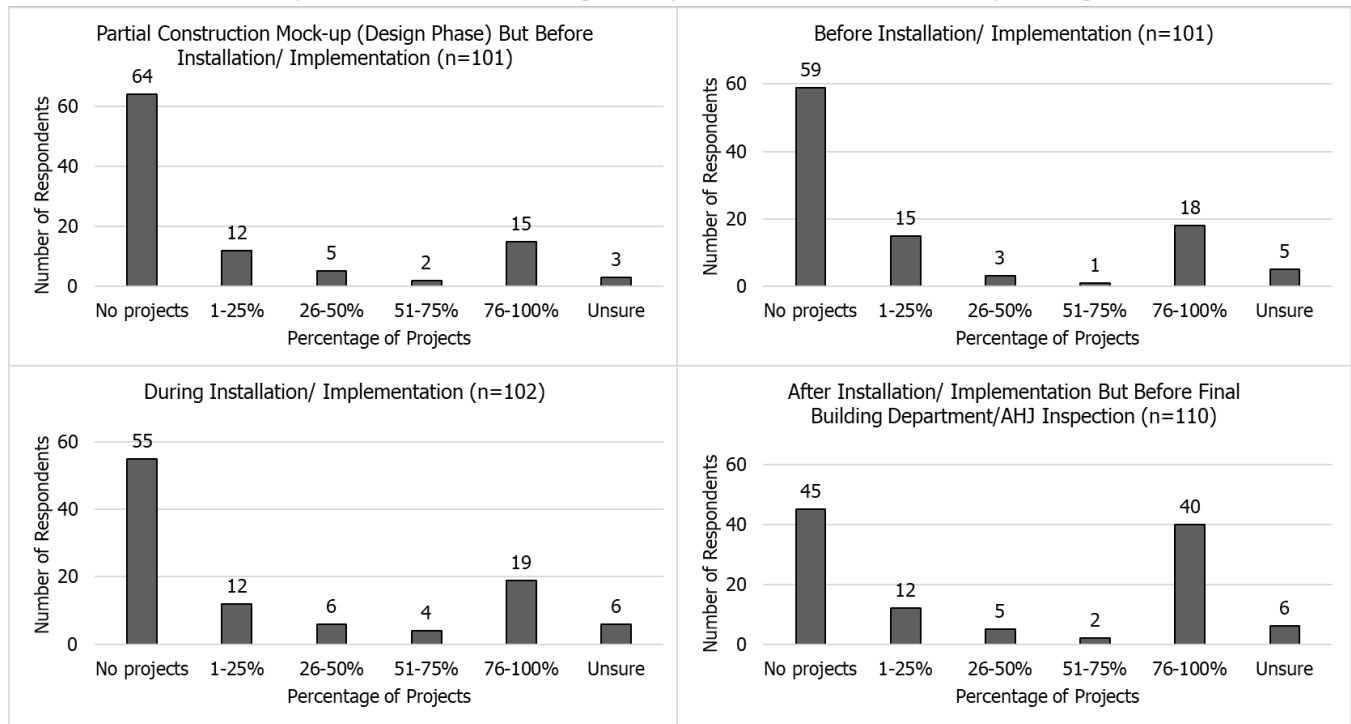
New Construction and Additions Project Stages that HERS Raters are Consulted by Contractor Respondents Who Only Work Energy Code Related Projects



When focusing specifically on those contractors who are most likely to consult with the Energy Code – general contractors, HVAC and mechanical contractors, and lighting contractors – and work on single-family residential and low-rise multifamily buildings, one meaningful difference appears: 41% of contractors consult with a HERS rater after installation but before the final inspection. Otherwise, the same general pattern appears. Over half to two thirds of these contractors stated that they never consult with a HERS rater during the mock-up phase, before installation, or during installation; 41% said they do not consult with a HERS rater on their projects after installation. Less than 20% of these contractors said they consult with a HERS rater on less than half of their projects at any stage of the process. Figure 11 shows the distribution of responses of contractor respondents who work on Energy Code related projects and single-family homes or low-rise multifamily buildings by the percentage of projects they consult with a HERS rater for new construction and addition projects.

Figure 11: Project Stage by Percentage of Projects that HERS Raters are Consulted by Contractor Respondents Who Work on Energy Code Related Projects and Single-family Homes or Low-rise Multifamily Buildings for New Construction and Additions [C19 & C9 & C4]

New Construction and Additions Project Stages that HERS Raters are Consulted by Contractor Respondents Who Work on Single-family Homes or Low-rise Multifamily Buildings



Contractors are likely to consult with ATTs at multiple phases of a project

To better understand the stages in which contractors consult ATTs for new construction and additions projects, each group was asked to respond to the following questions:

- Contractor: "What percentage of new construction/addition projects [supervisor: do you consult or hire / technician: does your company interact with] an Acceptance Test Technician (ATT) during the following project stages?"
- ATT: "Thinking about the new construction/addition projects where you were involved as an ATT, what percent of those projects included consultation at the following stages?"

Through beta testing from HERS raters and ATTs/ATEs, we heard that these groups can only report on the projects for which they were hired. There may be additional projects where contractors have not brought in a HERS rater or ATT for verification or testing, and these groups cannot speak on those projects.

A few meaningful trends appear across the survey respondents' answers:

- Approximately two thirds of contractors said they do not consult an ATT at any phase of the project for new construction and additions projects.
- Among those contractors who do consult an ATT during some phase of the project for new construction and additions projects, there appears to be a group of contractors

that consult ATTs on 1%-25% of their projects, and a group that consults ATTs on 75%-100% of their projects.

- ATTs indicated that they were consulted more frequently before and during the installation stages of projects.
 - During mockup phase, 12 out of the 22 ATTs said that they were not consulted on any projects, while six out of 22 ATTs said that they were consulted for 1-25% of their projects.
 - Before installation, seven out of 21 ATTs said they were not consulted on any projects.
 - During installation, four out of 23 ATTs said they were not consulted on any projects.

Table 43, Table 44, Table 45, and Table 46 show the percentage of projects that contractor and ATT respondents indicate an ATT is consulted for new construction and additions projects during the following stages, listed in the respective table order: partial construction mock-up, before installation or implementation stage, during installation or implementation, and after installation but before final building department/AHJ inspection¹⁷. Note that contractors who do not need to follow Energy Code requirements for their work may account for a portion of the “No projects” responses.

Table 43: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects During Partial Construction Mock-up [C18, A17]

Partial Construction Mock-up (Design Phase) But Before Installation/Implementation	Contractor # (%) of responses (n=92)	ATT # of responses* (n=22)
No projects	62 (67%)	12
1-25% of projects	15 (16%)	6
26-50% of projects	3 (3%)	0
51-75% of projects	1 (1%)	1
76-100% of projects	8 (9%)	3
Unsure	3 (3%)	n/a

* ATT survey frequencies not described in percentages due to a low number of responses.

¹⁷ Beta testing with ATTs/ATEs provided insight that ATTs are not consulted at all after installation as they are testing projects at this stage, thus the question was not asked to ATTs and not included in the table.

Table 44: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects Before Installation/Implementation [C18, A17]

Before Installation/Implementation	Contractor # (%) of responses (n=90)	ATT # of responses* (n=21)
No projects	62 (69%)	7
1-25% of projects	12 (13%)	4
26-50% of projects	4 (4%)	4
51-75% of projects	1 (1%)	3
76-100% of projects	8 (9%)	3
Unsure	3 (3%)	n/a

* ATT survey frequencies not described in percentages due to a low number of responses.

Table 45: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects During Installation/Implementation [C18, A17]

During Installation/Implementation	Contractor # (%) of responses (n=89)	ATT # of responses* (n=23)
No projects	60 (67%)	4
1-25% of projects	12 (13%)	5
26-50% of projects	3 (3%)	1
51-75% of projects	4 (4%)	2
76-100% of projects	7 (8%)	11
Unsure	3 (3%)	n/a

* ATT survey frequencies not described in percentages due to a low number of responses.

Table 46: Percentage of Projects that ATTs are Consulted for New Construction and Additions Projects After Installation/Implementation [C18]

After Installation/Implementation But Before Final Building Department/AHJ Inspection	Contractor # (%) of responses (n=91)
No projects	56 (62%)
1-25% of projects	8 (9%)

After Installation/Implementation But Before Final Building Department/AHJ Inspection	Contractor # (%) of responses (n=91)
26-50% of projects	6 (7%)
51-75% of projects	2 (2%)
76-100% of projects	13 (14%)
Unsure	6 (7%)

NOTE: ATTs were not asked this question as feedback from beta testing indicates that ATTs are brought in to inspect after installation.

When looking at the contractor respondents by their grouped license type, respondents who work on other building trade related work as well as Energy Code related projects (i.e., worked on general contracting, HVAC and mechanical systems, or lighting and electrical systems) were slightly more likely to reach out to ATTs in early project stages than those who only worked on Energy Code related projects. Figure 12 and Figure 13 show the distribution of contractor respondents who work on other building trade related work and Energy Code related projects, and those who only work on Energy Code related projects, respectively, on the percentage of projects by project stage they consult with ATTs for new construction and addition projects.

Figure 12: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work on Other Building Trade Related Work and Energy Code Related Projects for New Construction and Additions [C18 & C4]

New Construction and Additions Project Stages that ATTs are Consulted by Contractor Respondents Who Work On Other Building Trade Related Work and Energy Code Related Projects

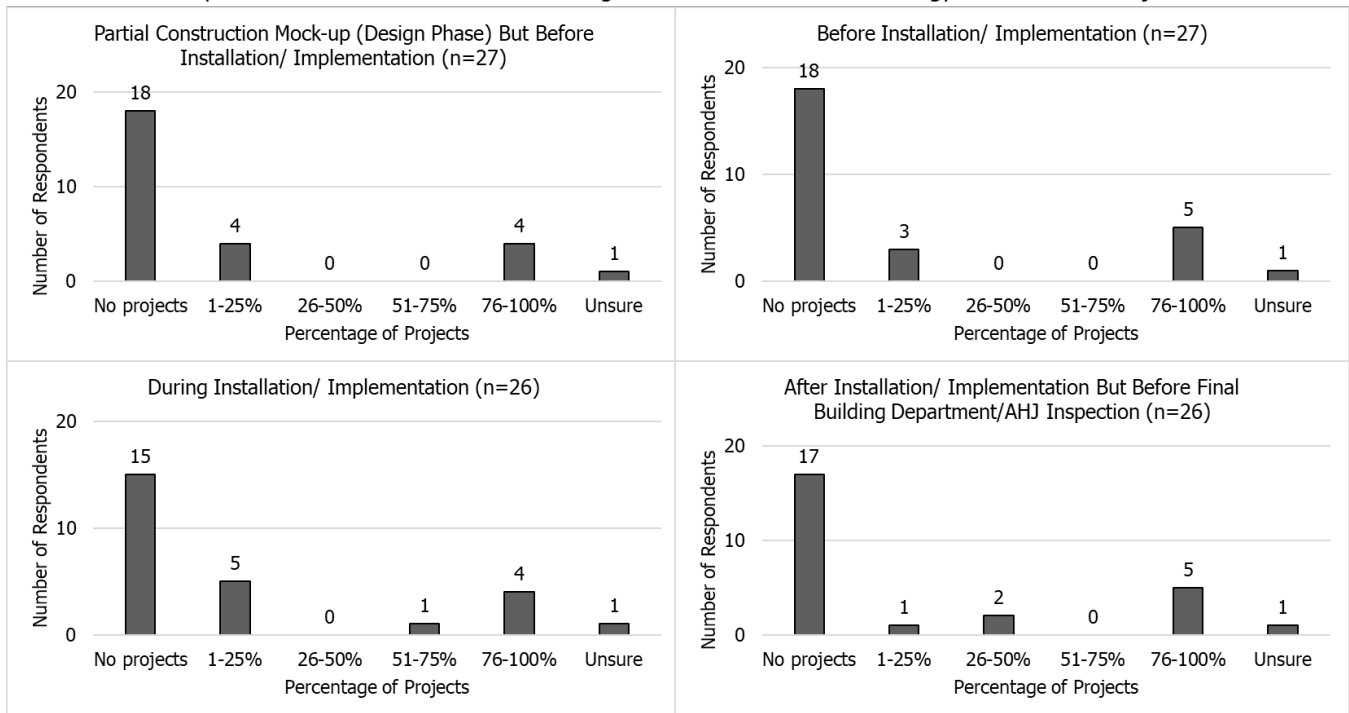
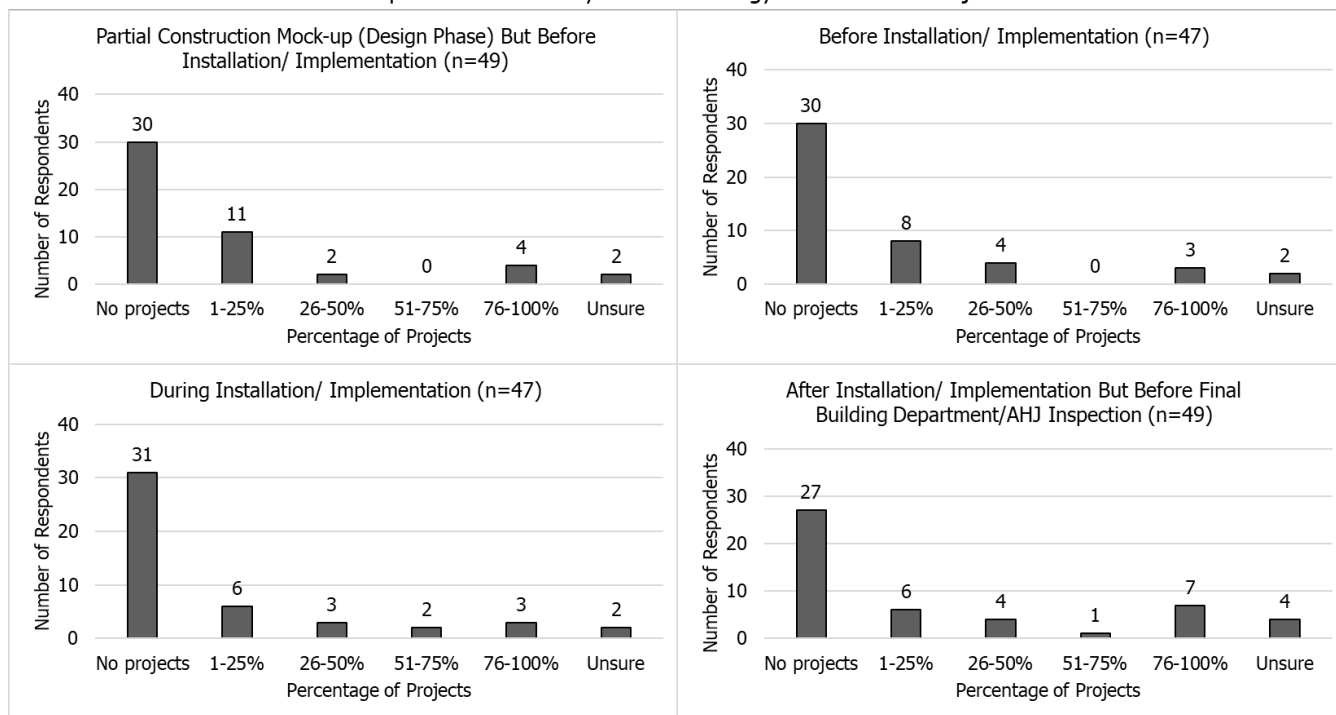


Figure 13: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work Only on Energy Code Related Projects for New Construction and Additions [C18 & C4]

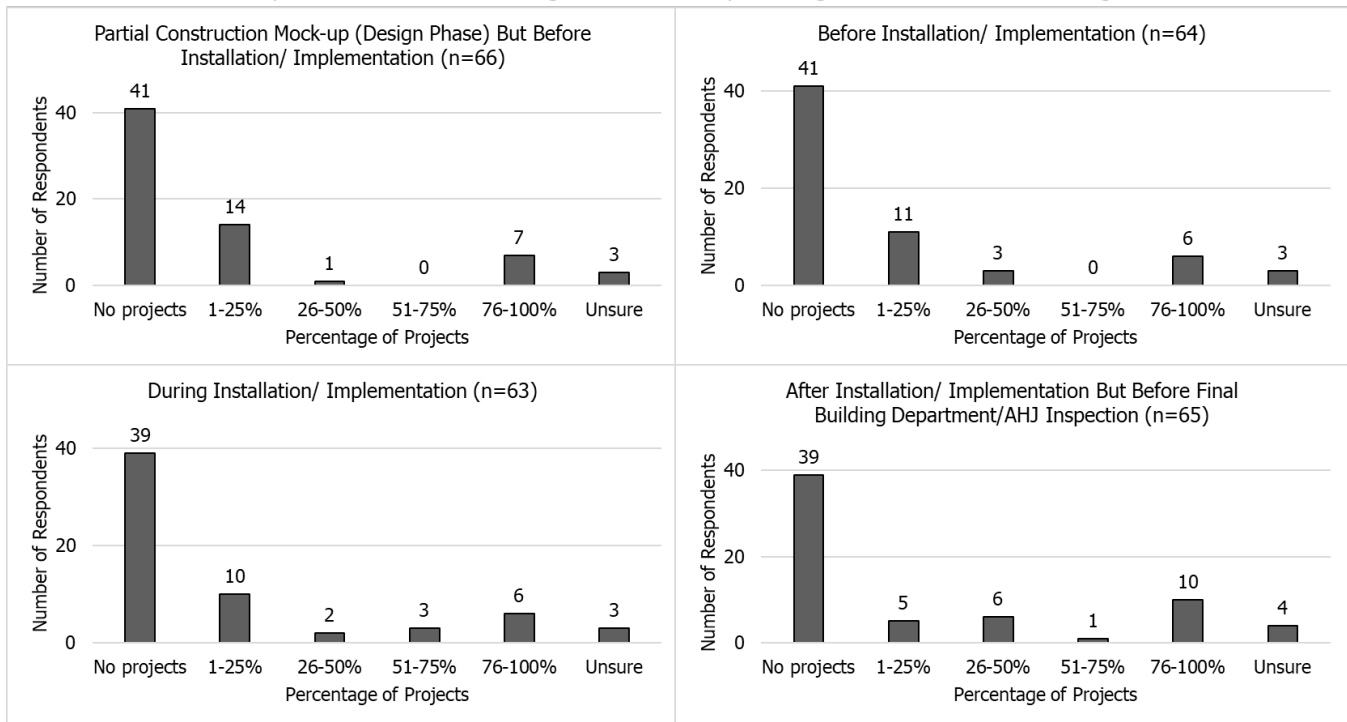
New Construction and Additions Project Stages that ATTs are Consulted by Contractor Respondents Who Only Work On Energy Code Related Projects



When focusing specifically on those contractors who are most likely to consult with the Energy Code – general contractors, HVAC and mechanical contractors, and lighting contractors – and work on nonresidential and high-rise multifamily buildings, the same pattern appears. This pattern can be seen in Figure 14. At any stage in the process, about two thirds of these contractors stated that they never consult with an ATT, less than 25% of these contractors said they consult with an ATT on less than half of their projects, and only a small percentage of contractors consult with an ATT on more than half of their projects.

Figure 14: Project Stage by Percentage of Projects that ATTs are Consulted by Contractor Respondents Who Work on Energy Code Related Projects and High-rise Multifamily Buildings or Nonresidential Buildings for New Construction and Additions [C18 & C9 & C4]

New Construction and Additions Project Stages that ATTs are Consulted by Contractor Respondents Who Work on High-rise Multifamily Buildings or Nonresidential Buildings



Most contractors encounter Code compliance issues in a quarter or fewer projects inspected by AHJs, HERS Raters, and ATTs

Contractors were asked, “As a percentage of projects, how often have you experienced issues complying with the Energy Code as pointed out by a building department/AHJ inspector, HERS rater, or ATT?” Table 47 shows the distribution of responses to this question. Note that contractors who do not need to follow Energy Code requirements for their work may account for the considerable number of “Not applicable” responses.

Approximately 37% of contractor respondents indicated that they do not encounter Energy Code compliance issues when their projects are tested by a HERS rater, ATT, or a building department/AHJ inspector. For those that have experienced issues, contractor respondents indicated that HERS raters, ATTs, or building department/AHJ inspectors typically find compliance issues for 1%-25% of their projects.

Table 47: Percentage of Projects Where Contractor Respondents Experienced Issues Complying with the Energy Code as Pointed Out by a Building Department/AHJ Inspector, HERS Rater, or ATT [C32]

Percentage of Projects	Issues Pointed Out by HERS Raters (n=230)	Issues Pointed Out by ATTs (n=230)	Issues Pointed Out by Building Departments/AHJs (n=230)
No projects	85 (37%)	91 (40%)	84 (37%)
1-25% of projects	37 (16%)	26 (11%)	45 (20%)
26-50% of projects	14 (6%)	9 (4%)	15 (7%)
51-75% of projects	4 (2%)	2 (1%)	9 (4%)
76-100% of projects	9 (4%)	8 (3%)	10 (4%)
Not Applicable	50 (22%)	57 (25%)	40 (17%)
Unsure	31 (13%)	37 (16%)	27 (12%)

Although not directly comparable, HERS raters and ATTs were asked a similar question to compare against contractor responses, with results shown in Table 48.

- HERS rater: "When you find a problem onsite that would cause a project to not meet Energy Code requirements, in what percentage of projects have you passed a HERS test after correction (without recording a fail) during the same testing visit instead of retesting at a later date?"
- ATT: "How often do you encounter projects during acceptance testing that do not meet Energy Code requirements and have issues that cannot be resolved with quick fixes during the same testing visit before submitting the Certificate of Acceptance forms?"

Nearly one-third of HERS raters (31%) indicated that they find 1%-25% of projects do not meet Energy Code requirements but have passed the HERS test after the contractor fixes the system within the same visit instead of retesting later. Similarly, nearly one-third of ATTs (8/23) indicated that they find 1%-25% of projects to not meet Energy Code requirements, however these projects cannot be resolved with quick fixes during the same testing visit and required a retest before submitting the Certificate of Acceptance forms.

Table 48: Percentage of Projects Not Meet Energy Code Compliance Upon Initial Review [H21, A22]

Percentage of Projects	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
Never	16 (23%)	3
1-25% of projects	22 (31%)	8
26-50% of projects	7 (10%)	3

Percentage of Projects	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
51-75% of projects	7 (10%)	3
76-100% of projects	14 (20%)	5
Prefer to answer	5 (7%)	1

* ATT survey frequencies not described in percentages due to a small number of responses.

Contractors and HERS Raters believe a quarter or less alteration/retrofit projects in their region are permitted

Contractors, HERS raters, and ATTs differed in their opinion on the number of addition or alteration/retrofit projects that are permitted.

Contractor, HERS rater, and ATT respondents were each asked the following question.

- Contractor: "Think about the other contractors who work in your territory. From your perspective, what percentage of the addition or alteration/retrofit projects (including repair and replacement) do you think are actually permitted?"
- HERS rater & ATT: "Think about the contractors who work in your territory. Of the addition or alteration/retrofit projects (including repair and replacement) that are supposed to comply with the Energy Code, from your perspective, what percentage do you think are actually permitted?"

Looking across the responses from contractors, HERS raters, and ATTs, shown in Table 49, at least a few respondents from each group indicated that they thought contractors working in their territory never pulled a permit. Among contractors who responded to the question, 84 (37%) said they thought less than half of projects in their territory are permitted. Among HERS raters, 32 (45%) of respondents shared the same belief. Among ATTs, however, only four said they thought less than half of projects were permitted. Meanwhile, 70 (30%) contractors, 20 (28%) HERS raters, and 12 ATTs believed that more than half their projects were permitted.

ATTs likely reported thinking that a higher portion of their projects are permitted because they focus on nonresidential and high-rise multifamily buildings, which may incur more risk if unpermitted. HERS raters, who focus on single-family homes and low-rise multifamily buildings, reported thinking that there is a higher proportion of unpermitted projects.

Table 49: Percentage of the Addition or Alteration/Retrofit Projects Respondents Think are Actually Permitted [C26, H20, A21]

Percentage of Projects	Contractor # (%) of responses (n=230)	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
Other contractors never pull permits for alterations/retrofits (including repair/replacement)	6 (3%)	n/a	n/a
Contractors never pull permits for alterations	n/a	3 (4%)	2
1-25% of projects are permitted	51 (22%)	22 (31%)	3
26-50% of projects are permitted	33 (14%)	10 (14%)	1
51-75% of projects are permitted	38 (17%)	8 (11%)	4
76-100% of projects are permitted	32 (14%)	12 (17%)	8
Unsure	68 (30%)	16 (23%)	4
Prefer not to answer	2 (1%)	n/a	1

* ATT survey frequencies not described in percentages due to a small number of responses.

To get a better understanding of whether contractors had a difference in opinion between those that work on single-family homes and low-rise multifamily buildings versus those that work on nonresidential and high-rise multifamily buildings, we looked at the contractor respondents to this question by property types they worked on, shown in Table 50. Across all property types, approximately one-third of contractor respondents were unsure about the percentage of projects that are actually permitted for addition or alteration/retrofit projects. Similar proportion of responses exist across response options apart from contractor respondents who indicated they work on all property types, where a higher percentage of respondents thought 1-50% of projects are permitted (41% versus 34-35%). Further research may be recommended to gain insight into the difference in opinion.

Table 50: Percentage of the Addition or Alteration/Retrofit Projects Contractor Respondents Think are Actually Permitted by Property Types Worked On [C26 & C9]

Percentage of Projects	Worked on single-family homes and low-rise multifamily buildings (n=119)	Worked on high-rise multifamily buildings, hotels/motels, and other nonresidential buildings (n=47)	Worked on all property types (n=64)
Other contractors never pull permits for alterations/retrofits (including repair/replacement)	4 (3%)	2 (4%)	0 (0%)
1-50% of projects are permitted	42 (35%)	16 (34%)	26 (41%)
51-100% of projects are permitted	36 (30%)	13 (28%)	21 (33%)
Unsure	35 (29%)	16 (34%)	17 (27%)
Prefer not to answer	2 (2%)	0 (0%)	0 (0%)

Most contractors consult AHJs on a quarter or less of their projects, but a notable number consult AHJs on over 75% of projects

When asked about the percentage of projects contractors consulted with building department/AHJs ("Prior to submitting a building permit application, on what percent of your projects do you or your company consult with the building department/AHJ about the following types of projects?"), across the three categories (new construction, additions, alterations/retrofits) the distribution is polarized between those who report lower levels (1-50% of projects) and higher levels (51-100% of projects) of consulting. This trend can be seen in Table 51, which shows the distribution of contractor responses where they consulted building department/AHJs by new construction, addition, and alteration/retrofit projects.

Thirty-four percent (34%, n=44) of contractor respondents identified they consult building departments/AHJs for new construction on 51-100% of projects while 26% (n=34) consult for 1-50% of new construction projects and 17% (n=22) indicated they do not consult building departments/AHJs for any of their projects. For additions, the same proportion of contractor respondents reported they consult with building departments/AHJs for 1-50% and 51-100% of projects, 30% each (n=37). Eighteen percent (18%, n=22) reported no additions projects were consulted with building departments/AHJs. For those working on alterations/retrofits projects, 30% (n=54) reported lower levels of consulting (1-50% of projects) compared to 28% of respondents (n=51) who reported higher levels of consulting (51-100% of projects).

Contractor respondents who work on alteration/retrofit projects also had the most selection for “No projects” being consulted on (22%, n=40).

Table 51: Percent of Contractor Respondent Projects that are Consulted with the Building Departments/AHJs [C34]

Percentage of Projects	New construction (n=129)	Additions (n=124)	Alterations/retrofits (including repairs and replacements) (n=182)
No projects	22 (17%)	22 (18%)	40 (22%)
1-25% of projects	27 (21%)	33 (27%)	42 (23%)
26-50% of projects	7 (5%)	4 (3%)	12 (7%)
51-75% of projects	9 (7%)	3 (2%)	13 (7%)
76-100% of projects	35 (27%)	34 (27%)	38 (21%)
Unsure	9 (7%)	9 (7%)	13 (7%)
Not applicable	20 (16%)	19 (15%)	24 (13%)

When asked the open response question, “Thinking of the building departments/AHJs your company works with, what makes it easy or difficult to work with their Code compliance systems?”, most contractor respondents had positive or negative opinions on the matter, with most focused on working with the building departments/AHJs rather than their Code compliance systems.

Out of 230 contractor respondents, 20% (n=45) shared details that made building departments/AHJs easy to work with, while 42% (n=97) noted a difficult quality or circumstance. Notably, 24% (n=55) of all contractor respondents noted that the situation was not applicable to their work – those that did explain noted they typically took subcontractor roles and left permitting (and presumably interactions with building departments/AHJs) to the general contractor who hired them. The remaining 14% (n=33) of responses were too vague to decipher or found no issues working with the building departments/AHJ and were removed from analysis.

Most contractors were very concise with their opinions – sharing no more than a handful of words. After reviewing the interpretable and applicable responses (n=142), a few consistent themes appear. See Appendix E for the full list of subthemes and related quotes.

Table 52 presents the summary of themes from contractor responses on the ease of working with building departments/AHJs. Out of the 45 contractor respondents who indicated they found building departments/AHJs easy to work with, 11 shared they encountered no issues during their interaction. Within the remaining 34 respondents, three main themes emerged: clear communication and building departments/AHJs are accessible for questions (n=14), system/forms/permits are easy to access online (n=5), and easy-to-work-with inspectors (n=4).

- Respondents noted that building departments/AHJs provided clear information, specifying they provide “Clear wording on compliance specifications” and make it easy as, “When I pull permits for a particular city, the requirements are usually listed within the permit process.”
- One contractor respondent shared the accessible online systems allow building departments/AHJs to easily verify their work, stating, “They finally just log into CHEERS and verify things so we don’t have to print out a book for them to throw away in the field.”
- Respondents indicated inspectors have a positive attitude, such as “Disposition and a get ‘er done attitude,” which makes them easy to work with.

Table 52: Contractor Respondent Themes for Ease of Working with Building Departments/AHJs [C29]

Themes	Number of Mentions in Responses (n=45)
Clear communication and building departments/AHJs accessible for questions	15
System/forms/permits easy to access online	5
Easy-to-work-with inspectors	4
No Issues	11
Other	10

While some contractor respondents mentioned they had a relatively easy time with AHJs, 42% (n=97) of contractor respondents noted having difficulties working with building departments/AHJs in some capacity. The most common issues noted include inspectors who are not up-to-date or do not understand the Energy Code (n=28), increased time and costs associated with permitting and inspections (n=15), inconsistencies between building departments/AHJs (n=10) as well as inspectors (n=9), and difficulties getting answers or support (n=8). Table 53 presents a summary of themes from contractor responses on the difficulties of working with building departments/AHJs. The top four themes are summarized below. See Appendix E for the full list of themes, subthemes, and related quotes.

- Some contractor respondents mentioned that building departments/AHJs are not aware of changes in the Energy Code, with one stating, “[...] due to the ever-changing Codes, even inspectors are not aware of Code updates. Changing the Energy Code every so often does not help the installers, inspectors, or certifiers. All this creates confusion.” Others noted that they do not believe inspectors understand the Energy Code as “The municipalities have no clue as to what the fed/state requirements are. We are constantly needing to educate them on the process,” or they lack field experience as they have “[...] no background experience in the trades they oversee or inspect” and “[...] follow the Code until a lengthy appeal is made up the chain.”
- Three contractor respondents noted that time is money that customers often do not have, with one sharing the example, “It used to be easy most commercial TI’s or like-for-like replacements were OTC with one or two quick inspections. Now a 5-Ton unit

with a replacement cost of \$16,000 will have to add \$5,500 for fire, \$4,800 for engineering plus permit costs. It will take 4 months to get the permit, if the AC unit is down and the space is not safe to use because it's now 120 degrees in the office, they don't care. Then once you are done you will have 4 inspections, each requiring 8 hours to wait in a parking lot for an inspector. Even if the job is 100% to Code, expect two failures and return inspections. The state of CA has now put on almost double the cost of the original 5-Ton unit. People just can't afford it, so they fix their 30-year-old energy hog unit because it's way cheaper to fix it then replace it." Other contractor respondents shared that there are scheduling difficulties with building departments/AHJs (n=4), they feel building departments/AHJs don't respect project timelines and costs of delays (n=4) as they take "[...] too long to review plans and issue the permit. I will have all the energy documents all in order and it can be months for them to issue the permit," and the time and costs of working with building departments/AHJs have no added benefit to the project (n=4).

- Ten contractor respondents noted that forms and interpretations differ between jurisdictions and "It is quite a challenge to navigate between hundreds of different formats each cities give," and that building departments/AHJs handle HERS and acceptance test testing processes differently, mentioning, "Building departments often request documents from HERS raters, but never from ATT's." Similarly, nine other respondents expressed that building inspectors are not consistent with each other with the inspection process and not consistent due to the difference in inspection experience.
- Eight contractor respondents cited having difficulties getting answers or support from building departments/AHJs as they "[...] do not provide any guidance," "It's difficult to find materials and forms to fill out, and when forms are available, they are hard to navigate," and "Now that the plans are submitted electronically, it is extremely difficult to get ANY questions answered concerning plan check since they don't want you in their offices anymore."

Table 53: Contractor Respondent Themes for Difficulty or Circumstance of Working with Building Departments/AHJs [C29]

Themes	Number of Mentions in Responses (n=97)
Inspectors aren't up to date with or don't understand Energy Code	28
Increased time and costs associated with permitting and inspections	15
Inconsistency between building departments/AHJs	10
Inconsistency between inspectors	9
Difficult to get answers or support from building departments/AHJs	8
Difficulty navigating online permitting systems	2
Lack of online permitting	1

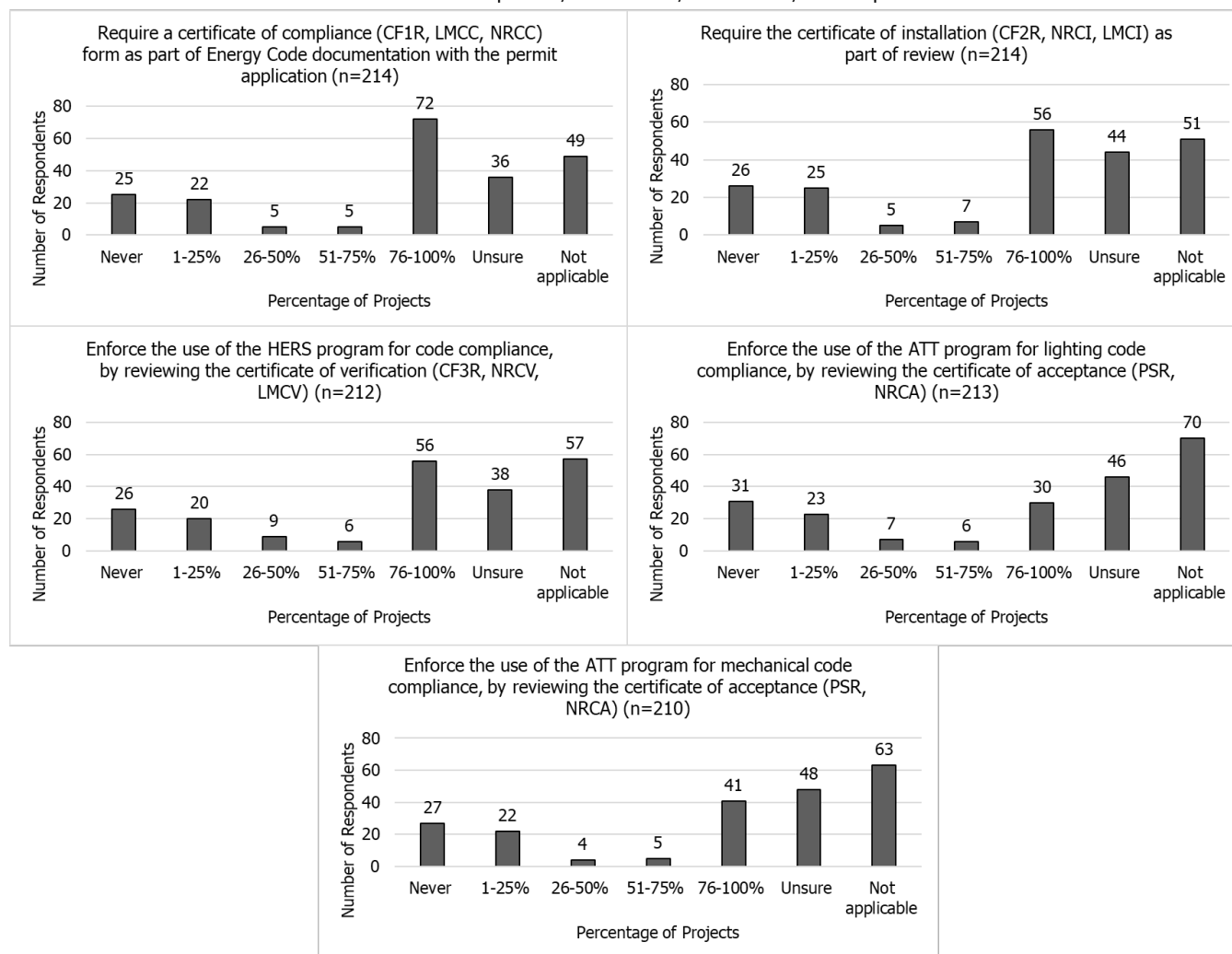
Themes	Number of Mentions in Responses (n=97)
Other	24

Contractor respondents were asked, “In your personal experience, in what percentage of the projects do the building departments/AHJs your company works with enforce the following?” to gain insight on the level of enforcement building departments/AHJs place on having Energy Code compliance files completed. Figure 15 shows the distribution of responses on the enforcement of compliance by percentage of projects. A table of the frequencies can be found in Appendix E. Note that contractors who do not need to follow Energy Code requirements for their work may account for the substantial number of “Not applicable” responses.

Approximately 13% of all respondents indicated building departments/AHJs “Never” require a certificate of compliance or installation, nor review the certificate of verification or certificate of acceptance for either lighting or mechanical Code. Thirty-four percent (34%, n=72) contractor respondents identified “Require a certificate of compliance” as being enforced in 76-100% of projects. Certificate of installation, verification, and acceptance for mechanical code compliance had similar reported enforcement rates, with 20-26% of contractor respondents seeing enforcement for 76-100% of their projects. In contrast, 14% (n=30) of contractor respondents reported that certificate of acceptance forms for lighting code compliance was enforced in 76-100% of their projects, being the least enforced certificate.

Figure 15: Percentage of Contractor Respondents' Projects Where Building Departments/AHJs Enforce Having Certificates of Compliance, Installation, Verification, or Acceptance [C35]

Contractor Respondents' Projects Where Building Departments/AHJs Enforce Having Certificates of Compliance, Installation, Verification, or Acceptance



HERS raters and ATTs were presented with a similar question to contractor respondents:

- HERS rater: "In your opinion, what percentage of HERS raters and building department/AHJ inspectors skip some Energy Code compliance requirements during post-installation inspections?"
- ATT: "In your opinion, what percentage of ATTs and building department/AHJ inspectors skip some Energy Code compliance requirements during acceptance test?"

Across HERS rater respondents, 43% (n=30) reported that the HERS rater population as a whole skip Energy Code Compliance requirements in 1-50% of post-installation inspections. Twenty-seven percent (27%, n=19) respondents indicated that requirements are skipped in 51-100% of inspections, while 15% (n=11) said that requirements are not skipped.

According to ATT respondents, eight reported that the ATT population as a whole skipped Energy Code Compliance requirements in 1-50% of post-installation inspections while six respondents indicated that requirements are skipped in 51-100% of inspections and four said that requirements are not skipped.

Table 54 below shows the distribution of responses by HERS rater and ATT respondents on the percentage of the HERS rater and ATT as a population that skip some Energy Code compliance requirements during post-installation inspections.

Table 54: Responses to the Percentage of HERS Raters or ATTs that Skip Some Energy Code Compliance Requirements During Post-Installation Inspection [H22, A23]

Percent of HERS Raters or ATTs	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
None	11 (15%)	4
1-25%	21 (30%)	6
26-50%	9 (13%)	2
51-75%	17 (24%)	4
76-100%	2 (3%)	2
Unsure	11 (15%)	5

* ATT survey frequencies not described in percentages due to a small number of responses.

When asked about building department/AHJ inspectors, 39% (n=28) of HERS rater respondents and 7 ATT respondents reported that requirements are skipped in 1-50% of post-installation inspections, while 30% (n=21) of HERS rater respondents and 11 ATT respondents reported that requirements are skipped in 51-100% of post-installation inspections. Ten percent (10%, n=7) of HERS raters and 1 ATT respondent said that building department/AHJ inspectors do not skip some Energy Code compliance requirements during post-installation inspections.

Table 55 below shows the distribution of responses by HERS rater and ATT respondents on the percentage of the building departments/AHJs that skip some Energy Code compliance requirements during post-installation inspections.

Table 55: Responses to the Percentage of Building Department/AHJ Inspectors that Skip Some Energy Code Compliance Requirements During Post-Installation Inspection [H22, A23]

Percent of Building Department/AHJ Inspectors	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
None	7 (10%)	1
1-25%	17 (24%)	2
26-50%	11 (15%)	5
51-75%	12 (17%)	3
76-100%	9 (13%)	8

Percent of Building Department/AHJ Inspectors	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
Unsure	15 (21%)	4

* ATT survey frequencies not described in percentages due to a small number of responses.

As HERS raters and ATTs are experts in their field and knowledgeable about their forms, we asked for their perspective on the level of knowledge that building department/AHJ inspectors have about their respective test forms.

- HERS rater: "In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the HERS test forms?"
- ATT: "In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the acceptance test forms?"

For HERS rater respondents, 45% (n=30) reported that 1-50% of building department/AHJ inspectors do not know to look for all the forms, while 35% (n=25) reported that 51-100% do not know to look for all the forms. Seven percent (7%, n=5) of HERS rater respondents reported there are no building department/AHJ inspectors that do not know to look for all the forms. Out of the 23 ATT respondents, eight reported that 1-50% of building department/AHJ inspectors do not know to look for all the forms, ten reported 51-100%, and two respondents reported "None."

ATT respondents were slightly more likely to respond that 51-100% of building department/AHJ inspectors do not know to look for all the forms compared to the HERS rater respondents. Further research is recommended to better understand the potential reasons for this difference.

Table 56 below shows the distribution of responses by HERS rater and ATT respondents on the percentage of the building departments/AHJs that do not know how to look for all the respective test forms.

Table 56: Percentage of Building Department/AHJ Inspectors That Do Not Know to Look for All the HERS Rater/ATT Test Forms [H23, A25]

Percent of Building Department/AHJ Inspectors	HERS Rater # (%) responses (n=71)	ATT # of responses* (n=23)
None	5 (7%)	2
1-25%	16 (25%)	5
26-50%	14 (20%)	3
51-75%	14 (24%)	3
76-100%	11 (11%)	7
Unsure	11 (14%)	3

* ATT survey frequencies not described in percentages due to a small number of responses.

HERS raters are more likely to falsify test results due to cost and peer pressures; ATTs are more likely to falsify due to paperwork problems

To glean some insights on reasons for falsifying Energy Code compliance verification and testing, HERS rater and ATT respondents, who did not select the response “None” to the question on percentage of HERS raters or ATTs who skip some Energy Code compliance requirements during testing, were asked the following questions.

- HERS rater: “If a HERS rater falsifies a HERS test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)”
- ATT: “If an ATT falsifies an acceptance test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)”

Of the 71 HERS rater respondents, 19 indicated they were unsure (n=15) or preferred not to answer (n=4). Of the ATT respondents, five selected “Unsure” (n=4) or “Prefer not to answer” (n=1). Responses from 52 HERS rater respondents and 18 ATT respondents were analyzed below. Table 57 shows the distribution of results on likely reasons to falsify excluding those who selected “Unsure” or “Prefer not to answer.” Given the sensitivity and low number of responses to these questions, caution should be taken when generalizing the results.

The most common response from HERS rater respondents to falsify a HERS test (n=20) was due to “Not paid enough to cover the time required for testing, thus testing for the most important items only.” Meanwhile, nine ATT respondents selected “NRCC/NRCI is not likely filled out accurately” as their primary reason.

Additionally, 13 HERS rater respondents and four ATT respondents selected “Other, please describe”, indicating that unlisted reasons also played a role in their decision. The open-ended responses from HERS rater respondents varied in theme, with the most prevalent being a lack of enforcement for passing tests, mentioned by five respondents. Additionally, three HERS rater respondents highlighted the lack of trained contractors and the need to save money during the process. There was no clear theme among the open-ended responses from ATT respondents, however one respondent strongly expressed their frustration with the testing process and difficulty understanding the Energy Code compliance.

Table 57: Likely Reasons to Falsify Energy Code Compliance Testing (Multiselect)
[H24, A24]

Reasons to Falsify	HERS Rater # (%) responses (n=52)	ATT # of responses* (n=18)
Company culture pressures	16 (31%)	4
Unable to record a fail in the ATTCP form submission software system and allow for corrections before submitting paperwork	n/a	7
Unable to record a fail in the HERS registry system and allow for corrections before submitting paperwork	9 (17%)	n/a

Reasons to Falsify	HERS Rater # (%) responses (n=52)	ATT # of responses* (n=18)
Not paid enough to cover the time required for testing, thus testing for the most important items only	20 (38%)	5
Building departments/AHJs do not validate the ATT testing results, so recording accurate test results does not matter	n/a	4
Building departments/AHJs do not validate the HERS testing results, so recording accurate test results does not matter	13 (25%)	n/a
NRCC/NRCI is not likely filled out accurately	n/a	9
CF2R is not likely filled out accurately	9 (17%)	n/a
Other, please describe	13 (25%)	4

* ATT survey frequencies not described in percentages due to a small number of responses.

In addition to the technical reasons for falsifying Energy Code compliance testing, there may be practical or social reasons for falsification. HERS rater and ATT respondents were asked:

- HERS rater: "Thinking about the projects that you verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?"
- ATT: "Thinking about the projects that [technician: you; employer: you or ATTs reporting to you] verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?"

Across the responses from HERS raters, the options "Skip parts of the review due to pressure from your boss/colleague/company" and "Your boss/colleague/company asks you to 'turn a blind eye' to pass a project that should not pass" were each selected by 70% (n=50) of respondents, noting that these pressures did not influence any of their projects. Meanwhile 21% (n=15) and 20% (n=14) of respondents, respectively, said that they experienced these pressures for 1-50% of their projects. These two options were also the pressures that were experienced the least for HERS rater respondents.

In contrast, nearly half (49%, n=35) of HERS rater respondents indicated that "Testing results were close enough to warrant a pass" influenced 1-50% of their projects, 7% (n=5) said that it influenced 51-100% of their projects, and 35% (n=25) said that it did not influence any of their projects, making it the pressure with the most influence in HERS rater respondents' decisions. The choices "Skip parts of the review due to contractor pressure" and "Contractor asks you to 'turn a blind eye' to pass a project that should not pass" had a moderate influence in HERS rater respondents' decision with 41% (n=29) and 39% (n=28) of respondents respectively saying these pressures influenced 1-50% of their projects.

Across the responses from ATTs, “Your boss/colleague/company asks you to ‘turn a blind eye’ to pass a project that should not pass” had the highest number of respondents (n=18) stating that it did not influence any of their projects, while one respondent, stated that it influenced 51-100% of their projects, making this the least influential pressure. In contrast, 15 respondents indicated that “Skip parts of the review due to lack of time” did not influence any of their projects, but five respondents stated that it influenced 51-100% of their projects. Similarly, the choices “Skip parts of the review due to contractor pressure” and “Skip parts of the review due to pressure from your boss/colleague/company” had four respondents each saying it influenced 51-100% of their projects. The choices “Contractor asks you to ‘turn a blind eye’ to pass a project that should not pass” and “Testing results were close enough to warrant a pass” had a moderate influence in ATT respondents’ decision with five and four respondents respectively saying these pressures influenced 1-50% of their projects.

For both HERS rater and ATT respondents, the pressure of “Your boss/colleague/company asks you to ‘turn a blind eye’ to pass a project that should not pass” had the least influence in the respondents’ decision, indicating that they are less likely to experience their boss/colleague/company requesting them for to pass a project failed.

Table 58 and Table 59 show the distribution of HERS rater and ATT responses, respectively, on the percentage of projects they experienced certain pressures to pass projects.

Table 58: Percentage of HERS Rater Respondents’ Projects Experienced Pressures to Pass Projects that Do Not Fully Meet Energy Code Requirements [H31]

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Skip parts of the review due to lack of time (n=71)	43 (61%)	18 (25%)	4 (6%)	1 (1%)	1 (1%)	4 (6%)
Skip parts of the review due to contractor pressure (n=71)	35 (49%)	22 (31%)	7 (10%)	1 (1%)	1 (1%)	5 (7%)
Skip parts of the review due to pressure from your boss/colleague/company (n=71)	50 (70%)	13 (18%)	2 (3%)	0 (0%)	1 (1%)	5 (7%)
Testing results were close enough to warrant a pass (n=71)	25 (35%)	26 (37%)	9 (13%)	3 (4%)	2 (3%)	6 (8%)

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Contractor asks you to "turn a blind eye" to pass a project that should not pass (n=71)	31 (44%)	21 (30%)	7 (10%)	4 (6%)	1 (1%)	7 (10%)
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass (n=71)	50 (70%)	11 (15%)	3 (4%)	0 (0%)	2 (3%)	5 (7%)

Table 59: Percentage of ATT Respondents' Projects Experienced Pressures to Pass Projects that Do Not Fully Meet Energy Code Requirements [A32]

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Skip parts of the review due to lack of time (n=23)	15	1	1	3	2	1	0
Skip parts of the review due to contractor pressure (n=23)	17	1	0	2	2	1	0
Skip parts of the review due to pressure from your boss/colleague/company (n=23)	16	1	2	2	2	0	0
Testing results were close enough to warrant a pass (n=23)	16	4	0	1	2	0	0

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Contractor asks you to "turn a blind eye" to pass a project that should not pass (n=23)	15	3	2	1	2	0	0
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass (n=23)	18	2	2	0	1	0	0

Summary of Key Findings from Contractor, HERS Rater, and ATT Surveys on the Current Practices That Affect Energy Code Compliance

Current practices that survey respondents said impacted Energy Code compliance can be grouped into seven themes: (1) definition of a project or job, (2) impact on decision to apply for a permit, (3) consultation/hiring of HERS raters and ATTs during specific project stages, (4) percent of addition/retrofit projects that are actually permitted, (5) frequency of encountering code compliance issues, (6) building department/AHJ consultation, knowledge, and inspection, and (7) HERS rater and ATT falsification. Each theme is summarized under a sub header below. For context, it is important to first understand how the definition of a project or job varies across contractors, HERS raters, and ATTs.

Definition of a project or job

When reviewing the results from this survey, and in conversation about the work, note that contractors may differ in the way they define a project or job (building, equipment) from HERS raters and ATTs (permit application, job site).

Impact on decision to apply for a permit

Contractors, HERS raters, and ATTs all noted project cost and profit margin as a top reason a contractor may not apply for a permit. Contractors that worked on alterations and repairs were more likely than those working on new construction and retrofits to also mention difficulty navigating the permitting process, but less likely to mention time pressures as a reason to avoid applying for a permit.

Contractors, HERS raters, and ATTs noted additional conditions that impact the ability to meet the Energy Code, and their responses align with aspects of the work they interact with most. For example, whereas more contractors indicated that difficulty finding workers and subcontractors with specific certifications impacted the work, more HERS raters noted pressure

from other responsible parties, and more HERS raters and ATTs indicated that AHJs do not review forms for accuracy or completeness. Contractors were provided space to elaborate on additional conditions that affected their ability to meet code requirements, and some contractors noted additional concerns with code knowledge and interpretation, equipment access, cost, coordination, and inspector issues.

Consultation/hiring of HERS raters and ATTs during project stages

In terms of seeking advice, approximately two-thirds of contractors said they do not consult a HERS rater or ATT during any phase of the project. Among those who do, some contractors may be more likely to consult a HERS rater after installation but before field verification. HERS raters and ATTs responded that they were consulted more often during project building phases than the contractors indicated.

Percent of addition or alteration/retrofit projects that are actually permitted

The survey focused more attention on alteration/retrofit noncompliance because there is generally less concern in the industry about new construction noncompliance. Focusing on alteration/retrofit projects, approximately half (48%) of contractor survey respondents indicated that they typically apply for a permit and do not have issues applying for permits and generally attempt to meet Energy Code compliance standards. The vast majority (70%) of contractors said they never offer customers a choice not to apply for a permit, however 21% sometimes or always do. All survey respondents were asked to provide an opinion on the portion of projects for which other contractors working in their territory pulled permits. Almost half of HERS raters and a third of contractors thought that less than half of projects were permitted, whereas the majority of ATTs thought more than half of projects were permitted.

Frequency of encountering code compliance issues

When projects are tested by HERS raters and ATTs, 37% of contractors said they do not encounter issues complying with Energy Code as noted by an AHJ inspector, HERS rater, or ATT. Among those that do, most contractors said they experience problems in less than a quarter of their projects. Among those that find problems, most HERS raters and ATTs also noted finding issues in a quarter or fewer projects.

Building department/AHJ consultation, knowledge, and inspection

Contractors reported a split experience in the reported percent of projects for which AHJs require specific certificates of compliance – some indicated little to no enforcement while others noted enforcement for the 75% or more projects. Most HERS raters and ATTs indicated that they skipped requirements in less than half of projects, but a notable group indicated skipping compliance requirements in more than half of projects.

HERS rater and ATT falsification

Among those HERS raters and ATTs that said they skip some compliance requirements during testing and were willing to note the reason, over a third of HERS raters indicated they were not paid enough to cover the time required for testing and experienced company culture pressures, whereas ATTs were more likely to note problems with the forms and form submission process. Across all HERS raters, those that experienced pressure to pass projects that do not fully meet Energy Code requirements were most likely to note pressure from contractors to skip requirements or turn a blind eye, or that the test results were close enough to warrant a pass. HERS raters warned that they are sometimes being coerced into “rubber stamping” documents and could lose work if they do not cooperate.

CHAPTER 4:

Barriers to Energy Code Compliance

This section describes barriers that contractors, HERS raters, and ATTs face when attempting to meet Energy Code requirements.

As a reminder:

- As with interpretation of findings in other chapters, it is important to note that the trends reported should be interpreted with caution given the low survey response rates. Please note that both contractors and technicians responded to the contractor survey, and that both ATTs and ATEs responded to the ATT survey.
- All responses are anonymous, respondents were not asked survey questions that could be used to identify their company or themselves, and no distinguishing characteristics were reported. Email addresses for respondents who opted in to the gift card drawing were kept in a separate file that had no link to their survey responses.
- Given the low number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages. The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages.
- Table titles may include references to the specific question number on the respective contractor, HERS rater, or ATT survey. These question references are listed inside square brackets and are denoted with a capital letter followed by a number (e.g., C1). The letter "C" references the contractor survey, "H" for the HERS rater survey, and "A" for the ATT survey.

Table 60 lists the survey question numbers explored within this chapter. Each topic and related findings from the surveys are defined in a header. A summary of findings is listed at the end of this chapter.

Table 60: Survey Questions Analyzed to Understand Barriers to Energy Code Compliance

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Aspects of the code that are difficult to achieve due to technical challenges, awareness, and understanding	17, 20, 25, 27	15, 17, 19, 25	16, 18, 19, 26

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Specific points in workflows where compliance issues occur and how that differs among new construction, additions, alteration and repairs, and equipment replacement workflows	28	26	27

Survey questions are in appendices B-D, and survey response frequency tables are in appendices E-G.

Top challenging aspects of the Energy Code include staying up to date, permit applications, and ensuring equipment installation meets requirements

Contractor, HERS rater, and ATT respondents were all asked, “Based on your experience and knowledge, what are the top three aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)” Some respondents indicated they were unsure (29 contractor respondents, four HERS rater respondents, and four ATT respondents) and were excluded from analysis.

Among contractor respondents, the top three aspects of the Energy Code that people in their industry find challenging were:

- “Stay up-to-date with the Energy Code” (65%, n=130)
- “Install equipment/measures to meet the Energy Code requirements” (37%, n=74)
- “Design a project to meet Energy Code requirements” (33%, n=66)

Among HERS rater respondents, the top three aspects of the Energy Code that people in their industry find challenging were:

- “Stay up-to-date with the Energy Code” (57%, n=38)
- “Install equipment/measures to meet the Energy Code requirements” (54%, n=36)
- “Find Energy Code requirements” (42%, n=28)

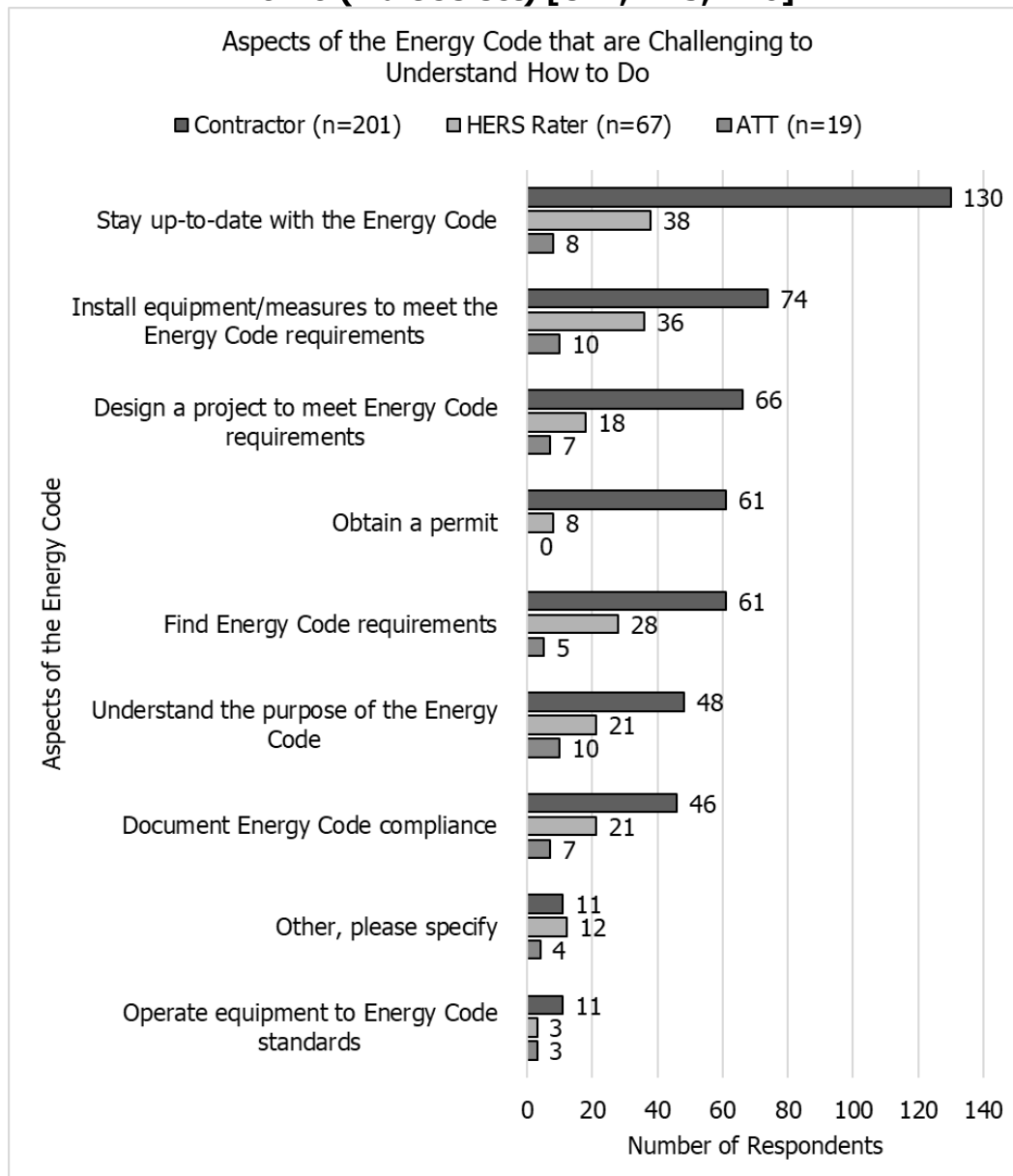
Among ATT respondents, the top three aspects of the Energy Code that people in their industry find challenging were:

- “Install equipment/measures to meet the Energy Code requirements” (n=10)
- “Understand the purpose of the Energy Code” (n=10)
- “Stay up-to-date with the Energy Code” (n=8)

When looking at the results across the three groups, “Stay up-to-date with the Energy Code” and “Install equipment/measures to meet the Energy Code requirements” are the most frequently cited challenges, while for all three groups “Operate equipment to Energy Code standards” was the least challenging aspect.

Figure 16 shows the distribution of responses on the aspects of the Energy Code that people in their industry find challenging to understand how to do. A table of the frequencies can be found in Appendix E-G for the respective respondent group.

Figure 16: Top Aspects of the Energy Code that are Challenging to Understand How To Do (Multiselect) [C17, H15, A16]

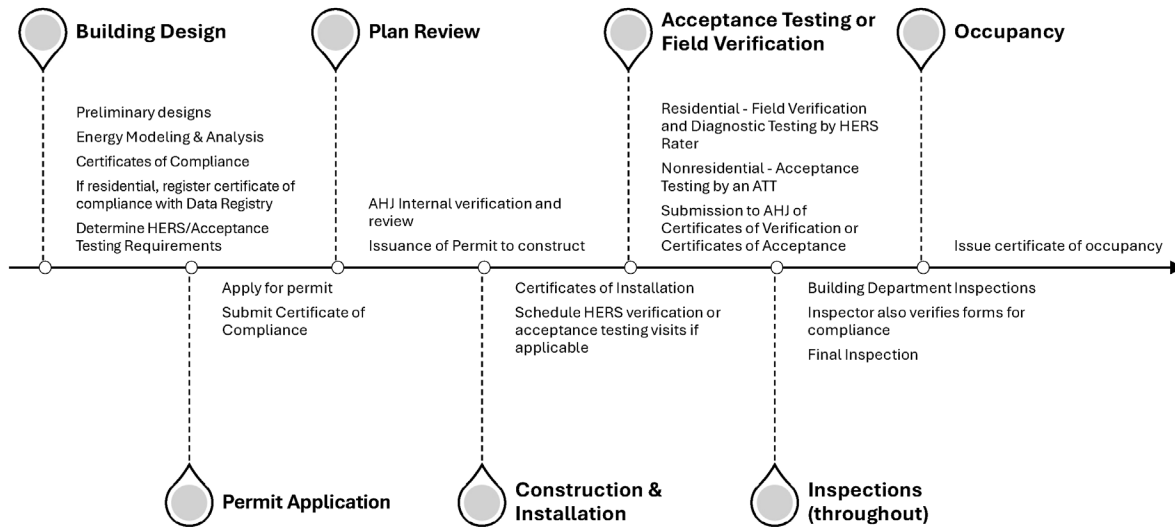


To get an understanding of where Energy Code compliance difficulties may occur, we asked respondents to indicate the steps of the Energy Code compliance process that they find challenging to complete. Respondents were shown a visual outlining the Energy Code compliance process (Figure 17) and presented with the following question, in respective to their survey pathway.

- Contractor: "Which part(s) of the Energy Code compliance process, if any, do [technician: you / supervisor: your technicians] find challenging to complete? (Select all that apply)"

- HERS rater: “Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)”
- ATT: “Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)”

Figure 17: Energy Code Compliance Flow Diagram

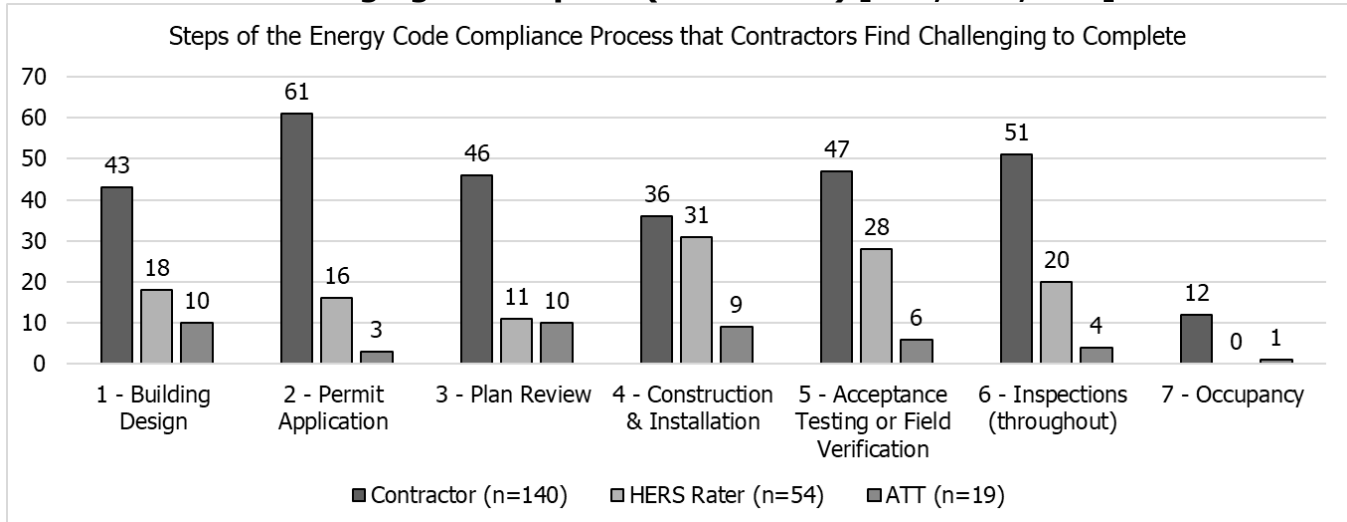


Source: California Energy Commission staff

A significant portion of contractor respondents noted that “No parts of the Energy Code compliance process are challenging to complete” (43%, n=60) or they were “Not aware of the Energy Code compliance process” (21%, n=30). Note that contractors who do not need to follow Energy Code requirements for their work may account for a portion of these responses. For HERS rater respondents, four indicated that no parts of the compliance process were challenging to complete for contractors while 13 were unsure. Three ATT respondents said that no parts of the compliance process were challenging to complete for contractors and one was unsure. The remaining responses were analyzed below (n=140 Contractor responses, n=54 HERS rater responses, 19 ATT responses), and shown in Figure 18. A table of the frequencies can be found in Appendix E-G for the respective respondent group.

Contractors, HERS raters, and ATT respondents expressed differences in the aspects of the permitting process that were most challenging to complete. However, both HERS rater and ATT respondents found “Construction & Installation” to be one of their top challenges. Contractor respondents said the “Permit Application” (44%, n=61) and “Inspections” (36%, n=51) were most challenging. Among HERS rater respondents, “Construction & Installation” (57%, n=31) and “Acceptance Testing or Field Verification” (52%, n=28) were most challenging. Among ATT respondents, the most challenging parts were “Building Design” and “Plan Review” (n=10 each) and “Construction & Installation” (n=9). Across the three groups, “Occupancy” was the least challenging part of the process for Contractor (9%, n=12), HERS rater (n=0), and ATT (n=1) respondents.

Figure 18: Steps of the Energy Code Compliance Process that Contractors Find Challenging to Complete (Multiselect) [C27, H25, A26]



Contractor and customer awareness of the need for Energy Code compliance

One goal of the survey was to derive insight into the level of awareness that customers and contractors have about Energy Code compliance. As the survey was not administered directly to property owners, developers, or managers, we asked Contractor, HERS rater, and ATT respondents to provide their perspective.

Contractor respondents were asked, “What percentage of the following customer types you work with are aware of the need to comply with Energy Code requirements?” Contractor respondents indicated that single-family home customers have mixed levels of awareness on the need to comply with 46 respondents stating they are not aware, 42 stating 1-25% of their single-family home customers are aware, and 45 stated 76-100% are aware. For low-rise multifamily buildings, high-rise multifamily buildings, and hotel/motel buildings, contractor respondents were more likely to select either 1-25% or 76-100% of their customers are aware of the need to comply. Nearly a third (n=31) of contractor respondents have a high proportion of nonresidential building customers that are aware of the need to comply with Energy Code requirements.

Table 61 below shows the distribution of contractor responses on the percentage of customer types they work with that are aware of the need to comply with Energy Code requirements.

Table 61: Percentage of Customer Types Who Are Aware of the Need to Comply with Energy Code Requirements Shared by Contractor Respondents [C20]

Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (n=176)	46	42	15	15	45	13

Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (n=51)	8	16	2	7	17	1
Owners/developers/managers of high-rise multifamily buildings (n=22)	1	7	3	3	8	0
Owners/developers/managers of hotel/motel buildings (n=27)	4	6	3	3	11	0
Owners/developers/managers of nonresidential buildings (n=97)	15	14	15	8	31	14

HERS rater and ATT respondents were asked a similar question to the contractor respondents:

- HERS rater: "In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with are aware of the need to comply with HERS testing requirements?"
- ATT: "In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with are aware of the need to comply with acceptance test requirements?"

The top trends amongst HERS rater and ATT respondents are the following:

- All 71 HERS rater respondents have interacted with owners/developers/managers of single-family homes as well as contractors who work on this home type. Thirty percent (30%, n=21) of respondents indicated 1-25% of the owners/developers/managers of single-family homes they interacted with are aware of the need to comply with HERS testing requirements, whereas a similar proportion (31%, n=22) of respondents indicated that 76-100% of the contractors they interacted with who work on single-family homes are aware of the need to comply. This difference in reported awareness between customers and contractors may necessitate further research to better understand the communication channels between contractors and property owners/developers/managers.
- Of the 38 HERS rater respondents who have interacted with owners/developers/managers of low-rise multifamily buildings, similar number of respondents selected 1-25% (26%, n=10) and 76-100% (29%, n=11) of the owners/developers/managers they interacted with are aware of the need to comply with HERS testing requirements.
- Of the 38 HERS rater respondents who have interacted with contractors that work on low-rise multifamily buildings, (37%, n=14) noted that 76-100% of the contractors they interacted with are aware of the need to comply with HERS testing requirements.

- Out of 21 ATT respondents who have interacted with owners/developers/managers of nonresidential buildings, 11 indicated that 1-50% of the owners/developers/managers they interacted with are aware of the need to comply with acceptance testing while 6 noted the owner/developer/manager customers they interacted with are not aware. Respondents, however, noted that the contractors they interacted with and who work on nonresidential buildings were slightly more aware as 10 selected 51-100% of contractors are aware of the need to comply with acceptance testing and 3 stated the contractors they interacted work are not aware.

Table 62 and Table 63 below shows the distribution of HERS rater and ATT responses on the percentage of customer types they work with that are aware of the need to company with Energy Code requirements.

Table 62: Percentage of Contractors and Building Owners, Developers, or Managers HERS Rater Respondents Have Interacted With and Are Aware of the Need to Comply with HERS Testing Requirements [H17]

HERS Rater Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (n=71)	5	21	17	11	15	2
Owners/developers/managers of low-rise multifamily buildings (n=38)	3	10	7	4	11	3
Owners/developers/managers of high-rise multifamily buildings (n=17)	1	4	3	3	4	2
Contractors who work on single-family homes (n=71)	1	12	16	18	22	2
Contractors who work on low-rise multifamily buildings (n=38)	2	6	7	6	14	3
Contractors who work on high-rise multifamily buildings (n=17)	1	7	1	3	3	2

Table 63: Percentage of Contractors and Building Owners, Developers, or Managers ATT Respondents Have Interacted With and Are Aware of the Need to Comply with HERS Testing Requirements [A18]

ATT Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (n=11)	3	6	1	1	0	0
Owners/developers/managers of high-rise multifamily buildings (n=6)	3	1	0	1	1	0
Owners/developers/managers of hotel/motel buildings (n=7)	3	3	0	1	0	0
Owners/developers/managers of nonresidential buildings (n=21)	6	6	5	1	3	0
Contractors who work on low-rise multifamily buildings (n=11)	2	4	4	0	1	0
Contractors who work on high-rise multifamily buildings (n=6)	1	2	1	2	0	0
Contractors who work on hotel/motel buildings (n=7)	3	3	1	0	0	0
Contractors who work on nonresidential buildings (n=21)	3	5	3	5	5	0

Awareness of the Energy Code may not correlate with the willingness to be in compliance, and we understand that there are instances where a customer may not want to comply with the Energy Code. Thus, survey respondents were asked to share the frequency in which they experienced issues with their customers not wanting to comply with the Energy Code due to time pressures, expenses, or other factors to discern the prevalence of occurrence.

- Contractor: "How often have you personally experienced issues with your company's customers not wanting to comply with the Energy Code due to time pressures, expenses, or other factors?"
- HERS rater: "How often have you personally experienced issues with the following entities/individuals not wanting to comply with the Energy Code due to time pressures, expense, or other factors?" H19

- ATT: “How often have you personally experienced issues with the following entities/individuals not wanting to comply with the Energy Code due to time pressures, expense, or other factors?” A19

Highlights of the contractor respondent results were the following:

- Over half of the contractor respondents who work on low-rise multifamily buildings (51%, n=26), high-rise multifamily buildings (59%, n=13), hotel/motel buildings (56%, n=15) noted that they never experienced issues with customers not wanting to comply with the Energy Code (selected “Never”).
- The proportion of contractor respondents that selected “Never” is lower for those who work on single-family homes and nonresidential buildings, with 36% (n=64) of respondents who work on single-family homes and 39% (n=38) who work on nonresidential buildings.
- The percentage of contractor respondents that were unsure how often their customers do not want to comply ranges from 7% to 11% across the building types.
- Contractors that noted they did experience issues indicated the occurrence takes place less than half the time (selected “1-25%” or “26-50%”). However, the difference may be negligible with the low number of responses in each category.

See Table 64 for details on the distribution of contractor responses on the frequency of experience with customers not wanting to comply.

Table 65 shows the distribution of HERS rater responses for a similar question. Results were distributed similarly for HERS rater respondents on the frequency of experience with owners/developers/managers of single-family homes and contractors who work on these homes not wanting to comply.

- There were a higher number of selections for “1-25% of projects” and lower number of selections as the frequency range increased. For example, 31% (n=22) and 34% (n=24) of HERS rater respondents indicated they experienced issues with owners/developers/managers and contractors, respectively, of single-family homes for 1-25% of projects. As compared to 10% (n=7) and 11% (n=8) of respondents indicated experiencing issues on 76-100% of projects with owners/developers/managers and contractors of single-family homes, respectively.
- Selections of “Never” and “1-25%” were higher than other ranges for HER Rater respondents who interacted with owners/developers/managers and contractors of low-rise multifamily buildings (“Never”: n=9 for low-rise building owners/developers/managers, n=11 for contractors; “1-25%”: n=14 for low-rise building owners/developers/managers, n=8 for contractors).

One third (n=7) of ATT respondents noted that they encountered contractors who work on nonresidential buildings that do not want to comply for 76-100% of their projects. This differs from their encounter with owners/developers/managers of nonresidential buildings as nearly one third (n=8) of respondents shared that they experience issues for 1-25% of projects. Results from ATT responses to the question can be seen in Table 66, however, due to the low number of responses caution should be taken when generalizing the results.

Table 64: Contractor Respondents' Frequency of Experience with Customers Not Wanting to Comply [C25]

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (n=176)	64	39	23	28	9	13
Owners/developers/managers of low-rise multifamily buildings (n=51)	26	12	2	4	3	4
Owners/developers/managers of high-rise multifamily buildings (n=22)	13	5	1	1	0	2
Owners/developers/managers of hotel/motel buildings (n=27)	15	4	1	2	3	2
Owners/developers/managers of nonresidential buildings (n=97)	38	14	12	9	13	11

Table 65: HERS Rater Respondents' Frequency of Experience with Entities/Individuals Not Wanting to Comply [H19]

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (n=71)	13	22	13	11	7	5
Owners/developers/managers of low-rise multifamily buildings (n=38)	9	14	4	5	2	4
Owners/developers/managers of high-rise multifamily buildings (n=17)	4	6	2	2	1	2
Contractors who work on single-family homes (n=71)	9	24	14	10	8	6
Contractors who work on low-rise multifamily buildings (n=38)	11	8	7	4	3	5

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Contractors who work on high-rise multifamily buildings (n=17)	4	4	3	1	2	3

Table 66: ATT Respondents' Frequency of Experience with Entities/Individuals Not Wanting to Comply [A19]

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (n=11)	2	4	2	0	2	1
Owners/developers/managers of high-rise multifamily buildings (n=6)	2	1	0	0	2	1
Owners/developers/managers of hotel/motel buildings (n=7)	2	2	0	1	1	1
Owners/developers/managers of nonresidential buildings (n=21)	4	8	1	0	6	2
Contractors who work on low-rise multifamily buildings (n=11)	2	2	2	1	4	0
Contractors who work on high-rise multifamily buildings (n=6)	2	0	0	0	4	0
Contractors who work on hotel/motel buildings (n=7)	0	2	1	0	4	0
Contractors who work on nonresidential buildings (n=21)	5	4	2	3	7	0

HERS Raters, ATTs, and AHJs Are Likely to Enforce Energy Code but Face Significant Challenges

Contractor respondents were asked, "What percentage of HERS raters, ATTs, and inspectors do not enforce Energy Code compliance (do not complete/request forms) during post-installation inspections for your company's projects?" Notable portions of contractor respondents stated, "Not applicable," presuming they do not work with these entities, and "Unsure" across all three code compliance testing conductors. Note that contractors who do

not need to follow Energy Code requirements for their work may account for the large number of “Unsure” and “Not applicable” responses. Other than these two selections, the next top selection was “None” for HERS raters (30%, n=69), ATTs (26%, n=60), and building department/AHJ inspectors (36%, n=82), meaning contractor respondents tend to encounter HERS raters, ATTs, and building department/AHJ inspectors enforcing Energy Code compliance.

Table 67 shows the distribution of contractor responses on their thoughts on the percentage of HERS raters, ATTs, and building department or AHJs inspectors that do not enforce Energy Code compliance during post-installation inspections for their company’s projects.

Table 67: Contractor Responses to the Percentage of HERS Raters, ATTs, and Building Department/AHJ Inspectors that Do Not Enforce Energy Code Compliance [C28]

Percentage of Nonenforcement	HERS Raters (n=230)	ATTs (n=230)	Building department/AHJ Inspectors (n=230)
None	69 (30%)	60 (26%)	82 (36%)
1-25%	16 (7%)	18 (8%)	11 (5%)
26-50%	9 (4%)	10 (4%)	13 (6%)
51-75%	3 (1%)	2 (1%)	6 (3%)
76-100%	10 (4%)	7 (3%)	14 (6%)
Unsure	80 (35%)	80 (35%)	72 (31%)
Not applicable	43 (19%)	53 (23%)	32 (14%)

HERS rater respondents were presented with an open response question, “What are the biggest challenges, if any, that HERS raters face while performing testing and verification in the field?” to understand the obstacles they encounter. Four out of 71 HERS rater respondents stated there are no challenges of which they can think. Of the 67 HERS rater respondents who shared their challenges while performing testing and verification in the field, eight themes were found: contractors overlooking the significance of HERS rater involvement throughout the construction process (24%, n=16), equipment installation challenges that impede testing (22%, n=15), knowledge gaps surrounding HERS requirements and testing (21%, n=14), competition with other HERS raters (18%, n=12), dealing with incomplete or incorrect completion of CFR forms (10%, n=7), competitive price market (9%, n=6), site limitations that impede testing (9%, n=6), and insufficient enforcement from building departments/AHJs (7%, n=5).

Table 68 summarizes the themes from HERS rater responses on the biggest challenges they face while performing testing and verification in the field. The top four of the eight themes are described below. See Appendix F for subthemes and quotes related to all eight themes.

- Contractors overlook the significance of HERS rater involvement throughout the construction process (n=16)

- Contractors involve HERS raters too late in project stage (n=7), citing that portions of the project are completed “without realizing testing or verification was required at an earlier stage” and that “HERS testing at the end of a project is counterproductive and cost prohibitive if/when problems are found.”
- There is poor coordination with scheduling HERS testing (n=6) with one example of uncoordinated efforts with other trades.
- Contractors pressure HERS raters to pass testing (n=5) with one example where a HERS rater may be contacted last minute for testing and may encounter financial or professional coercion should they, “[...] refuse to 'rubber-stamp' it.” One reason for the pressure, and was shared in response to the question, was that “Contractors don't want to pay for full set of HERS verifications listed on CF1R, because building departments that receive only duct leakage CF3R don't ask for the rest.”
- Contractors do not provide HERS raters with ample time for testing (n=2) as contractors rush to complete their deadlines.
- Equipment installation challenges which impede testing (n=15)
 - Testing impediments include the encounter with incorrect equipment or non-compliant components installed, inconsistent field conditions, and lack of follow-up between the energy analyst or consultant who designs the project and the contractor who installs the project. Similarly, two HERS rater respondents noted there are times when the systems are not ready for testing when a HERS rater arrives onsite due to supply chain issues or a designed system “doesn't exist, or [is] not read[ily] available” and a HERS rater would be informed by the construction management to “do the best you can” for testing.
- Knowledge gaps surrounding HERS requirements and testing (n=14)
 - With property owners and tenants uninformed about HERS testing (n=8), property owners or tenants can be “[...] difficult to contact prior to the appointment time”, HERS raters have a more difficult time to find clients “[...] because contractors or installers use their own raters [...]”, and customers are unaware of the HERS requirements and cost associated with verification (n=2) and, “[...] they think we're just trying to charge extra money.”
 - Insufficient knowledge of HERS requirements and testing from builders and contractors (n=6) leads to “improper installations that fail compliance testing” and “the lack of understanding by installers on when to call a HERS rater”.
 - The lack of understanding of HERS requirements and testing can lead to conflating the building department/AHJ inspection with HERS testing (n=1) and HERS rater customers “[...] trying to assert the fact of an AHJ inspection as 'superseding' the need for HERS inspection.”
- Competition with other HERS raters (n=12)
 - Twelve respondents mentioned the challenge of competing with other HERS raters who pass systems without proper testing (n=9) and those who bundle pulling permits and testing (n=1), which poses a concern about losing the contractor as a customer (n=3).

- Of the nine respondents who mentioned the competition with HERS raters who pass systems without proper testing, four noted the competition is with those who do not conduct the HERS test at all and are “Being undercut by ‘rubber-stampers.’”
- Five of the nine respondents shared there is the pressure from their employer to pass the HERS tests, and two of the five respondents noted potential conflict of interest with competing HERS raters and contractors, such as “Competition from the very large firms guaranteeing a pass the first time” and “Contractors hiring another HERS rater that will pass the failed HERS process like QII for framing or insulation. Small and large HERS companies that will have their HERS raters pass failed HERS steps and then hire another HERS rater after that HERS rater is suspended from [the HERS Provider].”

Table 68: HERS Rater Respondents’ Biggest Challenges While Performing Field Verification and Diagnostic Testing [H26]

Themes	Number of Mentions in Responses (n=67)
Contractors overlook the significance of HERS rater involvement throughout the construction process	16
Equipment installation challenges impede testing	15
Knowledge gap surrounding HERS requirements and testing	14
Competition with other HERS raters who pass systems without proper testing and those who bundle pulling permits and testing	12
Incomplete or incorrect completion of CFR forms	7
Competitive price market	6
Site limitations impede testing	6
Insufficient enforcement from building departments/AHJs	5
Other challenges	11

ATT respondents were presented a similar open response question as the HERS rater respondents, “What are the biggest challenges, if any, that ATTs face while performing acceptance testing in the field?” Of the 23 ATT respondents, two stated they have no issues in the field, and one was a partially completed survey response and did not reach this question on the survey. From the remaining 19 responses, three themes were observed: understanding Energy Code compliance (n=15), having on-site issues (n=7), and encountering issues with the compliance forms (n=6). These themes are described below.

Table 69 summarizes the themes from ATT responses on the biggest challenges they face while conducting acceptance testing in the field. See Appendix F for subthemes and related quotes.

- ATT respondents mentioned the stakeholders (contractors, owners, building departments/AHJs) have a difficult time understanding the various elements and purpose of complying with the Energy Code, including, "Lack of understanding of what acceptance testing is and what it's intended for" and they "[...] don't know how to do paperwork to obtain permit, don't know what equipment is needed to meet compliance." Respondents also noted difficulty finding contractors that understand or agree with the compliance requirements and keeping up to date with code changes.
- The on-site challenges ATT respondents shared include encounters with incorrect equipment design that "[...] don't accommodate correct installation that contractor was told to follow," non-compliant equipment delivery, timeline and test schedule constrictions as they "[...] did not account for the time it takes to perform an acceptance test in their discipline."
- Issues encountered with the compliance forms include receiving incorrect completion of NRCC forms such as, "NRCI not reflecting actual installation. No contractor is aware of NRCI requirements, and they have no idea on how to prepare one," seeing old versions of forms being used, or accessing online forms without access to the Internet due to lack of Wi-Fi or cellular network at the site location.

Table 69: ATT Respondents' Biggest Challenges While Performing Acceptance Testing [A27]

Themes	Number of Mentions in Responses (n=19)
Understanding Energy Code compliance	15
Having on-site issues	7
Encountering issues with the compliance forms	6

Summary of Key Findings from Contractor, HERS Rater, and ATT surveys on the Barriers to Meeting Energy Code Requirements

The key themes from the survey respondents' answers to questions about barriers to meeting Energy Code requirements can be summarized into two main themes: (1) aspects of the code that are difficult to achieve due to technical challenges, awareness, and understanding, and (2) specific points in workflows where compliance issues occur and how that differs among new construction, additions, alteration and repairs, and equipment replacement workflows.

Aspects of the code that are difficult to achieve due to technical challenges, awareness, and understanding

When asked what aspects of Energy Code compliance are most challenging for people in their industry, contractors, HERS raters, and ATTs most frequently noted staying up to date with Energy Code and installing equipment to code. Both contractors and HERS raters listed their top two challenges as staying up to date with the Energy Code (65%, 57%, respectively) and

installing equipment/measures to meet Energy Code requirements (37% and 54%, respectively). ATTs also reported staying up to date with the Energy Code (n=8) and installing equipment/measures to meet Energy Code requirements (n=10) as top concerns but also rated the purpose of the Energy Code (n=10) as an equally important challenge.

Contractors and HERS raters expressed split opinions on how aware they believe customers are aware of Energy Code compliance requirements. For example, while half of the contractor respondents believed 25% or less of single-family residential customers are aware of compliance requirements, a quarter of contractors thought that more than 75% of these customers were aware. Among HERS raters, 37% thought that 25% or less of single-family residential customers were aware, and 21% thought that more than 75% of these customers were aware. This was true across their opinions of owners/developers/managers of single-family and multifamily properties. ATTs were more likely to say that 25% or less of customers were aware. HERS raters and ATTs expressed mixed opinions on whether contractors were aware of Energy Code compliance requirements across the property types.

A third of HERS raters said they thought over 75% of single-family residential contractors were aware of HERS testing requirements but that 25% or less of single-family residential customers were aware of these requirements. Whereas equal numbers (n=10) of HERS raters said that, among low-rise multifamily customers, 25% or less of customers were aware or that over 75% of customers were aware. Approximately half of ATTs said they thought that half or less of nonresidential customers were aware of the need to comply with acceptance testing requirements. ATTs (n=10) indicated that over half of contractors are aware of nonresidential acceptance testing requirements; only three ATTs said that contractors they interacted with are not aware.

When asked how often customers across different property types did not want to comply with Energy Code requirements, the majority of contractors and HERS raters indicated that they never experience low-rise multifamily, high-rise multifamily, and nonresidential customers not wanting to comply. A notable percentage of contractors (22%) and HERS raters (25%) indicated that they experience residential customers not wanting to comply more than half of the time. However, HERS raters and ATTs expressed more problems with contractors not wanting to comply. For example, only 13% of HERS raters said they never experienced contractors not wanting to comply on single-family residential projects and only 5 of 21 ATTs said they never experienced contractors not wanting to comply on nonresidential buildings. Twenty-five percent of HERS raters and one third of ATTs (n=7) indicated that they experience contractors not wanting to comply more than 75% of the time. Contractors were asked a similar question about the extent to which HERS raters, ATTs, and AHJs do not enforce Energy Code compliance. A third of contractors were unsure, approximately another third said none of the three groups do not enforce code, and many of the remaining third said it was not applicable.

Specific points in workflows where compliance issues occur and how that differs among new construction, additions, alteration and repairs, and equipment replacement workflows

Homing in on barriers to completing the Energy Code Compliance process, a notable portion of contractors said no parts of the process were difficult to complete (n=60), and on the other extreme, a notable portion of contractors said they were not aware of the code compliance process (n=30). Among those that identified challenges, the permit application process (n=61)

and inspections (n=50) were most frequently cited by contractors, whereas more HERS raters noted challenges with the construction (n=31) and installation step and acceptance testing or field verification step (n=28). ATTs noted that building design (n=10), plan review (n=10), and construction and installation (n=9) were most challenging to complete.

HERS raters described the biggest challenges to performing field verification and testing as contractors overlooking the significance of HERS rater involvement throughout the construction process (n=16), equipment installation challenges (n=15), and lack of knowledge about the HERS role (n=14). Similarly, ATTs cited lack of understanding Energy Code compliance (n=15), on-site issues (n=7), and compliance form issues (n=6).

CHAPTER 5:

Recommendations for Improving Energy Code Compliance

This section summarizes feedback on improvements needed to help contractors, HERS raters, and ATTs achieve Energy Code compliance.

As a reminder:

- As with interpretation of findings in other chapters, it is important to note that the trends reported should be interpreted with caution given the low survey response rates. Please note that both contractors and technicians responded to the contractor survey, and that both ATTs and ATEs responded to the ATT survey.
- All responses are anonymous, respondents were not asked survey questions that could be used to identify their company or themselves, and no distinguishing characteristics were reported. Email addresses for respondents who opted in to the gift card drawing were kept in a separate file that had no link to their survey responses.
- Given the low number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages. The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages.
- Table titles may include references to the specific question number on the respective contractor, HERS rater, or ATT survey. These question references are listed inside square brackets and are denoted with a capital letter followed by a number (e.g., C1). The letter "C" references the contractor survey, "H" for the HERS rater survey, and "A" for the ATT survey.

Table 70 lists the survey question numbers explored within this chapter. Each topic and related findings from the surveys are defined in a header. A summary of findings is listed at the end of this chapter.

Table 70: Survey Questions Analyzed to Address Chapter 5

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Reducing barriers and encouraging better documentation	36	34	35
HERS rater process improvement	37	35, 36	n/a
ATT inspection process improvement	38	n/a	36, 37

Topic	Contractor Survey Question #'s	HERS Rater Survey Question #'s	ATT Survey Question #'s
Additional support from a HERS Provider or ATTCP	n/a	27	28
How to encourage contractors to ensure better Energy Code compliance	39,40	37, 38	38, 39

Survey questions are in appendices B-D, and survey response frequency tables are in appendices E-G.

Reducing barriers and encouraging better documentation

We followed up on questions C23¹⁸, H18¹⁹, A20²⁰ later in each survey by asking an open response question to understand what Contractor, HERS rater, and ATT respondents suggest could be done to reduce barriers and encourage accurate Energy Code documentation.

- Contractor: "What do you think could be done in these areas to reduce barriers and encourage accurate Energy Code documentation?"
- HERS raters/ATT: "What do you think could be done in these areas to reduce barriers and encourage contractors to submit accurate Energy Code documentation?"

These follow-up questions appeared for respondents that selected options other than "I typically apply for permits and none of these issues impact my decision," "I am not sure," and "Prefer not to answer." The number of respondents that selected other options listed in questions C23, H18, and A20 were 107 for Contractors, 63 for HERS raters, and 14 for ATTs.

Of the 107 contractor respondents, 95 responded to this question while 12 responses were partially completed and did not reach this question. Among the 95 respondents, 20 noted this question did not apply to them, seven noted they were unsure of a response, and eight mentioned nothing could be done. An additional four responses were vague or short to decipher, thus excluded from analysis. The remaining 56 responses fell into the following categories: code education (n=17), adjusting the permitting process (n=16), adjusting the Energy Code (n=13), code enforcement (n=7), and three responses that did not belong in any one category. Table 71 summarizes the themes from contractor respondents' thoughts on actions that can help reduce barriers and encourage accurate Energy Code documentation. See Appendix E for subthemes and quotes related to all four themes.

¹⁸ Question C23: "Which of the following typically impacts your company's decision to apply for a permit? (Select all that apply)"

¹⁹ Question H18: "In your personal experience, which of the following typically impacts contractors' decisions to apply for a permit to construct? (Select all that apply)"

²⁰ Question A20: "In your personal experience, which of the following typically impacts contractors' decision to apply for a permit? (Select all that apply)"

- Contractor respondents mentioned more contractor training on Energy Code materials could encourage compliance and Energy Code documentation.
 - One contractor would like to see the CEC “Certify installing contractors so they are knowledgeable enough to provide the required documentation to local jurisdiction building inspectors finalizing the permitted project.”
 - A few contractor respondents specifically called out homeowner/customer education, as one respondent explained, “Along with the rising costs of all building materials, upgrading to everything energy compliant can be prohibitive because of additional cost. If a project requires a permit to add these improvements the homeowner must be made aware that a licensed contractor is not allowed legally to take the project on without one.”
 - Contractor respondents also mentioned educating inspectors and building departments/AHJs on the Energy Code, with one noting it would be useful to “[get] building inspectors more educated with hand on training. Not just reading a book.”
- Contractors suggested adjusting the permitting process to reduce barriers to compliance such as simplifying the permitting process and “Make every area [have the] same rules.”
 - Reducing the complexity of the process can include using online permitting or reducing the number of forms with one respondent explaining, “When you require 5 copies of 8 pages of forms that some of it is not even applicable it just gets ridiculous. I had 5 rooftop package units we replaced. The documentation literally was 15 inches high that I submitted to the inspector. I had to give it to him in a giant box. It should be a 1-page form, easy to fill out.”
 - Respondents also mentioned streamlining and speeding up the permitting process to reduce costs as “Time is money, and smaller companies can’t afford the delays of test in and test out and permit hand holding... It slows the flow of business too much.”
- Some contractors suggested adjustments to the Energy Code to bolster compliance such as simplifying the code or language in the code such as “Establish a clear list or requirements (in order) for preparing for Energy Codes” or “Issue technical information in a friendly language.” Guidance on compliant products was raised, citing the Energy Code should “[...] be supported with more product choices to help customers for final decisions” or to “Work with manufacturers to give us the possible matchups and have a universal compliance [...].”
 - A few contractors wanted to see specific code requirements changed to fit common conditions in their work. These conditions include: “Don’t ask for architectural quality drawings from an HVAC installer,” “Apply code in a realistic manner on older buildings,” and “Do not have c20 HVAC equipment contractors complete c38 refrigeration equipment contractor service.”
- Five contractors used the space to request a reduction or elimination of the Energy Code entirely. The following three quotes show the breadth of reasonings for such requests:
 - “Make the codes based on energy rather than political/social guidance.”

- “Stop building an impregnable bureaucratic castle in the sky, requiring heroic and complicated paperwork. Do something about carbon pollution and global heating and do it now!”
- “Eliminate this crap and stop trying to steal our money with your left-wing liberal agenda [expletive]!”
- Contractors suggested increased enforcement could improve compliance rates by stepping up efforts against unlicensed contractors or contractors working with permits. Two contractors mentioned enforcement through incentive offerings such as to “Offer incentives from insurance co., utilities, etc. for projects built to code” or offer rebates to promote equipment upgrades.

Table 71: Contractor Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation [C36]

Themes	Number of Mentions in Responses (n=56)
Code education	17
Adjust permitting process	16
Adjust code	13
Enforcement	7
Other suggestions to reduce barriers and encourage accurate submission of accurate Energy Code documentation	3

Of the 63 HERS rater respondents, 62 responded to the question while one response was partially completed and did not reach this question. Out of the 62 respondents, four respondents that shared they were “unsure,” and four respondents did not specify, leaving 54 responses that were analyzed. Among the 54 respondents who responded, five themes were found to reduce barriers and encourage contractors to submit accurate Energy Code documentation: education on HERS requirements and testing (n=19), simplify and streamline the Energy Code compliance portion of the permitting process (n=14), proactive support from the building department/AHJ and proper enforcement, applying penalties where needed (n=13), engage HERS raters throughout the construction process (n=8), and revisions to the CSLB licensing process (n=4). The top three of the five themes are described here with Table 72 outlining the summary of themes. See Appendix F for subthemes and quotes related to all five themes.

- HERS rater respondents mentioned the need for education on HERS requirements and testing. Respondents shared that contractors should be more informed and educated about the HERS requirements and the testing process, which include scheduling and evolving testing procedures when Energy Code requirements change.
 - One respondent shared that contractors, “[...] have always relied on their HVAC installer to bring in a HERS rater at the end of the project when it's too late.”
 - A couple of respondents suggested offering workshops for contractors to learn about the Energy Code, with one stating, “Similar to distributor and

- manufacturing visits. Could have Providers visit, meet, and educate contractors on measures. Registry of contractor relations and history of competence.”
- Respondents also shared they would like to see the information communicated with the property owner or homeowner, and a couple of respondents expressed a similar statement where “Title 24 companies and designers” should communicate the Energy Code details to the contractor and homeowner.
 - Simplifying and streamlining the Energy Code compliance portion of the permitting process was mentioned by HERS rater respondents, as “Permitting is different in each jurisdiction [...]” with varying permit costs for the same job and that the current Title 24 permit increases project cost. The permit process can be easier, “[...] with user-friendly online platforms that reduce paperwork and processing time. Provide clear guidance and checklists for Energy Code documentation requirements.”
 - HERS rater respondents mentioned they would like to see proactive support from the building department/AHJ and proper enforcement, and to apply penalties where appropriate.
 - One respondent alluded to a lack of enforcement for submitting accurate Energy Code documentation as, “AHJs don’t enforce the codes, so the contractors don’t find it necessary.”
 - Another respondent suggested to, “Strengthen enforcement against unpermitted work by conducting random inspections and imposing penalties on non-compliance.”

Table 72: HERS Rater Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation for Contractors [H34]

Themes	Number of Mentions in Responses (n=54)
Education on HERS requirements and testing	19
Simplify and streamline the Energy Code compliance portion of the permitting process	14
Proactive support from the building department/AHJ and proper enforcement, applying penalties where needed	13
Engage HERS raters throughout the construction process	8
Revisions to the CSLB licensing process	4
Other suggestions to reduce barriers and encourage accurate submission of accurate Energy Code documentation	11

Of the 14 ATT respondents, 13 shared notable responses while one wrote “not applicable.” Three primary themes were found after reviewing the 13 responses: increase knowledge of

the Energy Code (n=8), the need for thorough and consistent inspections from inspectors (n=3), and the need to address the competitive pricing barrier (n=3). See Table 73 for an outline of the summarized themes and Appendix G for an expanded view of related quotes.

- Nearly all ATT respondents to this question mentioned the need for deeper understanding of the Energy Code through education or training. An alternative that one respondent suggested is to have an ATT “[...] designated during the permitting process so that there are no confusions or last-minute gatherings at the end of the project.”
- ATT respondents touched on the need for thorough and consistent inspections from inspectors who can support enforcement of the Energy Code. One respondent indicated that they experienced an inspector not visiting the job site, stating, “Have the city inspections be present at the job sight,” while another shared, “A majority (in my opinion) of plan checkers are only looking to see if the documents are there, not to see if they are accurate.”
- A few ATT respondents mentioned competitive pricing as a barrier to compliance as, “Many [companies] quote competitively to get the job and then start cutting cost to make profit,” and “[...] to include the testing your pricing is not competitive.”

Table 73: ATT Respondents’ Thoughts on Actions to Reduce Barriers and Encourage Submission of Accurate Energy Code Documentation for Contractors [A35]

Themes	Number of Mentions in Responses (n=13)
Increase knowledge of the Energy Code	8
Need for thorough and consistent inspections from inspectors	4
Competitive pricing	3
Other responses to reduce barriers and encourage accurate submission of accurate Energy Code documentation	4

HERS Rater process improvement

HERS rater respondents were asked, “How effective do you believe the HERS program is at improving Energy Code compliance?” Most HERS raters surveyed were in agreement about the efficacy of their program. Out of the 70 HERS raters surveyed, 87% (n=61) said they believed the HERS program was at least somewhat effective at improving Energy Code compliance. Only 12% (n=6) of HERS raters ranked the efficacy of the HERS program as somewhat ineffective or ineffective. Table 74 shows the distribution of responses to this question.

Table 74: HERS Rater Respondents' Selection to Effectiveness of the HERS Program [H35]

Effectiveness	HERS Rater # (%) of responses (n=70)
Ineffective	3 (6%)
Somewhat ineffective	3 (6%)
Neither effective nor ineffective	2 (3%)
Somewhat effective	29 (39%)
Effective	32 (47%)
Unsure	1 (3%)

Contractor and HERS rater respondents were asked about ways to improve HERS rater processes that can aid code compliance.

- Contractors: "In your opinion, how can HERS raters' processes be improved to ensure better Energy Code compliance?"
- HERS raters: "In your opinion, how can the HERS rater processes be improved to ensure better Energy Code compliance?"

Contractors who indicated they worked on single-family homes or low-rise multifamily buildings were presented with this question, and 168 responses were received. Of the 168 respondents, 43 noted that the question did not apply to them or their work, 30 were not sure of any improvements, and 33 suggested the program did not need changes at all. With five responses too vague or short to decipher, the remaining 57 responses were bucketed into the following themes (also outlined in Table 75): education (n=20), code language and process simplification (n=10), reducing scope of or removing HERS program (n=9), improving the HERS program (n=5), reducing costs (n=4) and improving communication (n=4). The top four themes are summarized below with the remaining themes and relevant quotes found in Appendix E.

- Contractor respondents mentioned education for building departments/AHJs, contractors, and customers could improve HERS rater processes.
 - Four respondents mentioned building departments/AHJs need to be trained, presumably on the HERS program, to avoid delays and help uninformed contractors.
 - Ten respondents mentioned that contractors themselves would benefit from education in some respect, with one suggesting to "send out emails when code changes" and another lamenting "rules can be confusing."
 - A couple of respondents noted customers would benefit from understanding the HERS program, with one explaining, "Better education of customers to better understand benefits of HERS raters' processes and what he bring[s]."

- Ten contractor respondents emphasized simplifying code or permitting processes. Although none in this category noted HERS topics specifically, seven of the ten expressed a desire for simplified code or code language.
 - One noted, “ease off on new codes” while another requested “Keep it simple. Use plain English when describing Energy Codes.” The remaining three requested a simplified permit process or online systems, with one contractor asking for CEC to, “Make software simpler so layman could process our own requirements.”
- Nine contractor respondents suggested reducing the scope of or doing away with the HERS program. While five briefly noted that the program was not needed, one contractor elaborated that “HERS it's just add more cost to owners and contractors.” Another noted they would like to see “Common sense over the counter consulting from the city agencies rather the sending projects to 3rd party agencies.”
 - One contractor suggested the program was superfluous when considering 2017 UBC Codes: “If one follows the 2017 UBC Codes and local governing requirements, then the addition HERS would not exist. Again, an unnecessarily additional layer to construction to add fees!”
 - One contractor seemed to appreciate the content of the HERS program, but suggested contractors be allowed to rate themselves: “Allow installing contractor to HERS rate his own work. But only after the company has a HERS certified tester. Plus, any company that self-tests would get random inspections/verifications for the first two years. That way they are accountable for their testing. If they fail more than 2 random inspection/verifications, they should lose their HERS rating ability.”
- Various aspects of improving the HERS program were mentioned by contractor respondents. Two noted they would like to have more HERS raters available, and one noted they would like to get HERS raters involved in each project.

Table 75: Contractor Respondents’ Suggestions to Improve HERS Rater Processes
[C37]

Themes	Number of Mentions in Responses (n=57)
Education	20
Code adjustments	10
Reducing scope of/doing away with HERS program	9
Improve HERS program	5
Reduce costs	4
Improving communications	4
Other suggestions for processes improvement	5

Out of 71 HERS rater respondents, 56 wrote a response to the question that can be summarized into a theme whereas 15 responses could not be grouped into a theme (eight responded “unsure”, five did not specify their response, one stated “Prefer not to answer”, one was a partial response and did not reach this question on the survey). Six main themes were identified to improve HERS rater processes to ensure better Energy Code compliance (also outlined in Table 76): educate contractors, installers, and property owners/managers about Energy Code compliance and HERS requirements and testing (n=14), proper enforcement (n=14), simplify and streamline the Energy Code compliance portion of the permitting process (n=11), engage HERS raters throughout the construction process (n=8), HERS rater accountability (n=8), and contractor accountability (n=4). The top three of the six themes are described here. See Appendix F for subthemes and quotes related to all six themes.

- Fourteen respondents noted educating contractors, installers, and property owners/managers on Energy Code compliance and HERS requirements and testing can aid improvements to the HERS rater processes. By informing responsible parties about the HERS requirements and testing process, contractors can, “[...] improve their compliance “before” they are inspected.”
- The need for proper enforcement of the Energy Code was raised by fourteen respondents as responses indicate HERS raters currently have little authority in regulating compliance with the contractor.
 - HERS rater respondents mentioned the need to investigate projects when unpermitted work is reported, to create a system where “[...] where a HERS rater would be able to anonymously report abusive developers trying to circumvent strongarm the code”, and to review protocols for testing efficiency as changing, “[...] the duct leakage from 6 to 5 percent. Basically, a rounding error that will have zero impact on energy use. While we have that 80 to 90 percent of jobs, the ones of inefficient housing stock that require the energy to condition, are being ignored.”
- The third most mentioned theme, noted by 11 respondents, is to simplify and streamline the Energy Code compliance portion of the permitting process. Examples include simplifying all documents and forms, removing redundant forms, and adding illustrations, and “[...] consider current technology and available equipment. Prioritize the ‘big bang for the buck’ energy features and back off on the requirements that are expensive/difficult.”
 - Respondents also noted making the Energy Code permit process easier and more uniform statewide, with one suggesting using “[...] LADBS [Los Angeles Department of Building and Safety] as an example.” and another mentioning to “Develop and implement clear, consistent testing protocols across all projects to minimize ambiguity.”

Table 76: HERS Rater Respondents' Suggestions to Improve Their Processes [H36]

Themes	Number of Mentions in Responses (n=56)
Educate contractors, installers, and property owners/managers about Energy Code compliance and HERS requirements and testing	14
Proper enforcement	14
Simplify and streamline the Energy Code compliance portion of the permitting process	11
Engage HERS raters throughout the construction process	8
HERS rater accountability	8
Contractor accountability	4
Other suggestions for processes improvement	15

ATT inspection process improvement

ATT respondents were asked, "How effective do you believe acceptance testing is at improving Energy Code compliance?" A majority of ATT respondents were in agreement over the general efficacy of the ATT program, as seen in Table 77. Fifteen out of 23 respondents noted they believed the ATT program was at least somewhat effective at improving Energy Code compliance. Notably, however, five out of 23 respondents believe the program is ineffective.

Table 77: ATT Respondents' Selection to Effectiveness of Acceptance Testing [A36]

Response Options	ATT # of responses* (n=23)
Effective	6
Somewhat effective	9
Neither effective nor ineffective	0
Somewhat ineffective	0
Ineffective	5
Unsure	3

* ATT survey frequencies not described in percentages due to a low number of responses.

Contractor and ATT respondents were asked about ways to improve acceptance testing processes that better ensure Energy Code compliance.

- Contractor: "In your opinion, how can ATT inspection processes be improved to ensure better Energy Code compliance?"
- ATT: "In your opinion, how can acceptance testing processes be improved to ensure better Energy Code compliance? (Select all that apply)"

Table 78 shows the distribution of results from ATT respondents on the suggestions for acceptance testing processes improvement. More than half of the ATT respondents selected training contractors and building departments/AHJs, requiring that ATTs consulted in early construction stages, and increasing enforcement for acceptance testing as ways to improve the acceptance testing processes.

Table 78: ATT Respondents' Suggestions to Improve Acceptance Testing Processes (Multiselect) [A37]

Suggestions for Processes Improvement	ATT # of responses* (n=21)
Require that ATTs be included as part of the design process for consultation	13
Provide better tools for completing the ATT forms	9
Train contractors to incorporate acceptance testing as part of the construction timeline to allow time for fixes	14
Enforce the requirement for acceptance testing with contractors and building departments/AHJs	12
Train building departments/AHJs on how to verify that they are receiving the correct forms, the correct number of forms, and the forms are completed accurately	13
Other, please specify	6

* ATT survey frequencies not described in percentages due to a low number of responses.

Out of the 230 contractor respondents, 110 answered the question on how acceptance testing processes can be improved to ensure better code compliance. Out of this group, 40 noted this question was not applicable to them or their work, 15 were not sure of a response, and 16 noted that nothing needed changing within the ATT program. Twelve responses were too vague or brief to decipher, but the remaining 27 fell into the following themes: improvements to the ATT program design (n=10), education and training (n=7), code compliance process simplification (n=4), enforcement of ATT inspections (n=3), enhanced communications (n=2) and reduced costs (n=1). The top three themes are summarized below and Table 79 outlines the appearing themes. See Appendix E for related quotes on all the themes.

- Ten contractor respondents suggested improvements to the ATT program design to address conflicts of interest, ability to find ATTs, and ATT required experience issues.

- Suggestions include ATTs to maintain current field experience requirements, noting “Not just recent experience or previous experience, but current experience.” One respondent suggested making ATTs independent entities: “This ATT thing is a dog that won’t hunt. No contractor wants to hire their competitor to be a subcontractor in their job where they have exposure to their clients. When their whole motivation is to make other contractors look bad so they can steal the business,” and two requested ATTs be easier to access by publishing a list of ATT authorized service providers.
- Others’ suggested improvements included simplifying the program by removing ATT requirements from small jobs and retrofits (n=1) and speeding up field review (n=1). One contractor did suggest replacing the ATT program with something else entirely, noting a request to “Dump it and start over. The problem is they won’t let the contractor that did the job test his own work. So, you hire an outside company that is actually one of your competitors that their whole goal is to make you look bad so they can then try and take the account.”
- Seven contractor respondents suggested additional training to improve ATT processes, mentioning that customers could use education on the need for the ATT program and contractors and inspectors could use education on the program and the code more broadly. One respondent suggested “Hold ongoing open workshops that bring inspectors and contractors together in good spirits and sharing of knowledge and experience.”
- Four contractor respondents noted they wanted to see simplification in the compliance process. One respondent noted they wanted to see ATTs “look for ways to say ‘yes,’ not just wield the ‘big fail’ sword.” Others wanted fewer steps to the Energy Code including fewer regulations (n=1) and an adjustment of the code to appropriately apply to old buildings (n=1). One respondent suggested Energy Code compliant equipment be exempt from inspections.

Table 79: Contractor Respondents’ Suggestions to Improve Acceptance Testing Processes [C38]

Themes	Number of Mentions in Responses (n=27)
ATT program improvements	10
Education	7
Simplification to compliance process	4
Enforcement of ATT inspections	3
Enhanced communication	2
Reduced costs	1

Additional support from HERS Providers or ATTCPs

HERS raters and ATTs were asked for their thoughts on the support they would like to have from their certification Provider.

- HERS rater: “What additional support would you like to have from a HERS Provider? Please provide specific examples.”
- ATT: “What additional support would you like to have from an ATTCP?”

Fifteen out of 71 HERS rater respondents did not provide details on the additional support they would like to have from a HERS Provider. Of the 56 respondents who answered the question, six topics were found: support on enforcing Energy Code compliance or work with entities to enforce compliance (n=14), increase education and marketing about HERS requirements and testing (n=10), offer additional training for building department/AHJ inspectors, HERS raters, and contractors (n=10), provide real-time phone support or a support system for HERS raters in the field (n=10), improvements to the HERS registry (n=8), and offer quick and easy-to-understand resources on Energy Code compliance (n=8). The top four of the six themes are described here with an outline listed in Table 80. See Appendix F for subthemes and quotes related to all six themes.

- Fourteen respondents would like to have HERS Provider support on enforcing Energy Code compliance or to work with entities to enforce compliance. Examples of HERS Provider support mentioned include being an advocate for HERS raters such as “Representation to communicate challenges faced by raters to policymakers or regulatory bodies”, providing HERS raters a way to report un-permitted jobs or “cancel or pull a HERS report that should not have been provided to the contractor, city inspector, or homeowner”. Examples of working with entities to enforce compliance include working with building departments/AHJs to require a HERS rater to be assigned or contracted as part of plan approval and issuance of a permit, which can “[...] ensure all parties are on board to meet the CF1R throughout the building process”, and informing the building departments/AHJs to verify correct documentation of passing tests from a HERS rater.
- An increase in education and marketing about HERS requirements and testing was mentioned by ten respondents, citing the need to educate homeowners, provide additional education or outreach to contractors, and keep building department/AHJ inspectors educated on Energy Code requirements. Ten respondents also raised the topic of offering additional training for building department/AHJ inspectors, HERS raters, and contractors. The training topics varied amongst respondents, which includes “how to perform tests and fill out forms,” “Cheat Sheets, Improved Checklists, Trade Training Docs for Builder/Trades, Measure illustrations,” and “updates and workshops on changes to the Energy Code.”
- HERS rater respondents noted they would like to have real-time support via phone or an improved support system for HERS raters in the field. Examples include, “Dedicated support lines or representatives to assist with real-time issues in the field. Timely updates on regulatory changes or new testing protocols.”, “[...] a somewhat more robust tech-support system since so often our clients' getting to final is being held up by technical difficulties or confusions with the CHEERS registry by those of us who have 'migrated' from being predominantly users of CalCERTS.”, and “Immediate registry help online.”

Table 80: HERS Rater Respondents' Items of Support Would Like from a HERS Provider [H27]

Themes	Number of Mentions in Responses (n=56)
HERS Provider support on enforcing Energy Code compliance or working with entities to enforce compliance	14
Increase education and marketing about HERS requirements and testing	10
Offer additional training for building department/AHJ inspectors, HERS raters, and contractors	10
Provide real-time phone support or a support system for HERS raters in the field	10
Improvements to the HERS registry	8
Offer quick and easy-to-understand resources on Energy Code compliance	8
Other aspects would like support from a HERS Provider	19

Out of 23 ATT respondents, 15 provided a notable response for the additional support they would like to have from an ATTCP. The other eight respondents shared there is no additional support they would like to have (n=4), they were unsure (n=3) or left no response (n=1). From the 15 respondents, two major themes were identified (also outlined in Table 81): training on code compliance (n=11) and internal process improvements (n=4). See Appendix G for the list of related quotes.

- ATT respondents would like to see more timely education and training support for all stakeholders involved as well as providing clarity and guidance. One respondent shared, "We need to educate contractors and then building departments, in that order, because we can't teach contractors when the job is finished by that time it's too late."
- Four ATT respondents mentioned the need to resolve issues with discrepancies on forms and improvement to the online forms and websites. One respondent described in detail²¹ how the forms can be improved, primarily noting, "Forms should allow a section for ATT to note what specific steps may not apply based on project SOP. ATT's should be able to note when NRCA's are incorrectly checked."

²¹ See question 28 in Appendix G for the full quote.

Table 81: ATT Respondents' Items of Support Would Like from an ATTCP [A28]

Themes	Number of Mentions in Responses (n=15)
Training on code compliance	11
Internal process improvements	4

How to encourage contractors to ensure better Energy Code compliance

We asked Contractor, HERS rater, and ATT respondents for their perspective on ways to encourage Contractors to ensure better Energy Code compliance: "In your opinion, how can contractors be encouraged to ensure better Energy Code compliance?"

Of the 230 contractor respondents, 26 did not answer the question, seven noted they believed nothing could be done, 14 answered "unsure", 23 responded in terms too vague to decipher, and unexpectedly, 39 contractors noted this question was not applicable to them or their work. The remaining 121 responses were categorized into the following themes: education and training (n=44), enforcing the Energy Code with different incentives (n=29), simplifying the Energy Code (n=26), equipment related improvements (n=7), simplifying the permitting process (n=5), and lowering costs (n=5). Summarized below are the top three themes. Table 82 summarizes the themes from the open responses, and the full list of themes and subthemes can be found in Appendix E.

- Forty-four contractor respondents mentioned education could encourage contractors to comply with the Energy Code. A good portion (n=11) of respondents did not elaborate what sort of education would be useful, but 33 respondents shared some ideas:
 - Offer additional training sessions, online courses with continued education credits, or free courses on Energy Code materials for contractors. Similarly, offer training for other stakeholders such as building department/AHJ inspectors and homeowners.
 - Offer better support with compliance processes such as "Supply a helper" or "Open offices for walk-ins [...]" to accommodate contractors who are not familiar with the digital process.
 - Provide handouts at stores where contractors regularly shop and mark new code changes with a star on the printouts or plans.
- Twenty-nine contractor respondents mentioned some sort of enforcement could improve Energy Code compliance for contractors. Contractor respondents shared that incentives could make a worthwhile enforcement strategy.
 - Respondents mentioned rebates for the contractor, customer, or "[...] for investors. Right now, the occupant/renter reaps the benefit of getting a higher SEER rating. Not the owner of the property." A couple of respondents mentioned incentives could be from, "[...] Insurance Co., Utilities, etc. for projects built to code" or to "Give incentives or credits toward taxes [...]."
 - Conversely, ten contractors supported enforcing Energy Code compliance through penalties. Suggestions included, "Risk to their license for not installing to manufacturer's instructions, for not meeting code, for not pulling permits" and

finer for little to no compliance. Responses also included stronger enforcement of contractor licenses and reducing the number of unlicensed contractors acting in the space.

- Twenty-six contractor respondents mentioned simplifying the Energy Code in some fashion would improve compliance among contractors. One respondent explained, “Like a lot of things in California it needs to practice the Bill Clinton principle of KISS. Keep it simple, I will leave the last word out of it.” Opinions on simplification generally split into three categories:
 - Simplify code language,
 - Slow down changes to the Energy Code, and
 - Reducing regulations overall.

Table 82: Contractor Respondents’ Suggestions to Encouraging Contractors to Ensure Energy Code Compliance [C39]

Themes	Number of Mentions in Responses (n=121)
Education	44
Simplify the Energy Code	26
Enforcement through incentives	16
Enforcement through penalties	10
General enforcement	3
Equipment-related improvements	7
Simplify the permitting process	5
Lower costs	5
Other suggestions to encourage contractors to ensure Energy Code compliance	5

Sixty-three HERS rater respondents answered the question with the remaining eight responses as “unsure” (n=6), “not applicable” (n=1), and unanswered (n=1, partially completed and did not reach this question on the survey).

Among the 63 responses, six themes were found: train contractors on the Energy Code, HERS requirements and testing, and related documentation (n=19), enforcement from building departments/AHJs and implement penalty fees for noncompliance (n=19), simplify the permit process, connect with a HERS rater in early project stages, and hold contractors accountable (n=15), provide accessible resources or support system while on the field (n=4), offer incentives for those that follow the Energy Code (n=3), and modify process for equipment purchasing (n=2). Table 83 summarizes the themes from this open response question. The top three of the six themes are described here. See Appendix F for subthemes and quotes related to all six themes.

- Nineteen HERS rater respondents mentioned training contractors on the Energy Code, HERS requirements and testing, and related documentation so they are knowledgeable about the Energy Code requirements, processes involved, and how to complete forms accurately, with a couple of respondents specifying:
 - “Know how to fill out a CF-1R form and CF-2R so they know how to comply on a project.”
 - “[...] educate contractors on the importance of compliance for energy efficiency, safety, and long-term cost savings [...] Emphasize how compliance can serve as a selling point to environmentally conscious customers and improve their professional reputation.”
- The second most mentioned theme (n=19) is to have enforcement from building departments/AHJs and to implement penalty fees for noncompliance.
 - Respondents mentioned building departments/AHJs and contractors to work together and, “Foster collaboration [...] to ensure better understanding and smoother implementation of Energy Code standards.” Additionally, building departments/AHJs should be aware of and look for compliance with all building codes to “[...] call something out before signing off.” Mentions about the implementation of penalty fees for failing to comply were also raised to dissuade contractors from conducting unpermitted work.
- Fifteen respondents shared comments on simplifying the permit process, connecting with a HERS rater in the early stages, and holding contractors accountable.
 - Respondents noted contractors, “[...] will listen if the code was easier to understand [...]” and involving HERS raters earlier in the project, such as during installation, can “[...] ensure proper installation and function.”
 - Responses also included capturing a paper trail of contractors’ agreement to understanding Energy Code requirements, where contractors, “[...] sign something that they have read the Title 24 section of the project plans.” Respondents noted that this fallback can ensure there is contractor accountability to, “[...] confirm ‘all installation measure requirements’ have been taught/reviewed/confirmed [...].”

Table 83: HERS Rater Respondents’ Suggestions to Encourage Contractors to Ensure Energy Code Compliance [H37]

Themes	Number of Mentions in Responses (n=63)
Trained on the Energy Code, HERS requirements and testing, and related documentation	19
Enforcement from building departments/AHJs and implement penalty fees for noncompliance	19
Simplify the permit process, connect with a HERS rater in early project stages, and hold contractors accountable	15

Themes	Number of Mentions in Responses (n=63)
Provide accessible resources or support system while on the field	4
Offer incentives for those that follow the Energy Code	3
Modify process for equipment purchasing	2
Other ways contractors can be encouraged to ensure better Energy Code compliance	11

Of the 23 ATT respondents, 20 responded to the question. Of the 20, two answered “unsure”, and one answered, “not applicable.”

Of the 18 ATT who shared their opinions, three primary themes were found: improve education and training requirements (n=9), modify the code compliance process (n=8), and increase enforcement (n=5). Table 84 lists the notable themes for encouraging contractors to ensure better Energy Code compliance. See Appendix G for additional details on the remaining themes and related quotes.

- ATT respondents mentioned improving training requirements and overall education, which can lead to better compliance among contractors.
 - Examples shared include, “Require any CSLB renewals to be aware of the T24 forms specific to that license/trade, and what the penalties are for not filling them out. Also explain step by step how to get a hold of a MATE,” and “Create a comprehensive guide/fact sheet with examples of different project scenarios (new and alterations) and what forms are required for what type of systems (mainly mechanical since lighting is fairly well understood).”
- ATT respondents mentioned they would want a more simplified compliance process, specifically with the forms, and it would be beneficial to update the compliance code requirements to modern standards.
 - A few examples, shared by one respondent, is to have, “One platform for all forms, (NRCC, NRCI & NRCA) would be ideal. When NRCC's check the wrong forms have a means for the ATT to document why the form does not apply. I checked the first box to have ATTs be included but logistically I am not sure how that would work. I just think feedback from the individuals that install or test the system should be implemented.”
- Five ATT respondents suggested increasing enforcement to boost compliance with the Energy Code.
 - One respondent shared, “Contractors will do the minimum amount to pass enforcement. So maybe push enforcement. No such thing as encouragement. Businesses will complete the project at the lowest cost. If inspectors are not asking for forms or don't read them contractors will not incur the unnecessary expenses.”

- The respondent who answered “not applicable” also shared, “Products being made are energy efficient more than they've ever been. Would much rather see NEC code [respondent likely referring to the Energy Code] start accounting for watts per square foot based on LED rather than old, antiquated metrics with halogen bulbs.”

Table 84: ATT Respondents’ Suggestions to Encouraging Contractors to Ensure Energy Code Compliance [A38]

Themes	Number of Mentions in Responses (n=18)
Improve training requirements and overall education	9
Modify the code compliance process	8
Increase enforcement	5
Need for support from the CEC	3
Economic incentives	2

Contractors, HERS raters and ATTs were given the opportunity to share additional comments when they reached the end of the survey (“Please share any additional comments and thoughts about Energy Code compliance in the box below.” – C40, H38, A39). Not all respondents provided a response as this question was not required. Majority of the responses received from contractor, HERS rater, and ATT respondents reflect themes already mentioned throughout the report. However, some respondents shared notable comments that may provide additional insights to better understand the innerworkings of complying with the Energy Code. A few examples of the comments received are listed below, categorized by the respondent group. See question 40 on Appendix E, question 38 on Appendix F, and question 39 on Appendix G for the full list of comments from contractor, HER rater, and ATT respondents, respectively.

- Contractor respondents
 - “The perception is that 90% of codes are developed with product/industry and code professionals in a back room..... Few active/field contractors have the time to be involved. ICC, etc. should make it easier and think about who their customers really are.... Hint... It's not the energy commission.... ultimately it's owners and taxpayers and they are beginning to revolt (in the form of not wanting any permits).”
 - “Communicate with all other divisions and their management to make sure the code will work before adopting things that conflict in either the planning process or installation process in the field. Leaving companies to argue with each other over which code is more important is not the way compliance should be.”
 - "Saying it's the law is not enough. We lose a lot of work because we will not engage in non-permitted work. Owners would rather take the risk than deal with the delays, expense and the un-motivated government employees.”
- HERS rater respondents

- "I have lost 70% of my business in the last 2-3 years due to the city inspectors closing out city permits without a HERS report. My contractors and HVAC installers will not request a HERS report unless the city inspector asks for one. My HVAC installers are finding HERS companies that will pass all jobs whether they meet the HERS requirements or not. These HERS companies will continue to stay in business since they will just hire another HERS rater to replace the ones that get suspended. The entire HERS company needs to be banned to prevent this revolving door."
- "Two issues. The business changed when large companies began offering guaranteed pass, first test. Contractors began asking us to do drive by testing. Some had to be turning a blind eye to this. Because it's harder than hell to pass these jobs with contractors on site. That must change. As stated earlier, as long as you focus on the efficiently built houses that will use little energy, trying to make them more efficient, while ignoring the true energy hogs, that is existing home stock. The ones few pull permits for. [...] Until you stop ignoring and address the problem buildings, it's a facade. Finally, the raters have zero power or input. At one of the meetings, the guy from the energy commission went through all these proposals for making Raters jobs more difficult. He finally admitted for many proposals that it wouldn't make for a better program, but it would cost the Raters dearly. [...] So, you have raters with no power, the contractors with all the power, and you can't expect it to work well. [...]"
- ATT respondents
 - "The state of California has the right intentions however went about making a difference the wrong way. You can't just pass rules and regulations expect contractors to comply when they don't understand or even have the diagnostic tools to learn there is a better way."
 - "The software that engineers are using to figure out what tests need to be performed on any given project are heavily flawed (energy ace). Incorrect tests chosen and correct tests not chosen is a common theme. PRF-E forms do not list the equipment that needs to be tested leaving us to guess what needs to be tested. These two issues make it extremely difficult to bid these projects accurately. We should not be guessing what work needs to be performed."

Summary of Key Findings from Contractor, HERS Rater, and ATT surveys on the Improvements Needed to Help Achieve Energy Code Compliance

Many contractors, HERS raters, and ATTs who provided recommendations for improvements expressed similar sentiments about making improvements in these areas: (1) increased and improved Energy Code education and training, including knowing how to work with HERS raters and ATTs earlier in the process, (2) simplifying and speeding up the code compliance process through streamlining processes, reducing paperwork, and adjusting the code to make it easier and faster to comply, and (3) truly enforcing the code with the support of incentives and penalties. ATTs also mentioned the importance of reducing costs to address competitive pressures. HERS raters recommended that HERS Providers directly support compliance enforcement, marketing about HERS requirements and testing, and training for AHJs, HERS

raters, and contractors. ATTs also raised the need to improve webforms, website resources, and for help resolving discrepancies. Although a minority opinion among contractor survey respondents, a group of respondents advocated for eliminating or drastically reducing Energy Code compliance requirements. In general, though, those who experienced issues with Energy Code compliance concur that improvements are warranted.

The key themes from the survey respondents' answers to questions about improvements needed to achieve Energy Code compliance are organized into five topics: (1) reducing barriers and encouraging better documentation, (2) HERS rater process improvement, (3) ATT inspection process improvement, (4) additional support from a HERS Provider or ATTCP, and (5) how to encourage contractors to ensure better Energy Code compliance.

Reducing barriers and encouraging better documentation

Among those survey respondents who provided responses, all agreed that improving awareness and understanding of the Energy Code would help improve documentation, and each group provided additional suggestions. Of the 56 contractors who wrote suggestions, the recommendations for improving documentation included code education (n=17), adjusting the permitting process (n=16), adjusting the Energy Code (n=13), and code enforcement (n=7). Eight mentioned nothing could be done. Among the 54 HERS raters who responded, their recommendations to reduce barriers and encourage contractors to submit accurate Energy Code documentation included: education on HERS requirements and testing (n=19), simplify and streamline the Energy Code compliance portion of the permitting process (n=14), proactive support from the building department/AHJ and proper enforcement, applying penalties where needed (n=13), engage HERS raters throughout the construction process (n=8), and revisions to the CSLB licensing process (n=4). Of the 13 ATTs who provided recommendations for improving documentation, they recommended: increase knowledge of the Energy Code (n=8), the need for thorough and consistent inspections from inspectors (n=3) and addressing the competitive pricing barrier (n=3).

HERS rater process improvement

Out of the 70 HERS raters surveyed, 87% (n=61) said they believed the HERS program was at least somewhat effective at improving Energy Code compliance. Contractors and HERS raters were asked to provide recommendations to improve HERS rater processes. Among the 57 contractors who provided recommendations, the following top three themes emerged: education for AHJs, contractors, and customers (n=20), code language and process simplification (n=10), and reducing scope of or removing HERS program (n=9). Of the 57 HERS raters who provided recommendations for improving their processes, six themes emerged: educate contractors, installers, and property owners/managers about Energy Code compliance and HERS requirements and testing (n=14), proper enforcement (n=14), simplify and streamline the Energy Code compliance portion of the permitting process (n=11), engage HERS raters throughout the construction process (n=8), HERS rater accountability (n=8), and contractor accountability (n=4).

ATT inspection process improvement

Fifteen out of 23 ATT survey respondents noted they believed the ATT program was at least somewhat effective at improving Energy Code compliance. Notably, however, five out of 23 respondents believe the program is ineffective. Contractor and ATT respondents were asked about ways to improve acceptance testing processes that better ensure Energy Code compliance. More than half of the ATT respondents selected training contractors and building

departments/AHJs, requiring that ATTs consulted in early construction stages, and increasing enforcement for acceptance testing as ways to improve the acceptance testing processes. Of the 27 contractors who provided recommendations for improvements to the ATT processes, the top three themes were: improvements to the ATT program design to address conflicts of interest, ability to find ATTs, and ATT required experience issues (n=10), education and training (n=7), and code compliance process simplification (n=4).

Additional support from a HERS Provider or ATTCP

HERS raters and ATTs were asked for their thoughts on the support they would like to have from their certification Provider. Of the 56 HERS raters who answered the question, six topics were found: support on enforcing Energy Code compliance or work with entities to enforce compliance (n=14), increase education and marketing about HERS requirements and testing (n=10), offer additional training for building department/AHJ inspectors, HERS raters, and contractors (n=10), provide real-time phone support or a support system for HERS raters in the field (n=10), improvements to the HERS registry (n=8), and offer quick and easy-to-understand resources on Energy Code compliance (n=8). From the 15 ATT respondents, two major themes were identified: training on code compliance (n=11) and internal process improvements (n=4).

How to encourage contractors to ensure better Energy Code compliance

Contractor, HERS rater, and ATT respondents provided their perspectives on ways to encourage Contractors to ensure better Energy Code compliance. Across the three groups, improving education and training was a top recommendation for improving contractor Energy Code Compliance. Among the 121 contractors who provided specific suggestions, these were the top three themes: education and training (n=44), enforcing the Energy Code with different incentives (n=28), and simplifying the Energy Code (n=26). Among the 63 HERS raters who offered suggestions, the top three groups of recommendations for encouraging contractor compliance were: train contractors on the Energy Code, HERS requirements and testing, and related documentation (n=19), enforcement from building departments/AHJs and implement penalty fees for noncompliance (n=19), and simplify the permit process, connect with a HERS rater in early project stages, and hold contractors accountable (n=15). From the 20 ATT responses, three primary themes were found: improve education and training requirements (n=9), modify the code compliance process (n=8), and increase enforcement (n=5).

CHAPTER 6:

Conclusions and Recommendations

This section includes a summary of conclusions and recommendations for future exploration. Given that the results of the survey are not generalizable to the populations of contractors, HERS raters, and ATTs, the following recommendations should be treated as topics for further consideration based on feedback from the survey respondents as opposed to conclusive directives.. Further, these conclusions and recommendations should be weighed in relation to the outcomes of other studies conducted under this work authorization.

Despite low response rates, survey respondents are inclusive of a breadth of perspectives

The response rate of the survey was relatively low given the sample size across twelve regions of California (see Table 7). Despite low response rates, each of the survey respondent groups – contractors, HERS raters, and ATTs – included people working in each category of organization sizes, geographic regions, and project, building, and equipment types. The balance was heavily weighted in two ways:

- Organization size. Most contractor respondents represented a firm size of less than fifty employees, and most often, from one to four employees. This implies that the employees likely hold multiple roles, and the number of projects the organization completes each year is limited.
- Geographic regions. Of the twelve regions, Los Angeles and Bay areas were the geographic areas most heavily represented. The Imperial County region had little representation.

Given the significant overlap in the various types of projects contractors worked on, few cross tabular analyses, such as comparing question responses based on project type, yielded meaningful results. Since the response rate of the survey was low overall, and particularly with ATTs, we cannot draw firm conclusions about the prevalence of the trends survey respondents reported, and it would be inappropriate to generalize the findings to all contractors, HERS Raters, and ATTs. However, there are many findings throughout the report worth further discussion and exploration.

The main goal of this report is to better understand issues with code compliance and ways to address them. First, though, it is important to recognize that most contractors responding to this survey indicated that they do not have issues applying for permits and generally attempt to meet Energy Code compliance standards. This suggests a few possible conclusions about the respondents:

- People who support code compliance were more willing to respond to the survey than those who do not,
- Code compliance among contractors may be better than is widely perceived, or
- Some survey respondents may not feel comfortable admitting that they do not adhere to the Energy Code.

While we cannot know which might be correct, it is important to keep these possibilities in mind as we consider the implications of the survey findings.

Competition and costs make it difficult to justify applying for a permit

Those contractors who reported having problems adhering to the Energy Code said they may not apply for a permit because of the costs and impact on profit margin. HERS Raters and ATTs also noted project cost and profit margin as a top reason contractors may not apply for a permit, suggesting that the issue cuts across building types.

Contractors also have difficulty finding qualified subcontractors and workers with specialized certifications. HERS rater inspection costs can add significant cost to small projects such as equipment replacement for a single-family residence. For a homeowner, paying for the tests presents a barrier to Energy Code compliance. HERS raters and ATTs acknowledged the costs of their inspections being a burden on some projects. In addition, for HERS raters, being paid for their work was seen as linked to pressure to pass the project.

Recommendations for future exploration

- Conduct further research that can determine whether or not issuing rebates for permitting fees and testing fees after AHJs verify compliance would reduce barriers to permitting.
- Consider exploring ways to radically simplify Energy Code forms and processes (online and offline) to reduce and align paperwork, and reduce processing time, especially for larger projects with multiple units.

Clunky processes and burdensome paperwork make code compliance less likely across all parties

In addition to cost burdens, issues navigating the code compliance can cause confusion, add time delays, and deter contractors from applying for a permit. This may be more of an issue for some types of projects than others. For example, contractors that worked on alterations and repairs were more likely than those working on new construction and retrofits to also mention difficulty navigating the permitting process, but less likely to mention time pressures as a reason to avoid applying for a permit. HERS raters and ATTs both indicated that submitting compliance forms is problematic, although ATTs were more likely to note problems with the forms and form submission process.

Recommendations for future exploration

- Explore how Energy Code compliance requirements could be funneled down to what is applicable for a particular project once design and procurement decisions are made. Consider addressing these specific questions:
 - For example, when the design is complete, could the documentation include a summary of the elements of the design that require product submittals/purchases checks, third party testing, and AHJ confirmation?
 - Could the documentation be coupled with a timeline, checklist, and dataset that inform all responsible parties of which parts of the Energy Code apply and who is responsible for which aspects of the process, and could be part of the proof of compliance with associated signatures?
- Since some ATTs and others working in the field find it difficult to access online NCRA forms when no Internet services are available, consider investing in a way to provide information and forms that could be used offline and uploaded later.

Lack of enforcement and consistency undermines Energy Code goals

Among the current practices that contractor, HERS rater, and ATT survey respondents reported, there are several practices that are worth further exploration:

- **Rubber-stamping plans.** The practice of contractors who hire HERS raters to “rubber stamp” permits stands-out as a practice that undermines Energy Code effectiveness. This behavior is compelling for some HERS raters because those contractors who practice this will ban them from their projects if they refuse and then hire other raters who will keep the practice going. While this issue was not explicitly discussed in regard to ATTs, a few ATTs indicated that, in over half of their projects, contractors asked them to pass a project that should not pass, and their boss, colleague, or company encouraged them to skip parts of the assessment.
- **Low confidence in AHJ accessibility and effectiveness.** Among the contractors, 42% (n=97) noted having difficulties working with building departments/AHJs in some capacity. Only five out of 230 contractors responded that it is easy to access permits online.

Lack of access to AHJs, combined with variable standards and inconsistent enforcement, means there is little risk associated with noncompliance or bending the rules. To this end, HERS raters, contractors, and ATTs who do aim to comply with Energy Code may be frustrated with inconsistencies across AHJ enforcement. They would like AHJs across jurisdictions to be more aligned with each other on what meets code and what does not. Respondents noted that inspectors have differing interpretations and understanding of the Energy Code. In addition, they noted that there should be more consistency across jurisdictions concerning the level of attention each AHJ pays to permit applicants.

Recommendations for future exploration

- Consider conducting further research to investigate whether enforced penalties lead to improved compliance and less pressure on HERS raters and ATTs to falsify documents. If so, determine who should pay a penalty.
- Determine if it is feasible to identify and penalize those entities that “rubber stamp” permitting documentation or request falsified documents. Explore whether there should be a whistleblower system for HERS raters to combat rubber stamping.
- Determine whether AHJs should be incentivized to enforce Energy Code. Investigate whether it would be feasible and effective to improve enforcement by adding a team of field verifiers to assist the AHJs with site visits and photo documentation, with the AHJ making the final ruling.

Not consulting HERS Raters, ATTs, and AHJs early in the construction process may add cost and delay to Energy Code compliance process

Most contractors never consult with HERS raters, ATTs, or AHJs during their projects. HERS raters - and to a lesser extent ATTs - confirmed that contractors overlook the significance of HERS rater involvement throughout the construction process. Survey respondents described barriers that contribute to the lack of collaboration:

- HERS raters described two notable barriers to compliance: equipment installation challenges, and the disconnect between the designer and installer when it comes to what is on the plan vs what is required for installation.
- The disconnect between the requirements and what is actually built leads to added pressure on ATT and HERS raters to pass the project.
- For other building-code required inspections, contractors know that you cannot close up a wall or ceiling until the necessary inspections occur, but it is not the same with the Energy Code. Compliance or lack thereof is dependent on who does what and when.

This lack of consistent, coherent engagement suggests that all involved in the process from the design and permit application through installation and final inspection, need continuing education, coordination support, and incentives to comply with code. It also may mean that without enforcement, there would not be an incentive to keep up with the changing Energy Code requirements or to comply.

Recommendations for future exploration

- Explore how education and training programs could be improved to bring contractors, HERS raters, ATTs, and AHJs together to understand Energy Code requirements, forms, and processes. Consider researching whether improved training would lead to early coordination that could prevent costs and complications later, helping to reduce cost and time burdens for all involved.
- Consider investigating how Energy Code compliance process modifications could better ensure that actions are taken at the appropriate time in order to avoid timing, cost, and paperwork problems being identified at the end of the project when those issues are no longer feasible to fix. Consider addressing these specific questions:
 - How can AHJs be incentivized to provide direction, consistency, and enforcement throughout the process.
 - Is there a way to support coordination of various parties, for example, helping designers be available to coordinate with installers, and ensuring that installers include ATTs and HERS raters sooner in the process?
 - Is there a way to encourage or incentivize contractors and HERS raters/ATTs to coordinate testing and inspection at the right time in the process? For example, contractors can avoid purchasing lighting or HVAC equipment that will not meet Energy Code standards if they seek approval from HERS raters or ATTs prior to purchase and installation.
- Consider conducting further research to determine whether contractors and their customers would value a recognition program that awarded contractors with a seal of approval for a strong Energy Code compliance track record. If so, determine if this approach could be coordinated with the insurance industry and utilities such that seals of approval carry benefits in terms of fee discounts, refund/pay for inspection equipment, or being listed on an approved vendor list.
- Consider conducting further research to determine whether employers could be incentivized to offer vacation hours to technicians for submitting correct documentation and whether or not technicians would value this incentive.

Energy Code compliance updates that occur every three years are too fast for entities to stay up to date

An additional challenge noted by over half of the contractor and HERS rater respondents and slightly less than half of ATTs was the difficulty of staying up to date with the code. Respondents noted both the frequency of the updates occurring every three years and the complexity of the code as factors that make it difficult to keep up.

Recommendation for future exploration

- Consider investigating how to create and train all parties on a set of tools that allow contractors, AHJs, HERS raters, and ATTs to reference the same set of code requirements for a given project, ensuring more consistent compliance and enforcement. One example would be to create and enforce the use of a central database for code compliance rules that would allow contractors, HERS raters, ATTs, and AHJs to quickly and easily query code requirements relevant to a specific project.

GLOSSARY

ACCEPTANCE TEST TECHNICIAN (ATT) —According to Section 10-102 of Title 24 Part 6, an ATT is a Field Technician, who is certified by an authorized Acceptance Test Technician Certification Provider to perform acceptance testing of either lighting controls or mechanical systems pursuant to the requirements of Sections 10-103.1 or 10-103.2 of Title 24 Part 6, respectively. ATTs are authorized to perform only those acceptance tests for which they are certified by an ATTCP.

ACCEPTANCE TEST EMPLOYER (ATE)— According to Section 10-102 of Title 24 Part 6, an ATE is a person or entity who employs an Acceptance Test Technician and is certified by an authorized Acceptance Test Technician Certification Provider pursuant to the requirements of Sections 10-103.1 or 10-103.2 of Title 24 Part 6. ATEs are authorized to employ only those ATTs for which they are certified by an ATTCP. Each ATT must be employed by an acceptance test employer to participate in the program; even ATTs that are self-employed. However, an ATT can also be certified as an acceptance test employer.

ACCEPTANCE TEST TECHNICIAN CERTIFICATION PROVIDER (ATTCP)— According to Section 10-102 of Title 24 Part 6, an ATTCP is an agency, organization, or entity approved by the California Energy Commission to train, certify and oversee ATTs and ATEs relating to either lighting controls or mechanical systems according to the requirements of Sections 10-103.1 or 10-103.2 of Title 24 Part 6, respectively. ATTCPs are authorized to certify only those ATTs and ATEs for which they are approved by the California Energy Commission; ATTCPs approved to certify ATTs and ATEs relating to the acceptance testing of lighting controls are sometimes referred to as “lighting control ATTCPs”, and ATTCPs approved to certify ATTs and ATEs relating to the acceptance testing of mechanical systems are sometimes referred to as “mechanical ATTCPs”.

BUILDING ENERGY EFFICIENCY STANDARDS—California Code of Regulations (California Code of Regulations), Title 24, Part 6 regulating the energy efficiency of buildings constructed in California. Also known as the Energy Code. The timing of permit submittal determines the current version of the Energy Code that the project is subject to, which may have different HERS or ATT requirements.

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibility are:

1. Forecasting future statewide energy needs.
2. Licensing a sufficient number of power plants to meet those needs.
3. Promoting energy conservation and efficiency measures.
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels.
5. Planning for and directing state responses to energy emergencies.

ENERGY CODE COMPLIANCE—Energy Code Compliance refer to the steps required to comply with Title 24, Part 6 during the course of new construction, addition or alteration, including the documentation requirements outlined in section 10-103, as summarized below:

- A responsible person solicits design that complies with Energy Code requirements.
- A responsible person submits an application for a permit as required by Energy Code.
- All documentation steps are completed in correct order according to Energy Code standards.
 - Certificate of Compliance for design
 - Application for building permit
 - Certificate of Installation
 - ATT Certificate of Acceptance
 - HERS Certificate of Field Verification & Diagnostic Testing
 - Compliance, Operating, Maintenance, and Ventilation Information to be provided by the Builder
- HERS raters, ATTs, and building department inspectors perform verification, testing, and inspections according to Energy Code requirements.
- Installation and initial equipment operation meets quality standards.

ENERGY CODE—see BUILDING ENERGY EFFICIENCY STANDARDS

HOME ENERGY RATING SYSTEM (HERS) PROVIDER— An organization approved by the California Energy Commission that administers a home energy rating system in compliance with requirements per Title 20. HERS Providers also train, certify, and oversee the performance of HERS raters. They maintain a data registry in compliance with requirements of Title 20.

HERS RATER— According to Section 10-102 of Title 24 Part 6, HERS rater is a person who has been trained, tested, and certified by a HERS Provider to perform Field Verification and Diagnostic Testing (FV and DT) required to confirm compliance with Title 24, Part 6.

Title 24 – In this report Title 24, refers to California Code of Regulations Title 24, Part 6, which is also referred to as the Energy Code.

APPENDIX A:

Survey Methodology

This appendix includes details on the survey design, distribution, and analysis approach along with the associated limitations.

Survey Design Approach

Arup and CSE worked closely with CEC staff to develop a list of priority topic categories and topics used to inform the survey design for three surveys: (1) contractors and installers (referred to as “contractors” in this report), (2) HERS raters, and (3) ATTs and Acceptance Test Employers (ATEs). CSE took into consideration that the contractor survey would be taken by those who serve as an owner/co-owner of the company, work in operations, or work in the field as installers or technicians, or field supervisor. CSE facilitated a series of conversations and iterative rounds of survey document review with Arup and CEC to transform the initial scope of work topics into a prioritized list of topic categories and topics, and the topics into survey questions for each of the three surveys. CSE tested the surveys through interviews with two contractors, a HERS rater, an ATT, and an ATE. CSE used feedback from the interviews to further refine question language, response options, and prioritization of questions. Given the breadth of topics, the draft surveys would have required over 30 minutes to complete. Based on the prioritized topic category list and interview feedback, CSE recommended, and Arup and CEC approved, survey revisions that reduced the expected time to complete the surveys.

Contractors who indicate they are a certified HERS rater or ATT were directed to take the respective HERS rater or ATT survey instead of the contractor survey. The redirection of the survey is to gather as many responses as possible from the perspective of HERS raters, ATTs, and ATEs due to the low population size as opposed to the contractors. A respondent who is certified as a HERS rater and ATT or ATE were directed to the ATT survey due to the smaller population of ATTs and ATEs compared to HERS raters. All respondents will be asked to take the survey one time to reduce the chances of duplication.

CSE collected survey responses in two rounds, in November 2024 and in January 2025, as the initial launch of the survey was not distributed to all identified populations. After the first round of survey administration, CSE reviewed the parts of the survey where respondents exited most frequently to determine if a revision is feasible to increase the response rate. CSE identified the first question to have the highest drop-off rate, which asked respondents to identify the specific CSLB licenses, HERS Rater certification, or acceptance test certifications they currently held. CSE proposed to shorten this question and, after approval from Arup and the CEC, revised the question prior to launching the second round of survey administration.

Survey Distribution Approach and Limitations

Surveys were distributed via email by the following licensing board and certifying bodies to a portion of their membership:

- Contractors: California Department of Consumer Affairs Contractors State License Board
 - Distributed to members associated with the following licensure categories (see Table 1 in the body of the report for contractor population and survey sample size):

- CSLB Class A – General Engineering Contractor
- CSLB Class B – General Building Contractor
- CSLB C-2 – Insulation and Acoustical Contractor
- CSLB C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor
- CSLB C-8 – Concrete Contractor
- CSLB C-10 – Electrical Contractor
- CSLB C-11 – Elevator Contractor
- CSLB C-20 – Warm-Air Heating, Ventilating and Air-Conditioning Contractor
- CSLB C-27 Landscaping Contractor
- CSLB C-36 – Plumbing Contractor
- CSLB C-38 – Refrigeration Contractor
- CSLB C-39 – Roofing Contractor
- CSLB C-46 – Solar Contractor
- CSLB C-47 – General Manufactured Housing Contractor
- CSLB C-51 – Structural Steel Contractor
- CSLB C-53 – Swimming Pool Contractor
- HERS raters: California Home Energy Efficiency Rating Service (CHEERS)
 - Distributed to 1,694 members.
- ATTs and ATEs: Acceptance Test Technician Certification Providers (ATTCs)²²²³ including
 - National Lighting Contractors Association of America
 - California Advanced Lighting Controls Training Program
 - California State Pipe Trades Council
 - National Energy Management Institute Committee
 - National Environmental Balancing Bureau
- Refrigeration Service Engineers Society

There are a few limitations and considerations to note about the recruiting effort and obtaining survey responses for this research project.

1. Survey target populations are limited to licensed providers, potentially excluding unlicensed contractors working in the field.

²² The number of members listed are provided by the CEC and represent active ATT and ATE memberships as of December 31, 2023. These numbers serve as estimates for gauging the total population size of ATTs and ATEs.

²³ The following ATTCs did not distribute the survey to their members: National Lighting Contractors Association of America (NLCAA), California Advanced Lighting Controls Training Program (CALCTP), California State Pipe Trades Council (CSPTC), National Energy Management Institute Committee (NEMIC)

2. Building departments/AHJs did not take the survey, which excludes a relevant perspective on permitting barriers, practices, and ways to improve compliance.
3. Some ATTCPs shared a concern about the ATT survey and the potential for results to generate inaccurate information. The ATTCPs that did not distribute the survey to their members were:
 - a. National Lighting Contractors Association of America (NLCAA)
 - b. California Advanced Lighting Controls Training Program (CALCTP)
 - c. National Energy Management Institute Committee (NEMIC)
 - d. California State Pipe Trades Council (CSPTC)
 - e. National Environmental Balancing Bureau (NEBB)
4. With low response rates, results may not fully capture the full range of issues and experiences faced by contractors, HERS raters, and ATTs. Similarly, the research may not be capturing the full range of contractors, HERS raters, and ATTs as participation in the survey is dependent on the willingness of identified organizations to communicate with their members about the research study, share the survey link within their network, verify the credibility of the survey, and advocate for their members to respond to the survey.
5. Due to CalCERTS closing prior to the survey launch, HERS rater recruitment occurred only through CHEERS.
6. Due to limitations in schedule and budget, the survey did not rely on a dedicated literature review or pre-development interviews and therefore may miss key details about the compliance process experience. The survey topic priorities and design relied heavily on CEC staff's knowledge of Energy Compliance experiences and key concerns. Finalization of survey question language relied heavily on feedback from CEC staff and five beta tester interviews in addition to the survey development team's expertise.

Survey Analysis Approach and Limitations

The results of each survey question were summarized in frequency tables found in Appendices E-G. If appropriate and meaningful, CSE analyzed responses to some questions in relation to demographic and firmographic characteristics such as geographic territory served, or property types served. The decision to conduct cross tabular analysis depended on the frequency of response per question and the extent to which respondents could be effectively categorized into distinct groups for comparison. A group of 30 responses is deemed reasonable to provide meaningful insights, however, results may not indicate trends if the data is distributed sparsely across response options.

Due to the sensitivity of the topic and limitations on survey distribution options, CSE anticipated very low response rates (less than 5%) across the target populations. Thus, CSE prepared to take several steps to reduce misinterpretation of findings during analysis, including: refraining from using percentages when reporting on results based on low frequencies, only reporting on cross tabular analyses if there was a sufficient number of responses per group and if trends were strongly evident, and reporting conclusions and recommendations as topics for further exploration as opposed to findings that confirm a generalizable trend. Across all three surveys, response rates were between 1-7% (see Chapter 2 for response rates). After reviewing the number of survey responses from the ATT and ATE

survey, CSE concluded²⁴ to group both respondent groups together due to the low number of responses. As such, any reference to the ATT and ATE population and survey will be referred to as "ATT." Given the low number of responses for the ATT survey, CSE reported all responses in frequencies, not percentages, and deemed cross tabular analyses generally infeasible. The number of responses to the contractor and HERS rater surveys was sufficient to allow for reporting in percentages, and CSE deemed some cross tabular analyses feasible.

Due to the low number of contractor respondents by specific CSLB license and the revision of the first survey question²⁵, we grouped CSLB licenses into the following categories after receiving input from the CEC and Arup.

- General Contactor
 - CSLB Class A – General Engineering Contractor
 - CSLB Class B – General Building Contractor
 - CSLB Class B-2 – Residential Remodeling Contractor
 - CSLB C-47 – General Manufactured Housing Contractor
- HVAC and Mechanical systems
 - CSLB C-4 – Boiler, Hot Water Heating and Steam Fitting Contractor
 - CSLB C-20 – Warm-Air Heating, Ventilating and Air-Conditioning Contractor
 - CSLB C-38 – Refrigeration Contractor
 - CSLB C-43 – Sheet Metal Contractor
- Lighting and Electrical systems
 - CSLB C-10 – Electrical Contractor
 - CSLB C-11 – Elevator Contractor
 - CSLB C-45 – Sign Contractor
 - CSLB C-46 – Solar Contractor
- Other building trade related work
 - CSLB C-2 – Insulation and Acoustical Contractor
 - CSLB C-5 – Framing and Rough Carpentry Contractor
 - CSLB C-8 – Concrete Contractor
 - CSLB C-9 – Drywall Contractor
 - CSLB C-17 – Glazing Contractor
 - CSLB C-27 – Landscaping Contractor
 - CSLB C-29 – Masonry Contractor

²⁴ Respondents taking survey as an ATT or ATE were asked to indicate the role they held at the company: ATE, ATT, or both roles. Sixteen of the 23 respondents indicated they held both roles while three and four indicated they only held an acceptance test employer/supervisor (ATE) or acceptance test technician (ATT) role, respectively. With this distribution, CSE made the decision to refer to the group as an ATT for ease of reference.

²⁵ Question options were revised for question "Which of the following certification(s) or license(s) do you currently have?" prior to launching the second round of survey administration.

- CSLB C-36 – Plumbing Contractor
- CSLB C-39 – Roofing Contractor
- CSLB C-51 – Structural Steel Contractor
- CSLB C-53 – Swimming Pool Contractor

With a limited sample size across the Contractor, HERS rater, and ATT survey, and a sparse distribution of responses in specific geographic regions, we were unable to compare responses by geography across surveys with certainty (see Table 7 for distribution). There were enough responses, however, to the Contractor survey that we were able to categorize geographic regions into three groups for comparison: those who work only in coastal regions, only in inland regions, and both coastal and inland regions (Table 4).

- Coastal regions: Bay Area, Central Coast, Los Angeles & Ventura Counties, Orange County, Redwood Coast, San Diego County
- Inland regions: Greater Central Valley, Central & Eastern Sierras, Imperial County, Inland Empire including High Desert and Coachella Valley areas, Shasta & Cascades, Greater Sacramento

These groupings provided an adequate sample size when segmenting data by another question. This comparison had the potential to highlight differences between those who work in regions that have more temperate climates versus climates with more severe swings in temperature. However, we understand this comparison limits insights into the large urban coastal jurisdictions from the more suburban/rural inland jurisdictions. Trends associated with different building types in different climate regions may also be masked. As mentioned in chapters three and four, there were limited findings that suggested geographic trends.

APPENDIX B:

Contractor Survey Questions

This appendix includes the contractor survey instrument as of January 6, 2025. Survey questions that were updated in January from the original contractor survey distributed in November 2024 are denoted with a footnote.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. The survey logic information is listed inside square brackets as well as whether the question was required to be answered.

Survey Introduction

Welcome to the California Energy Code building permit and compliance practitioner survey administered by Arup and the Center for Sustainable Energy (CSE) on behalf of the California Energy Commission (CEC). This survey focuses on work you conducted in the past few years.

We know your time is valuable and we appreciate you sharing your thoughts with us. Results from the survey will inform the CEC on how to improve awareness of and compliance with the California Building Energy Efficiency Standards for residential and nonresidential buildings (Title 24, Part 6; also known as the Energy Code).

Your identity will remain confidential, and all reported results will be aggregated and anonymous, so we encourage you to be open and honest. **Neither your name nor your company name will be reported to the CEC.**

The survey is voluntary and will take about 20-25 minutes to complete. If needed, you will have the option to save your progress and return to the survey later via an email link. As a thank you, you have the option to be entered in a drawing for one \$500 gift card to Best Buy upon completing the survey. Your email address will **not** be tied to your responses, and only used for the purpose of contacting you if you win the raffle.

Questions? If you have any questions or concerns about this survey, please contact the CEC at sco@energy.ca.gov and reference Energy Code Compliance Survey #400-21-005.

Survey access issues? If you have any problems accessing the survey, please contact Anjelica Thang at CSE: anjelica.thang@energycenter.org.

Thank You!

Section 0: Demographics/Firmographics

1. [*Required question*]

Which of the following certification(s) or license(s) **do you currently** have? (Select all that

apply; your selections will help determine which questions we ask you)²⁶

(Please select only the current licenses you hold personally.)

- ☐ California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)
- ☐ CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer
- ☐ CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer
- ☐ CSLB license(s)
- ☐ I am not currently certified in any of the certifications listed above or do not hold a CSLB license [*Exclusive*]

2. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which of the following applies to you?

- I am in training, but am not yet certified or licensed
- I have not pursued certification nor a license
- I do not currently have a certification nor a license, but was certified/licensed in the past

3. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which kind(s) of work have you done in the **past 5 years** (January 2020 to present)?

(Select all that apply)

- ☐ General Contractor work
- ☐ HVAC and Mechanical systems work (Including refrigeration and sheet metal)
- ☐ Lighting and Electrical systems work (Including elevator, signage, and solar)
- ☐ Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)
- ☐ California Home Energy Rating System (HERS) rater work
- ☐ Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)
- ☐ Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)
- ☐ None of the above [*Disqualified – Message shown: Unfortunately, you do not qualify for this survey at this time. You indicated that you have not done the following work within the past 5 years: General Contractor work, HVAC and Mechanical systems work (Including refrigeration and sheet metal, Lighting and Electrical systems work (Including elevator, signage, and solar, Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.), Certified lighting controls/mechanical acceptance test technician/employer work (ATT/ATE), Certified Home Energy Rating System (HERS) rater work. We thank you*]

²⁶ This is the phrasing of question 1 from the revised version distributed in January 2025. The first version of the survey distributed in November 2024 asked survey respondents to select from a long list of CSLB licenses as well as HERS Rater and ATT certification. The question was revised to encourage higher response rates and reduce the burden on the survey respondents.

for your time and appreciate your interest.]

Page Description:

- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - **You have indicated that you performed building trade related work in the past 5 years (January 2020 to present). When responding to the survey questions, please answer based on this prior experience. If you do not currently work for a company in the building trades, please respond based on your most recent building trade related employer.**

4. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which kind(s) of work are you currently working on and have a CSLB license for? (Select all that apply)²⁷

- General Contractor
- HVAC and Mechanical systems (Including refrigeration and sheet metal)
- Lighting and Electrical systems (Including elevator, signage, and solar)
- Other building trade related (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)

5. [*Required question*]

Which of the following roles do you hold in your company?

	I hold this role	I do not hold this role
Work as a field technician/equipment installer or field supervisor/superintendent		
Work as part of operations (executive management, operations/staff management, estimator, sales, etc.)		
Work as a project manager		
Own/co-own the company		
Hold the CSLB license for the company (responsible managing employee)		

²⁷ This survey question was added in to revised version distributed in January 2025. This question captures the type of work contractor respondents primarily work on to help understand the population responding to the survey.

6. [*Required question*]

Including yourself, how many people are currently employed **at your company** in California?

- 1-4
- 5-9
- 10-49
- 50-99
- 100+
- Unsure
- Prefer not to answer

7. [*Required question*]

What is the estimated total number of projects **your company** will work on in [*currently certified: 2024 / not currently certified: in a typical year*] within California?

[Description shown for those not currently certified: (You indicated that you performed building trade related work in the past 5 years. If you do not currently work for a company in the building trades, please respond based on your most recent building trade related employer.)]

- 1-10
- 11-20
- 21-50
- 51-100
- 101-500
- 501+
- Unsure
- Prefer not to answer

8. [*Required question*]

How do you most often define a single “project” or a “job” in your field of work?

(If you have multiple definitions, please use the response option “Other” to describe them for us.)

- Anytime you go to a job site
- A single permit application
- A multifamily building
- A floor of a multifamily building
- A residential unit (such as an apartment or single-family home)
- A whole building (hotel, motel, commercial, or industrial)
- A floor of a hotel, motel, commercial, or industrial building
- System maintenance, troubleshooting and repair (HVAC or electrical)
- New system(s) (such as an HVAC or electrical installation/upgrade)
- Building envelope replacement or upgrade (such as windows, roof, etc.)
- Other, please describe

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - Project Manager/Owner
 - **You have indicated that you are a project manager, in sales, in operations, or an owner of the company. When responding to the survey questions, please answer from the perspective of company practices.**
For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
 - Technician/Installer/Supervisor/Superintendent
 - **You have indicated that you work as a field technician/equipment installer or field supervisor/superintendent. When responding to the survey questions, please answer from your personal experience.**
For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - Project Manager/Owner
 - **You have indicated that you were a project manager, in sales, in operations, or an owner of the company. When responding to the survey questions, please answer from the perspective of company practices.**
For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).
 - Technician/Installer/Supervisor/Superintendent
 - **You have indicated that you worked as a field technician/equipment installer or field supervisor/superintendent. When responding to the survey questions, please answer from your personal experience.**
For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

9. [*Required question*]

What type(s) of properties has **your company** typically worked on? (Select all that apply)

- ☐ Single-family homes (detached homes, townhomes, duplexes, or triplexes)
- ☐ Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)
- ☐ High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)
- ☐ Hotels/motels

- ☐ Other nonresidential buildings

10. [*Required question*]

Which of the following type(s) of projects has **your company** worked on? (Select all that apply)

- ☐ Ductwork
- ☐ Heating, ventilation, and air conditioning (HVAC) equipment
- ☐ Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)
- ☐ Indoor or outdoor lighting, or lighting controls
- ☐ Building envelope
- ☐ Water heating or general plumbing
- ☐ Solar ready, photovoltaic, or battery storage
- ☐ Pools or spas
- ☐ Powered outdoor signs
- ☐ Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)
- ☐ General construction
- ☐ Other, please specify

11. [*Required question*]

Which of the following does your company work on? (Select all that apply)

- ☐ New construction (ground-up build)
- ☐ Additions (any change to a building that increases conditioned floor area and conditioned volume)
- ☐ Alterations/retrofits (including repairs and replacements)

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

12. [*Required question; Question shown if response to Q10 is "New construction"*]

Which of the projects were **new construction** (ground-up build)? (Select all that apply)

[*Note that each row will be displayed in the programmed version of the survey based on the project type selections in Q9.*]

- ☐ Ductwork
- ☐ Heating, ventilation, and air conditioning (HVAC) equipment

- ☐ Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)
- ☐ Indoor or outdoor lighting, or lighting controls
- ☐ Building envelope
- ☐ Water heating or general plumbing
- ☐ Solar ready, photovoltaic, or battery storage
- ☐ Pools or spas
- ☐ Powered outdoor signs
- ☐ Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)
- ☐ General construction
- ☐ Other

13. [*Required question; Question shown if response to Q10 is "Additions"*]

Which of the projects were **additions** (any change to a building that increases conditioned floor area and conditioned volume)? (Select all that apply)

[Note that each row will be displayed in the programmed version of the survey based on the project type selections in Q9.]

- ☐ Ductwork
- ☐ Heating, ventilation, and air conditioning (HVAC) equipment
- ☐ Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)
- ☐ Indoor or outdoor lighting, or lighting controls
- ☐ Building envelope
- ☐ Water heating or general plumbing
- ☐ Solar ready, photovoltaic, or battery storage
- ☐ Pools or spas
- ☐ Powered outdoor signs
- ☐ Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)
- ☐ General construction
- ☐ Other

14. [*Required question; Question shown if response to Q10 is "Alterations/retrofits"*]

Which of the projects were **alterations/retrofits** (including repairs and replacements)? (Select all that apply)

(Here we are referring to "alterations/retrofits" as any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition; including changes to outdoor lighting system, signs, and covered processes such as an enclosed parking garage, data center, commercial refrigeration.)

[Note that each row will be displayed in the programmed version of the survey based on the project type selections in Q9.]

- ☐ Ductwork
- ☐ Heating, ventilation, and air conditioning (HVAC) equipment

- ☐ Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)
- ☐ Indoor or outdoor lighting, or lighting controls
- ☐ Building envelope
- ☐ Water heating or general plumbing
- ☐ Solar ready, photovoltaic, or battery storage
- ☐ Pools or spas
- ☐ Powered outdoor signs
- ☐ Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)
- ☐ General construction
- ☐ Other



15.

[*Required question*]

[*Currently certified*: From January 2023 to present / *Not currently certified*: From January 2020 to present], which areas of California has **your company's** work taken place within? (Select all that apply)

(References of the regions can be seen in the image shown above.)

- ☐ Bay Area
- ☐ Central Coast
- ☐ Greater Central Valley
- ☐ Central & Eastern Sierras
- ☐ Imperial County
- ☐ Inland Empire including High Desert and Coachella Valley areas
- ☐ Los Angeles & Ventura Counties
- ☐ Orange County
- ☐ Redwood Coast
- ☐ Shasta & Cascades
- ☐ Greater Sacramento
- ☐ San Diego County

16. [*Required question*]

What proportion of **your company's** work has taken place in each of the following areas of California?

(Your total must equal to 100%.)

[Note that each row will be displayed in the programmed version of the survey based on the region selections in the prior question.]

Bay Area	[<i>Numeric response</i>]
Central Coast	[<i>Numeric response</i>]
Greater Central Valley	[<i>Numeric response</i>]
Central & Eastern Sierras	[<i>Numeric response</i>]
Imperial County	[<i>Numeric response</i>]
Inland Empire including High Desert and Coachella Valley areas	[<i>Numeric response</i>]
Los Angeles & Ventura Counties	[<i>Numeric response</i>]
Orange County	[<i>Numeric response</i>]
Redwood Coast	[<i>Numeric response</i>]
Shasta & Cascades	[<i>Numeric response</i>]
Greater Sacramento	[<i>Numeric response</i>]
San Diego County	[<i>Numeric response</i>]

Section 1: Contractor training on Energy Code compliance and process

Page Description:

In the next series of questions, we define "Energy Code compliance" as construction systems and/or elements that meet all the following criteria:

1. Design and/or specifications for the building, equipment, or system complies with the Energy Code requirements
2. A permitted mechanical, electrical, plumbing, or building envelope system or other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools) authorized by a building department/authority having jurisdiction (AHJ)
3. Building, equipment, and systems are installed in accordance with Energy Code and passes field verification or diagnostic testing (as applicable)
4. Installation and operation meets efficiency standards defined in the Energy Code

17. Based on your experience and knowledge, what are the **top 3** aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)

- ☐ Find Energy Code requirements
- ☐ Stay up-to-date with the Energy Code
- ☐ Understand the purpose of the Energy Code
- ☐ Design a project to meet Energy Code requirements
- ☐ Obtain a permit
- ☐ Install equipment/measures to meet the Energy Code requirements
- ☐ Operate equipment to Energy Code standards
- ☐ Document Energy Code compliance
- ☐ Other, please specify
- ☐ I am not sure [*Exclusive*]

Section 2: Contractor awareness of Energy Code requirements

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - Project Manager/Owner
 - **You have indicated that you are a project manager, in sales, in operations, or an owner of the company. When responding to the survey questions, please answer from the perspective of company practices.**
For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
 - Technician/Installer/Supervisor/Superintendent
 - **You have indicated that you work as a field technician/equipment installer or field supervisor/superintendent. When responding to the survey questions, please answer from your personal experience.**
For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - Project Manager/Owner
 - **You have indicated that you were a project manager, in sales, in operations, or an owner of the company. When responding to the survey questions, please answer from the perspective of company practices.**
For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).
 - Technician/Installer/Supervisor/Superintendent
 - **You have indicated that you worked as a field technician/equipment installer or field**

supervisor/superintendent. When responding to the survey questions, please answer from your personal experience.

For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

18. [*Question shown if building types selected include nonresidential, hotel/motel, high-rise multifamily, or low-rise multifamily AND project types selected include new construction or additions*]

What percentage of new construction/addition projects [*manager/owner/sales/operations: do you consult or hire / technician/installer: does your company interact with*] an Acceptance Test Technician (ATT) during the following project stages?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Partial construction mock-up (design phase) but before installation/implementation						
Before installation/implementation						
During installation/implementation						
After installation/implementation but before final building department / AHJ inspection						

19. [*Question shown if building types selected include low-rise multifamily or single-family AND project types selected include new construction or additions*]

What percentage of new construction/addition projects [*manager/owner/sales/operations: do you consult or hire / technician/installer: does your company interact with*] a Home Energy Rating System (HERS) rater during the following project stages?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure

Partial construction mock-up (design phase) but before installation/ implementation						
Before installation/ implementation						
During installation/ implementation						
After installation/ implementation but before final building department /AHJ inspection						

Section 3: Challenges that affect comprehensive compliance with the Energy Code

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

20. [*Required question*]

What percentage of the following customer types you work with are aware of the need to comply with the Energy Code requirements?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes)						

Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)						
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)						
Owners/developers/managers of hotel/motel buildings						
Owners/developers/managers of nonresidential buildings						

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

21. [*Required question; Question shown if building types selected includes single-family or low-rise multifamily AND project types selected include additions or alterations/retrofit*]

Thinking about **single-family or low-rise multifamily residential additions or alterations/retrofits**: What percent of the following project types

[*manager/owner/sales/operations*: do you / *technician/installer*: does your company]

submit a permit application (or have a subcontractor submit a permit on your behalf) that includes Energy Code compliance documentation?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded. Here we are referring to "additions" as any change to a building that increases conditioned floor area and conditioned volume, and "alterations/retrofits" as any change to a building's water-heating system, space-conditioning system, lighting system, electrical power

distribution system, or envelope that is not an addition; including changes to outdoor lighting system, signs, and covered processes such as an enclosed parking garage, data center, commercial refrigeration.)

[Note that each row will be displayed in the programmed version of the survey based on the installation type selections.]

	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type	51-75% of project type	76-100% of project type	Unsure	Prefer not to answer
Ductwork								
Heating, ventilation, and air conditioning (HVAC) equipment								
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)								
Indoor or outdoor lighting, or lighting controls								
Building envelope								
Water heating or general plumbing								
Solar ready, photovoltaic, or battery storage								
Pools or spas								
Powered outdoor signs								

Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)								
General construction								
Other								

22. [*Required question; Question shown if building types selected includes nonresidential, hotel/motel, or high-rise multifamily AND project types selected include alterations/retrofits*]

Thinking about **nonresidential, hotel/motel, or high-rise multifamily**

alterations/retrofits: What percent of the following project types

[*manager/owner/sales/operations:* do you / *technician/installer:* does your company]

submit a permit application (or have a subcontractor submit a permit on your behalf) that includes Energy Code compliance documentation?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded. Here we are referring to "alterations/retrofits" as any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition; including changes to outdoor lighting system, signs, and covered processes such as an enclosed parking garage, data center, commercial refrigeration.)

[*Note that each row will be displayed in the programmed version of the survey based on the installation type selections.*]

	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type	51-75% of project type	76-100% of project type	Unsure	Prefer not to answer
Ductwork								
Heating, ventilation, and air conditioning (HVAC) equipment								

Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)								
Indoor or outdoor lighting, or lighting controls								
Building envelope								
Water heating or general plumbing								
Solar ready, photovoltaic, or battery storage								
Pools or spas								
Powered outdoor signs								
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)								
General construction								
Other								

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).

- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

23. [*Required question*]

Which of the following typically impacts your company's decision to apply for a permit?
(Select all that apply)

- ☐ Project cost and profit margins (includes offering competitive pricing)
- ☐ Competition from contractors performing unpermitted work
- ☐ Deadlines and time pressures
- ☐ Customer pressures for unpermitted work
- ☐ Difficulty navigating permitting system
- ☐ Other, please specify
- ☐ I typically apply for permits and none of these issues impact my decision [*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

24. [*Required question; Question shown if building type selected includes single-family, low-rise multifamily*]

Do you offer customers who are homeowners/property owners the choice to complete the work without a permit?

- Always
- Sometimes
- Never
- Prefer not to answer

25. [*Required question*]

How often have you personally experienced issues with your company's customers not wanting to comply with the Energy Code due to time pressures, expense, or other factors?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes)						

Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)						
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)						
Owners/developers/managers of hotel/motel buildings						
Owners/developers/managers of nonresidential buildings						

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

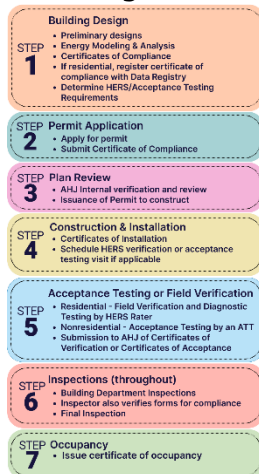
26. [*Required question*]

Think about the other contractors who work in your territory. From your perspective, what percentage of the **addition or alteration/retrofit projects** (including repair and replacement) do you think are actually permitted?

- Other contractors **never** pull permits for alterations/retrofits (including repair/replacement)
- 1-25% of projects are permitted
- 26-50% of projects are permitted
- 51-75% of projects are permitted
- 76-100% of projects are permitted
- Unsure
- Prefer not to answer

27. [*Required question*]

The image below represents the current Energy Code compliance process.



Which part(s) of the Energy Code compliance process, if any, [*manager/owner/sales/operations*: do your technicians / *technician/installer*: do you personally] find challenging to complete? (Select all that apply)

- ☐ 1 - Building Design
- ☐ 2 - Permit Application
- ☐ 3 - Plan Review
- ☐ 4 - Construction & Installation
- ☐ 5 - Acceptance Testing or Field Verification
- ☐ 6 - Inspections (throughout)
- ☐ 7 - Occupancy
- ☐ No parts of the Energy Code compliance process are challenging to complete [*Exclusive*]
- ☐ Not aware of the Energy Code compliance process [*Exclusive*]

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

28. [*Required question*]

What percentage of HERS raters, ATTs, and inspectors **do not enforce** Energy Code compliance (do not complete/request forms) during post-installation inspections for your company's projects?

	None	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable
HERS raters							
ATTs							
Building department / AHJ inspectors							

29. [*Required question*]

Thinking of the building departments/AHJs your company works with, what makes it easy or difficult to work with their code compliance systems?

[*Open response*]

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

30. [*Required question; Question shown if contractor/installer indicated a job role of project manager/business owner/sales/operations*]

What percentage of your company's projects have been affected by the following conditions to the extent that it impacted your company's ability to meet Energy Code requirements?

	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not Applicable
Finding compliant equipment available for purchase							
Finding compliant equipment that meet clients' needs							

Difficulty finding qualified trade partners/skilled workers							
Difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls ATT certification, NATE, etc.)							
Deadlines and cost/time pressures							
Pressure from the homeowner or manager/owner							
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers)							
Energy Code is complicated to understand and difficult to comply with							
Energy Code is not enforced by building departments/AHJs (don't ask for forms)							
Building departments/AHJs do not review forms for accuracy/completeness							

31. [*Required question; Question shown if contractor/installer indicated a job role of project manager/business owner/sales/operations*]

What are the other conditions, if any, that affect your company's ability to build or install equipment in a way that meets Energy Code requirements?

[*Open response*]

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

32. [*Required question*]

As a percentage of projects, how often have you experienced issues complying with the Energy Code as pointed out by a building department/AHJ inspector, HERS rater, or ATT?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Not applicable
HERS raters							
ATTs							
Building department /AHJ inspectors							

33. [*Required question*]

If it is not feasible to get a permit for a project, which of the following measure(s) would your company take to ensure the work meets the standards for the California Building Code and the Energy Code? (Select all that apply)

- ☐ Purchase the same equipment/material as a code compliant permitted project
- ☐ Install equipment in alignment with code requirements (but without permit and documentation)
- ☐ Test for what HERS raters/ATTs would do but test it with company staff
- ☐ Be responsible for making sure design/build documents and installation comply with the Building Code and Energy Code standards
- ☐ Other, please specify
- ☐ If the company cannot secure a permit, then we would not attempt to meet the Energy Code standards but proceed with the project [*Exclusive*]

- ☐ If the company cannot secure a permit, then we would not do the project
[*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

Section 4: Contractor and HERS Rater/ATT interactions with Building Departments

Page Description:

- Currently certified [*Description shown if response to Q1 is not "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is "Building, electrical, lighting, mechanical, plumbing, or general contractor work" or "Other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools)"*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

34. [*Question shown if contractor/installer indicated a job role of project manager/business owner/sales/operations*]

Prior to submitting a building permit application, on what percent of your projects do you or your company consult with the building department/AHJ about the following types of projects?

[*Note that each row will be displayed in the programmed version of the survey based on the type of work selected in Q10.*]

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Not Applicable
New construction							
Additions							
Alterations/retrofits (including repairs and replacements)							

35. [*Question shown if contractor/installer indicated a job role of project manager/business owner/sales/operations*]

In your personal experience, in what percentage of the projects do the building departments/AHJs your company works with enforce the following?

(If the enforcement is not applicable with the projects you work on, please select "Not applicable".)

	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable

Require a certificate of compliance (CF1R, LMCC, NRCC) form as part of Energy Code documentation with the permit application							
Require the certificate of installation (CF2R, NRCI, LMCI) as part of review							
Enforce the use of the HERS program for code compliance, by reviewing the certificate of verification (CF3R, NRCV, LMCV)							
Enforce the use of the ATT program for lighting code compliance, by reviewing the certificate of acceptance (PSR, NRCA)							
Enforce the use of the ATT program for mechanical code compliance, by reviewing the certificate of acceptance (PSR, NRCA)							

Section 5: How to improve Energy Code compliance

36. [*Required question*]

In response to a prior question, you selected the following aspects impact your company's decision to submit Energy Code documentation when applying for permits.

[List the options selected; Note that the selected aspects from Q22 "Which of the following typically impacts your company's decision to apply for a permit?" will be displayed following the question as a reference. The question will not be displayed if the respondent selected "I typically apply for permits and none of these issues impact my decision".]

What do you think could be done in these areas to reduce barriers and encourage accurate Energy Code documentation?

[*Open response*]

37. [*Required question; Question shown if building type selected includes low-rise multifamily or single-family homes*]

In your opinion, how can **HERS raters' processes** be improved to ensure better Energy Code compliance?

[*Open response*]

38. [*Required question; Question shown if building type selected includes nonresidential, hotel/motel, high-rise multifamily, or low-rise multifamily*]

In your opinion, how can **ATT inspection processes** be improved to ensure better Energy Code compliance?

[*Open response*]

39. [*Required question*]

In your opinion, how can **contractors be encouraged** to ensure better Energy Code compliance?

[*Open response*]

Section 6: Additional comments/feedback

40. Please share any additional comments and thoughts about Energy Code compliance in the box below.

[*Open response*]

41. As a thank you for participating in the survey research, you will be entered in a drawing for a \$500 gift card. If you would like to be included in the drawing, please provide your first name, last name, and email address so that we may contact you if you were selected. Your name and email address are collected only for contacting you about the raffle. Your name and contact information will not be associated with your responses.

- First name
- Last name
- Email address

Thank You Page

Thank you very much for participating in this survey! Your feedback is greatly appreciated and will help inform the California Energy Commission (CEC) on how to improve the awareness of and compliance with the Energy Code.

This survey was administered by Arup and the Center for Sustainable Energy on behalf of the California Energy Commission.

Arup is an employee-owned global sustainable development consultancy bringing technology, imagination and rigor to shape a better world. Center for Sustainable Energy® (CSE) is a national nonprofit that accelerates adoption of clean transportation and distributed energy through effective and equitable program design and administration.

For information about the California Building Energy Efficiency Standards, visit <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards>.

For information about Arup, visit www.arup.com. For information about CSE, visit www.energycenter.org.

APPENDIX C:

HERS Rater Survey Questions

This appendix includes the HERS Rater survey instrument as of January 6, 2025. Survey questions that were updated in January from the original HERS Rater survey distributed in November 2024 are denoted with a footnote.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. The survey logic information is listed inside square brackets as well as whether the question was required to be answered.

Survey Introduction

Welcome to the California Energy Code building permit and compliance practitioner survey administered by Arup and the Center for Sustainable Energy (CSE) on behalf of the California Energy Commission (CEC). This survey focuses on work you conducted in the past few years.

We know your time is valuable and we appreciate you sharing your thoughts with us. Results from the survey will inform the CEC on how to improve awareness of and compliance with the California Building Energy Efficiency Standards for residential and nonresidential buildings (Title 24, Part 6; also known as the Energy Code).

Your identity will remain confidential, and all reported results will be aggregated and anonymous, so we encourage you to be open and honest. **Neither your name nor your company name will be reported to the CEC.**

The survey is voluntary and will take about 20-25 minutes to complete. If needed, you will have the option to save your progress and return to the survey later via an email link. As a thank you, you have the option to be entered in a drawing for one \$500 gift card to Best Buy upon completing the survey. Your email address will **not** be tied to your responses, and only used for the purpose of contacting you if you win the raffle.

Questions? If you have any questions or concerns about this survey, please contact the CEC at sco@energy.ca.gov and reference Energy Compliance Survey #400-21-005.

Survey access issues? If you have any problems accessing the survey, please contact Anjelica Thang at CSE: anjelica.thang@energycenter.org.

Thank You!

Section 0: Demographics/Firmographics

1. [*Required question*]

Which of the following certification(s) or license(s) **do you currently** have? (Select all that

apply; your selections will help determine which questions we ask you)²⁸

(Please select only the current licenses you hold personally.)

- ☐ California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)
- ☐ CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer
- ☐ CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer
- ☐ CSLB license(s)
- ☐ I am not currently certified in any of the certifications listed above or do not hold a CSLB license [*Exclusive*]

2. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which of the following applies to you?

- I am in training, but am not yet certified or licensed
- I have not pursued certification nor a license
- I do not currently have a certification nor a license, but was certified/licensed in the past

3. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which kind(s) of work have you done in the **past 5 years** (January 2020 to present)?

(Select all that apply)

- ☐ General Contractor work
- ☐ HVAC and Mechanical systems work (Including refrigeration and sheet metal)
- ☐ Lighting and Electrical systems (Including elevator, signage, and solar)
- ☐ Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)
- ☐ California Home Energy Rating System (HERS) rater work
- ☐ Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)
- ☐ Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)
- ☐ None of the above [*Disqualified – Message shown: Unfortunately, you do not qualify for this survey at this time. You indicated that you have not done the following work within the past 5 years: General Contractor work, HVAC and Mechanical systems work (Including refrigeration and sheet metal, Lighting and Electrical systems work (Including elevator, signage, and solar, Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.), Certified lighting controls/mechanical acceptance test technician/employer work*]

²⁸ This is the phrasing of question 1 from the revised version distributed in January 2025. The first version of the survey distributed in November 2024 asked survey respondents to select from a long list of CSLB licenses as well as HERS Rater and ATT certification. The question was revised to encourage higher response rates and reduce the burden on the survey respondents.

(ATT/ATE), Certified Home Energy Rating System (HERS) rater work. We thank you for your time and appreciate your interest.]

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - **You have indicated that you have a California Home Energy Rating System (HERS) Rater Certification issued by CalCERTS or CHEERS. When responding to the survey questions, please answer from your perspective as a HERS rater.**
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - **You have indicated that you had a California Home Energy Rating System (HERS) Rater Certification issued by CalCERTS or CHEERS. When responding to the survey questions, please answer from your experience as a HERS rater.**

4. [*Required question; Question shown if response to Q1 OR Q3 includes HERS certification and no ATT/ATE certification*]

Which HERS Provider(s) have you received training from?

- CalCERTS
- CHEERS
- Both HERS Providers

5. [*Required question; Question shown if response to Q1 includes HERS certification and no ATT/ATE certification*]

Which of the following best describes your HERS certification status?

- I am only certified with CHEERS
- I was certified with CalCERTS and am currently certified with CHEERS
- I was only certified with CalCERTS and am transitioning to CHEERS
- I was only certified with CalCERTS and am **NOT** going to transition to CHEERS

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

6. [*Required question*]

What building type(s) have you conducted HERS testing on? (Select all that apply)

- ☐ Single-family homes (detached homes, townhomes, duplexes, or triplexes)
- ☐ Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)
- ☐ High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)

7. [*Required question*] Please indicate the type(s) of new construction, addition, or alteration/retrofit in which you have typically conducted HERS testing for. (Select all that apply)

(Each row must have a response, please select "Not applicable" if you do not conduct testing on a certain system/technology.)

Here we are referring to "additions" as any change to a building that increases conditioned floor area and conditioned volume, and "alterations/retrofits" as any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition; including changes to outdoor lighting system, signs, and covered processes such as an enclosed parking garage, data center, commercial refrigeration.)

	New construction (ground-up build)	Additions	Alterations/retrofits (including repairs and replacements)	Not applicable
Ducts				
Heating and cooling equipment				
Mechanical ventilation				
Building envelope				
Domestic hot water				
Other				

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]

- For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

8. [*Required question; Question shown if building type selection does not include high-rise multifamily buildings*]

Would you find it beneficial for your business to expand into HERS verification and testing of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)?

- Yes
- No
- It depends, please specify

9. [*Required question; Question shown if project types selected include additions or alterations*]

What percent of your projects required testing the following measures for additions and alterations/retrofits?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded.)

[*Note that each row will be displayed in the programmed version of the survey based on the HERS measures assessed.*]

	1-25% of HERS projects	26-50% of HERS projects	51-75% of HERS projects	76- 100% of HERS projects
Duct measures				
Heating and cooling equipment measures				
Mechanical ventilation measures				
Building envelope measures				
Domestic hot water measures				
Other				

10. [*Required question*]

For each of the following building types, what is the total number of projects that you expect to conduct HERS testing on [*currently certified*: in 2024 / *not currently certified*: in a typical year]?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

Single-family homes	[<i>Numeric response</i>]
---------------------	-----------------------------

Low-rise multifamily buildings	[<i>Numeric response</i>]
High-rise multifamily buildings	[<i>Numeric response</i>]

11. [*Required question*]

How do you most often define a single “project” or a “job” in your field of work?

(If you have multiple definitions, please use the response option “Other” to describe them for us.)

- Anytime you go to a job site
- A single permit application
- A multifamily building
- A floor of a multifamily building
- A residential unit (such as an apartment or single-family home)
- A whole building (hotel, motel, commercial, or industrial)
- A floor of a hotel, motel, commercial, or industrial building
- System maintenance, troubleshooting and repair (HVAC or electrical)
- New system(s) (such as an HVAC or electrical installation/upgrade)
- Building envelope replacement or upgrade (such as windows, roof, etc.)
- Other, please describe

12. [*Required question*]

On average, how many different contracting companies do you work with for HERS testing in a given year?

- I do not work with any contracting companies
- 1-4
- 5-9
- 10-24
- 25-50
- 51+
- Prefer not to answer



13.

[*Required question*]

[*Currently certified*: From January 2023 to present / *Not currently certified*: From January 2020 to present], which areas of California has your work taken place within? (Select all that apply)

(References of the regions can be seen in the image shown above.)

- ☐ Bay Area
- ☐ Central Coast
- ☐ Greater Central Valley
- ☐ Central & Eastern Sierras
- ☐ Imperial County
- ☐ Inland Empire including High Desert and Coachella Valley areas
- ☐ Los Angeles & Ventura Counties
- ☐ Orange County
- ☐ Redwood Coast
- ☐ Shasta & Cascades
- ☐ Greater Sacramento
- ☐ San Diego County

14. [*Required question*]

What proportion of the HERS testing you have conducted took place in each of the following areas of California?

(Your total must equal to 100%.)

[*Note that each row will be displayed in the programmed version of the survey based on the region selections in the prior question.*]

Bay Area	[<i>Numeric response</i>]
Central Coast	[<i>Numeric response</i>]
Greater Central Valley	[<i>Numeric response</i>]
Central & Eastern Sierras	[<i>Numeric response</i>]
Imperial County	[<i>Numeric response</i>]
Inland Empire including High Desert and Coachella Valley areas	[<i>Numeric response</i>]
Los Angeles & Ventura Counties	[<i>Numeric response</i>]
Orange County	[<i>Numeric response</i>]
Redwood Coast	[<i>Numeric response</i>]
Shasta & Cascades	[<i>Numeric response</i>]
Greater Sacramento	[<i>Numeric response</i>]
San Diego County	[<i>Numeric response</i>]

Section 1: HERS rater training on Energy Code compliance and process

Page Description:

In the next series of questions, we define “Energy Code compliance” as construction systems and/or elements that meet all the following criteria:

1. Design and/or specifications for the building, equipment, or system complies with the Energy Code requirements
 2. A permitted mechanical, electrical, plumbing, or building envelope system or other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools) authorized by a building department/authority having jurisdiction (AHJ)
 3. Building, equipment, and systems are installed in accordance with Title 24 standards and passes field verification or diagnostic testing (as applicable)
 4. Installation and operation meets efficiency standards defined in the Energy Code
15. Based on your experience and knowledge, what are the **top 3** aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)
- ☐ Find Energy Code requirements
 - ☐ Stay up-to-date with the Energy Code
 - ☐ Understand the purpose of the Energy Code
 - ☐ Design a project to meet Energy Code requirements
 - ☐ Obtain a permit
 - ☐ Install equipment/measures to meet the Energy Code requirements
 - ☐ Operate equipment to Energy Code standards
 - ☐ Document Energy Code compliance
 - ☐ Other, please specify
 - ☐ I am not sure [*Exclusive*]

Section 2: HERS rater involvement in Energy Code compliance

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

16. [*Question shown if project types selected include new construction or additions*]

Thinking about the new construction/addition projects where you were involved as a HERS rater, what percent of those projects included consultation at the following stages?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Partial construction mock-up (design phase) but before installation/implementation						
Before installation/implementation						
During installation/implementation						
After installation/implementation but before field verification and diagnostic testing						

Section 3: Challenges that affect comprehensive compliance with the Energy Code

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

17. [*Required question*]

In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with **are aware of the need** to comply with HERS testing requirements?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure

Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes)						
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)						
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)						
Contractors who work on single-family homes						
Contractors who work on low-rise multifamily buildings						
Contractors who work on high-rise multifamily buildings						

18. [*Required question*]

In your personal experience, which of the following typically impacts contractors' decision to apply for a permit? (Select all that apply)

- ☐ Project cost and profit margins (includes offering competitive pricing)
- ☐ Competition from contractors performing unpermitted work
- ☐ Deadlines and time pressures
- ☐ Customer pressures for unpermitted work
- ☐ Difficulty navigating permitting system
- ☐ Other, please specify
- ☐ I am not sure [*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

19. [*Required question*]

How often have you personally experienced issues with the following entities/individuals **not wanting to comply** with the Energy Code due to time pressures, expense, or other factors?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Never	1-25% of projects	26-50% of projects	51-75% of projects	76- 100% of projects	Unsure
Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes)						
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)						
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)						
Contractors who work on single-family homes						

Contractors who work on low-rise multifamily buildings						
Contractors who work on high-rise multifamily buildings						

20. [*Required question*]

Think about the contractors who work in your territory. Of the **addition or alteration/retrofit projects** (including repair and replacement) that are supposed to comply with the Energy Code, from your perspective, what percentage do you think are actually permitted?

- Contractors **never** pull permits for alterations/retrofits (including repair/replacement)
- 1-25% of projects are permitted
- 26-50% of projects are permitted
- 51-75% of projects are permitted
- 76-100% of projects are permitted
- Unsure
- Prefer not to answer

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

21. [*Required question*]

When you find a problem onsite that would cause a project to **not** meet Energy Code requirements, in what percentage of projects have you passed a HERS test after correction (without recording a fail) during the same testing visit instead of retesting at a later date? (*Reminder, survey responses are kept anonymous; the CEC will not know who responded.*)

- Never
- 1-25% of projects
- 26-50% of projects
- 51-75% of projects
- 76-100% of projects
- Prefer not to answer

22. [*Required question*]

In your opinion, what percentage of HERS raters and building department/AHJ inspectors skip some Energy Code compliance requirements during post-installation inspections?

	None	1-25%	26-50%	51-75%	76-100%	Unsure
HERS raters						
Building department/AHJ inspectors						

23. [*Required question*]

In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the HERS test forms?

- None
- 1-25%
- 26-50%
- 51-75%
- 76-100%
- Unsure

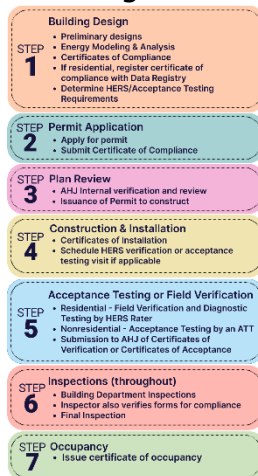
24. [*Required question; Question shown if response Q22 is not "None" for HERS raters*]

If a HERS rater falsifies a HERS test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)

- ☐ Company culture pressures
- ☐ Unable to record a fail in the HERS registry system and allow for corrections before submitting paperwork
- ☐ Not paid enough to cover the time required for testing, thus testing for the most important items only
- ☐ Building departments/AHJs do not validate the HERS testing results, so recording accurate test results does not matter
- ☐ CF2R is not likely filled out accurately
- ☐ Other, please describe
- ☐ Unsure [*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

25. [*Required question*]

The image below represents the current Energy Code compliance process.



Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)

- ☐ 1 - Building Design
- ☐ 2 - Permit Application
- ☐ 3 - Plan Review
- ☐ 4 - Construction & Installation
- ☐ 5 - Acceptance Testing or Field Verification
- ☐ 6 - Inspections (throughout)
- ☐ 7 - Occupancy
- ☐ No parts of the Energy Code compliance process are challenging to complete for contractors [*Exclusive*]
- ☐ Unsure [*Exclusive*]

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

26. [*Required question*]

What are the biggest challenges, if any, that HERS raters face while performing testing and verification in the field?

[*Open response*]

27. [*Required question*]

What additional support would you like to have from a HERS Provider? Please provide

specific examples.

[*Open response*]

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

28. [*Required question*]

Thinking about the HERS tests you conducted, in your experience as a HERS rater, what percentage of the projects have been affected by the following conditions to the extent that it impacted **the contractors'** ability to meet Energy Code requirements?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Not Applicable
Finding compliant equipment available for purchase							
Finding compliant equipment that meet clients' needs							
Difficulty finding qualified trade partners/skilled workers							
Difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls acceptance test technician (ATT) certification, NATE, etc.)							

Deadlines and cost/time pressures							
Pressure from the homeowner or building manager/owner							
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers)							
Energy Code is complicated to understand and difficult to comply with							
Energy Code is not enforced by building departments/AHJs (don't ask for forms)							
Building departments/AHJs do not review forms for accuracy/ completeness							

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

29. [*Required question*]

For each type of work below, in what percent of projects do you see compliance issues the first time you arrive on-site for verification?

[Note that each row will be displayed in the programmed version of the survey based on the HERS measures assessed.]

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects
Ducts					
Heating and cooling equipment					
Mechanical ventilation					
Building envelope					
Domestic hot water					
Other					

30. [Required question]

We have heard that HERS raters are sometimes pressured to pass projects that don't fully meet Energy Code requirements for various reasons. Thinking about the **building features** that you verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded.)

[Note that each row will be displayed in the programmed version of the survey based on the HERS measures assessed.]

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Duct measures						
Heating and cooling equipment measures						
Mechanical ventilation measures						
Building envelope measures						
Domestic hot water measures						
Other						

31. [*Required question*]

Thinking about **the projects** that you verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded.)

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Skip parts of the review due to lack of time						
Skip parts of the review due to contractor pressure						
Skip parts of the review due to pressure from your boss/colleague/company						
Testing results were close enough to warrant a pass						
Contractor asks you to "turn a blind eye" to pass a project that should not pass						
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass						

Section 4: Experience with HERS Provider Quality Assurance Audits

Page Description:

- Currently certified [*Description shown if response to Q1 includes HERS certification and no ATT/ATE certification*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 includes "California Home Energy Rating System (HERS) rater" and no ATT/ATE work*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

32. [*Required question*]

Have you been audited by a HERS Provider?

- Yes

- No
- Prefer not to answer

33. [*Required question; Question shown if response to Q32 is "Yes"*]

Have you failed an audit from a HERS Provider?

- Yes
- No
- Prefer not to answer

Section 5: How to improve Energy Code compliance

34. [*Required question*]

In response to a prior question, you selected the following aspects impact contractors' decision to submit Energy Code documentation when applying for permits:

[List the options selected; Note that the selected aspects from Q18 "In your personal experience, which of the following typically impacts contractors' decisions to apply for a permit to construct?" will be displayed following the question as a reference. The question will not be displayed if the respondent selected "I am not sure."]

What do you think could be done in these areas to reduce barriers and encourage contractors to submit accurate Energy Code documentation?

[Open response]

35. [*Required question*]

How effective do you believe the HERS program is at improving Energy Code compliance?

- Effective
- Somewhat effective
- Neither effective nor ineffective
- Somewhat ineffective
- Ineffective
- Unsure

36. [*Required question*]

In your opinion, how can HERS rater processes be improved to ensure better Energy Code compliance?

[Open response]

37. [*Required question*]

In your opinion, how can contractors be encouraged to ensure better Energy Code compliance?

[Open response]

Section 6: Additional comments/feedback

38. Please share any additional comments and thoughts about Energy Code compliance in the box below.

[Open response]

39. As a thank you for participating in the survey research, you will be entered in a drawing for a \$500 gift card. If you would like to be included in the drawing, please provide your first name, last name, and email address so that we may contact you if you were selected. Your name and email address are collected only for contacting you about the raffle. Your name and contact information will not be associated with your responses.

- First name
- Last name
- Email address

Thank You Page

Thank you very much for participating in this survey! Your feedback is greatly appreciated and will help inform the California Energy Commission (CEC) on how to improve the awareness of and compliance with the Energy Code.

This survey was administered by Arup and the Center for Sustainable Energy on behalf of the California Energy Commission.

Arup is an employee-owned global sustainable development consultancy bringing technology, imagination and rigor to shape a better world. Center for Sustainable Energy® (CSE) is a national nonprofit that accelerates adoption of clean transportation and distributed energy through effective and equitable program design and administration.

For information about the California Building Energy Efficiency Standards, visit <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards>.

For information about Arup, visit www.arup.com. For information about CSE, visit www.energycenter.org.

APPENDIX D:

ATT/ATE Survey Questions

This appendix includes the ATT/ATE survey instrument as of January 6, 2025. Survey questions that were updated in January from the original ATT/ATE survey distributed in November 2024 are denoted with a footnote.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. The survey logic information is listed inside square brackets as well as whether the question was required to be answered.

Survey Introduction

Welcome to the California Energy Code building permit and compliance practitioner survey administered by Arup and the Center for Sustainable Energy (CSE) on behalf of the California Energy Commission (CEC). This survey focuses on work you conducted in the past few years.

We know your time is valuable and we appreciate you sharing your thoughts with us. Results from the survey will inform the CEC on how to improve awareness of and compliance with the California Building Energy Efficiency Standards for residential and nonresidential buildings (Title 24, Part 6; also known as the Energy Code).

Your identity will remain confidential, and all reported results will be aggregated and anonymous, so we encourage you to be open and honest. **Neither your name nor your company name will be reported to the CEC.**

The survey is voluntary and will take about 20-25 minutes to complete. If needed, you will have the option to save your progress and return to the survey later via an email link. As a thank you, you have the option to be entered in a drawing for one \$500 gift card to Best Buy upon completing the survey. Your email address will **not** be tied to your responses, and only used for the purpose of contacting you if you win the raffle.

Questions? If you have any questions or concerns about this survey, please contact the CEC at sco@energy.ca.gov and reference Energy Compliance Survey #400-21-005.

Survey access issues? If you have any problems accessing the survey, please contact Anjelica Thang at CSE: anjelica.thang@energycenter.org.

Thank You!

Section 0: Demographics/Firmographics

1. [*Required question*]

Which of the following certification(s) or license(s) **do you currently** have? (Select all that

apply; your selections will help determine which questions we ask you)²⁹

(Please select only the current licenses you hold personally.)

- ☐ California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)
- ☐ CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer
- ☐ CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer
- ☐ CSLB license(s)
- ☐ I am not currently certified in any of the certifications listed above or do not hold a CSLB license [*Exclusive*]

2. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which of the following applies to you?

- I am in training, but am not yet certified or licensed
- I have not pursued certification nor a license
- I do not currently have a certification nor a license, but was certified/licensed in the past

3. [*Required question; Question shown if response to Q1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*]

Which kind(s) of work have you done in the **past 5 years** (January 2020 to present)?

(Select all that apply)

- ☐ General Contractor work
- ☐ HVAC and Mechanical systems work (Including refrigeration and sheet metal)
- ☐ Lighting and Electrical systems (Including elevator, signage, and solar)
- ☐ Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)
- ☐ California Home Energy Rating System (HERS) rater work
- ☐ Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)
- ☐ Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)
- ☐ None of the above [*Disqualified – Message shown: Unfortunately, you do not qualify for this survey at this time. You indicated that you have not done the following work within the past 5 years: General Contractor work, HVAC and Mechanical systems work (Including refrigeration and sheet metal, Lighting and Electrical systems work (Including elevator, signage, and solar, Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.), Certified lighting controls/mechanical acceptance test technician/employer work (ATT/ATE), Certified Home Energy Rating System (HERS) rater work. We thank you*]

²⁹ This is the phrasing of question 1 from the revised version distributed in January 2025. The first version of the survey distributed in November 2024 asked survey respondents to select from a long list of CSLB licenses as well as HERS Rater and ATT certification. The question was revised to encourage higher response rates and reduce the burden on the survey respondents.

for your time and appreciate your interest.]

4. [*Required question; Question shown if response to Q3 is CLCATT/E or CMATT/E*]

Which Acceptance Test Technician Certification Provider (ATTCP) were you certified with in the **past 5 years** (January 2020 to present)? (Select all that apply)

- ☐ National Lighting Contractors Association of America (NLCAA)
- ☐ California Advanced Lighting Controls Training Program (CALCTP)
- ☐ California State Pipe Trades Council (CSPTC)
- ☐ National Energy Management Institute Committee (NEMIC) (also referred to as The Testing, Adjusting, and Balancing Bureau (TABB))
- ☐ National Environmental Balancing Bureau (NEBB)
- ☐ Refrigeration Service Engineers Society (RSES)

5. [*Required question; Question shown if response to Q1 is CLCATT/E or CMATT/E*]

Which Acceptance Test Technician Certification Provider (ATTCP) are you **currently** certified with? (Select all that apply)

- ☐ National Lighting Contractors Association of America (NLCAA)
- ☐ California Advanced Lighting Controls Training Program (CALCTP)
- ☐ California State Pipe Trades Council (CSPTC)
- ☐ National Energy Management Institute Committee (NEMIC) (also referred to as The Testing, Adjusting, and Balancing Bureau (TABB))
- ☐ National Environmental Balancing Bureau (NEBB)
- ☐ Refrigeration Service Engineers Society (RSES)

6. [*Required question*]

Which of the following roles do you hold in your company?

- Acceptance test technician (ATT)
- Acceptance test employer/supervisor (ATE)
- I hold both roles

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]

- **You have indicated that you have an Acceptance Test Technician/Employer (ATT or ATE) Certification. When responding to the survey questions, please answer from your perspective as an ATT/ATE.**

For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).

- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]

- **You have indicated that you had an Acceptance Test Technician/Employer (ATT or ATE) Certification. When responding to the survey questions, please answer from your experience as an ATT/ATE.**

For the questions on this page, please respond based on the time period of

January 2020 to present (2019 and 2022 California Energy Code cycle).

7. [*Required question*]

What percentage of projects requiring at least one acceptance test were conducted as the following?

(Your total must equal 100%. If not applicable, please leave the option blank.)

A member of the project team (e.g., installing technician, other technician, commissioning agent)	[<i>Numeric response</i>]
A supervisor of the project team [<i>Row shown to ATE roles only</i>]	[<i>Numeric response</i>]
An ATT hired from outside of the project team	[<i>Numeric response</i>]

8. [*Required question*]

What building type(s) [*ATT*: have you / *ATE*: have you or ATTs reporting to you], conducted acceptance testing on? (Select all that apply)

- ☐ Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)
- ☐ High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)
- ☐ Hotels/motels
- ☐ Other nonresidential buildings

9. [*Required question*]

Please indicate the type(s) of new construction or addition projects [*ATT*: you / *ATE*: you or ATTs reporting to you] have typically conducted acceptance testing for.

Acceptance tests listed below include both those that are required by the ATTCP program and other acceptance tests you are asked to complete. You may select both required acceptance tests and other tasks you are asked to complete. (Select all that apply)

(Here we are referring to "additions" as any change to a building that increases conditioned floor area and conditioned volume. Each row must have a response, please select "Not applicable" if you do not conduct testing on a certain system/technology.)

[*Options "Indoor lighting controls" and "Outdoor lighting controls" shown if CLCATT/E is selected, all other options shown if CMATT/E is selected*]

	New construction (ground-up build)	Additions	Not applicable
Building envelope (fenestration thermal performance, envelope leakage blower door test)			

Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems)			
Outdoor lighting controls			
Simple HVAC replacements without duct alterations/retrofits			
New or altered duct systems			
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery)			
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD))			
Hydronic systems (including variable flow, temperature reset, and water chillers)			
Energy storage systems			
Mechanical Energy management control system (EMCS) (including automatic demand shed)			
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD)			

10. *[Required question]*

Which of the following types of **alterations/retrofits** (including repairs and replacements) [*ATT*: have you / *ATE*: have you or the ATTs reporting to you] conducted acceptance testing on? You may select both required acceptance tests and other tasks you are asked to complete. (Select all that apply)

(Here we are referring to "alterations/retrofits" as any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition; including changes to outdoor lighting systems, signs, and covered processes such as an enclosed parking garage, data center, commercial refrigeration.)

[Options "Indoor lighting controls" and "Outdoor lighting controls" shown if CLCATT/E is selected, all other options shown if CMATT/E is selected]

- ☐ Building envelope
- ☐ Indoor lighting controls
- ☐ Outdoor lighting controls
- ☐ Simple HVAC replacements without duct alterations/retrofits

- ☐ New or altered duct systems
- ☐ Outside air ventilation and exhaust controls
- ☐ HVAC equipment and fan controls
- ☐ Hydronic systems
- ☐ Energy storage systems
- ☐ Mechanical Energy management control system (EMCS)
- ☐ Covered Systems
- ☐ I do not conduct acceptance testing for alterations/retrofit projects [*Exclusive*]

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

If you do not currently work for a company in the building trades, please respond based on your most recent building trade related employer.

11. [*Required question*]

For each of the following building types, what is the estimated total number of projects requiring at least one acceptance test [*currently certified ATT*: that you expect to work on in 2024 / *currently certified ATE*: that you and the ATTs reporting to you expect to work on in 2024 / *not currently certified ATT*: that you to work on in a typical year / *not currently certified ATE*: that you and the ATTs reporting to you work on in a typical year] within California?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

- Nonresidential buildings [Drop-down menu]
- Hotels/motels [Drop-down menu]
- Low-rise multifamily buildings [Drop-down menu]
- High-rise multifamily buildings [Drop-down menu]

Drop-down menu options

- 0-20
- 21-50
- 51-100
- 101-500
- 501 or more

12. [*Required question*]

How do you most often define a single “project” or a “job” in your field of work?

(If you have multiple definitions, please use the response option "Other" to describe them for us.)

- Anytime you go to a job site
- A single permit application
- A multifamily building
- A floor of a multifamily building
- A residential unit (such as an apartment or single-family home)
- A whole building (hotel, motel, commercial, or industrial)
- A floor of a hotel, motel, commercial, or industrial building
- System maintenance, troubleshooting and repair (HVAC or electrical)
- New system(s) (such as an HVAC or electrical installation/upgrade)
- Building envelope replacement or upgrade (such as windows, roof, etc.)
- Other, please describe

13. [Required question]

Including yourself, how many people are currently employed **at your company** in California?

- 1-4
- 5-9
- 10-49
- 50-99
- 100+
- Unsure
- Prefer not to answer



14.

[Required question]

[Currently certified: From January 2023 to present / Not currently certified: From January 2020 to present], which areas of California has your work taken place within? (Select all that apply)

(References of the regions can be seen in the image shown above.)

- ☐ Bay Area
- ☐ Central Coast
- ☐ Greater Central Valley

- ☐ Central & Eastern Sierras
- ☐ Imperial County
- ☐ Inland Empire including High Desert and Coachella Valley areas
- ☐ Los Angeles & Ventura Counties
- ☐ Orange County
- ☐ Redwood Coast
- ☐ Shasta & Cascades
- ☐ Greater Sacramento
- ☐ San Diego County

15. *[Required question]*

What proportion of the acceptance testing [*ATT*: you / *ATE*: you and the ATTs reporting to you] have conducted took place in each of the following areas of California?

(Your total must equal to 100%.)

[Note that each row will be displayed in the programmed version of the survey based on the region selections in the prior question.]

Bay Area	<i>[Numeric response]</i>
Central Coast	<i>[Numeric response]</i>
Greater Central Valley	<i>[Numeric response]</i>
Central & Eastern Sierras	<i>[Numeric response]</i>
Imperial County	<i>[Numeric response]</i>
Inland Empire including High Desert and Coachella Valley areas	<i>[Numeric response]</i>
Los Angeles & Ventura Counties	<i>[Numeric response]</i>
Orange County	<i>[Numeric response]</i>
Redwood Coast	<i>[Numeric response]</i>
Shasta & Cascades	<i>[Numeric response]</i>
Greater Sacramento	<i>[Numeric response]</i>
San Diego County	<i>[Numeric response]</i>

Section 1: ATT training on Energy Code compliance and process

Page Description:

In the next series of questions, we define “Energy Code compliance” as construction systems and/or elements that meet all the following criteria:

1. Design and/or specifications for the building, equipment, or system complies with the Energy Code requirements

2. A permitted mechanical, electrical, plumbing, or building envelope system or other building trade related work (e.g., landscaping, refrigeration, sheet metal, solar, pools) authorized by a building department/authority having jurisdiction (AHJ)
3. Building, equipment, and systems are installed in accordance with Title 24 standards and passes field verification or diagnostic testing (as applicable)
4. Installation and operation meets efficiency standards defined in the Energy Code

16. Based on your experience and knowledge, what are the **top 3** aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)

- ☐ Find Energy Code requirements
- ☐ Stay up-to-date with the Energy Code
- ☐ Understand the purpose of the Energy Code
- ☐ Design a project to meet Energy Code requirements
- ☐ Obtain a permit
- ☐ Install equipment/measures to meet the Energy Code requirements
- ☐ Operate equipment to Energy Code standards
- ☐ Document Energy Code compliance
- ☐ Other, please specify
- ☐ I am not sure [*Exclusive*]

Section 2: ATT involvement in Energy Code compliance

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

17. [*Question shown if project types selected include new construction or additions*]

Thinking about the new construction/addition projects where you were involved as an ATT/ATE, what percent of those projects included consultation at the following stages?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects
Partial construction mock-up (design phase) but before installation/implementation					

Before installation/ implementation					
During installation/ implementation					

Section 3: Challenges that affect comprehensive compliance with the Energy Code

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

18. [*Required question*]

In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with **are aware of the need** to comply with acceptance test requirements?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)						
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)						
Owners/developers/managers of hotel/motel buildings						

Owners/developers/managers of nonresidential buildings						
Contractors who work on low-rise multifamily buildings						
Contractors who work on high-rise multifamily buildings						
Contractors who work on hotel/motel buildings						
Contractors who work on nonresidential buildings						

19. [*Required question*]

How often have you personally experienced issues with the following entities/individuals **not wanting to comply** with the Energy Code due to time pressures, expense, or other factors?

[*Note that each row will be displayed in the programmed version of the survey based on the building type selections.*]

	Never	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)							
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)							

Owners/developers /managers of hotel/motel buildings							
Owners/developers /managers of nonresidential buildings							
Contractors who work on low-rise multifamily buildings							
Contractors who work on high-rise multifamily buildings							
Contractors who work on hotel/motel buildings							
Contractors who work on nonresidential buildings							

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

20. [*Required question*]

In your personal experience, which of the following typically impacts contractors' decision to apply for a permit? (Select all that apply)

- ☐ Project cost and profit margins (includes offering competitive pricing)
- ☐ Competition from contractors performing unpermitted work
- ☐ Deadlines and time pressures
- ☐ Customer pressures for unpermitted work
- ☐ Difficulty navigating permitting system
- ☐ Other, please specify

- ☐ I am not sure [*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

21. [*Required question*]

Think about the contractors who work in your territory. Of the **addition or alteration/retrofit projects** (including repair and replacement) that are supposed to comply with the Energy Code, from your perspective, what percentage do you think are actually permitted?

- Contractors **never** pull permits for alterations/retrofits (including repair/replacement)
- 1-25% of projects are permitted
- 26-50% of projects are permitted
- 51-75% of projects are permitted
- 76-100% of projects are permitted
- Unsure
- Prefer not to answer

22. [*Required question*]

How often do you encounter projects during acceptance testing that do **not** meet Energy Code requirements and have issues that cannot be resolved with quick fixes during the same testing visit before submitting the Certificate of Acceptance forms?

(Remember, this survey is anonymous; the CEC will not know who responded.)

- Never
- 1-25% of projects
- 26-50% of projects
- 51-75% of projects
- 76-100% of projects
- Prefer not to answer

23. [*Required question*]

In your opinion, what percentage of ATTs and building department/AHJ inspectors skip some Energy Code compliance requirements during acceptance test?

	None	1-25%	26-50%	51-75%	76-100%	Unsure
ATTs						
Building department / AHJ inspectors						

24. [*Required question; Question shown if response Q23 is not "None" for ATTs*]

If an ATT falsifies an acceptance test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)

- ☐ Company culture pressures

- ☐ Unable to record a fail in the ATTCP form submission software system and allow for corrections before submitting paperwork
- ☐ Not paid enough to cover the time required for testing, thus testing for the most important items only
- ☐ Building departments/AHJs do not validate the ATT testing results, so recording accurate test results does not matter
- ☐ NRCC/NRCI is not likely filled out accurately
- ☐ Other, please describe
- ☐ Unsure [*Exclusive*]
- ☐ Prefer not to answer [*Exclusive*]

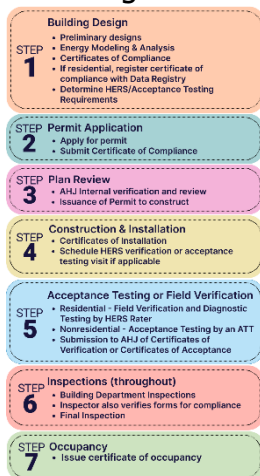
25. [*Required question*]

In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the acceptance test forms?

- None
- 1-25%
- 26-50%
- 51-75%
- 76-100%
- Unsure

26. [*Required question*]

The image below represents the current Energy Code compliance process.



- Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)

- ☐ 1 - Building Design
- ☐ 2 - Permit Application
- ☐ 3 - Plan Review
- ☐ 4 - Construction & Installation
- ☐ 5 - Acceptance Testing or Field Verification
- ☐ 6 - Inspections (throughout)
- ☐ 7 - Occupancy
- ☐ No parts of the Energy Code compliance process are challenging to complete for contractors [*Exclusive*]

☐ Unsure [*Exclusive*]

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

27. [*Required question*]

What are the biggest challenges, if any, that [*ATT: ATTs / ATE: ATEs and ATTs*] face while performing acceptance testing in the field?

[*Open response*]

28. [*Required question*]

What additional support would you like to have from an ATTCP? Please provide specific examples.

[*Open response*]

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

29. [*Required question*]

Thinking about the projects requiring at least one acceptance test that you conducted, in your experience as an ATT/ATE, what percentage of projects have been affected by the following conditions to the extent that it impacted **the contractors'** ability to meet Energy Code requirements?

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Not applicable
Finding compliant equipment available for purchase							

Finding compliant equipment that meet clients' needs							
Difficulty finding qualified trade partners/skilled workers							
Difficulty finding workers or subcontractors with specific certifications (e.g., Home Energy Rating System (HERS), mechanical or lighting controls ATT certification, NATE, etc.)							
Deadlines and cost/time pressures							
Pressure from the homeowner or building manager/owner							
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers)							
Energy Code is complicated to understand and difficult to comply with							

Energy Code is not enforced by building departments/AHJs (don't ask for forms)							
Building departments/AHJs do not review forms for accuracy/completeness							

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

30. [*Required question*]

For each type of work below, in what percent of projects do you see compliance issues the first time you arrive on site for testing?

[*Note that each row will be displayed in the programmed version of the survey based on the acceptance test measure selections. Options "Indoor lighting controls" and "Outdoor lighting controls" shown if CLCATT/E is selected, all other options shown if CMATT/E is selected*]

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Building envelope (fenestration thermal performance, envelope leakage blower door test)						
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems)						

Outdoor lighting controls						
Simple HVAC replacements without duct alterations/retrofits						
New or altered duct systems						
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery)						
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD))						
Hydronic systems (including variable flow, temperature reset, and water chillers)						
Energy storage systems						
Mechanical Energy management control system (EMCS) (including automatic demand shed)						
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD)						

31. *[Required question]*

We have heard that ATTs/ATEs are sometimes pressured to pass projects that don't fully meet Energy Code requirements for various reasons. Thinking about the **building features** that [*ATT: you / ATE: you* or ATTs reporting to you] verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

(Reminder, survey responses are kept anonymous; the CEC will not know who responded.)

[Note that each row will be displayed in the programmed version of the survey based on the ATT selections. Options "Indoor lighting controls" and "Outdoor lighting controls" shown if CLCATT/E is selected, all other options shown if CMATT/E is selected]

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Building envelope (fenestration thermal performance, envelope leakage blower door test)							
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems)							
Outdoor lighting controls							
Simple HVAC replacements without duct alterations/retrofits							
New or altered duct systems							
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery)							

HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD))							
Hydronic systems (including variable flow, temperature reset, and water chillers)							
Energy storage systems							
Mechanical Energy management control system (EMCS) (including automatic demand shed)							
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD)							

32. [*Required question*]

Thinking about **the projects** that [*ATT: you* / *ATE: you or ATTs reporting to you*] verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

(*Reminder, survey responses are kept anonymous; the CEC will not know who responded.*)

	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Skip parts of the review due to lack of time							

Skip parts of the review due to contractor pressure							
Skip parts of the review due to pressure from your boss/colleague/company							
Testing results were close enough to warrant a pass							
Contractor asks you to "turn a blind eye" to pass a project that should not pass							
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass							

Section 4: Experience with ATTCP Quality Assurance Audits

Page Description:

- Currently certified [*Description shown if response to Q1 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2023 to present** (2022 California Energy Code cycle).
- Not currently certified [*Description shown if response to Q3 is CLCATT/E or CMATT/E*]
 - For the questions on this page, please respond based on the time period of **January 2020 to present** (2019 and 2022 California Energy Code cycle).

33. [*Required question*]

Have you been audited by an ATTCP?

- Yes
- No
- Prefer not to answer

34. *[Required question; Question shown if response to Q33 is "Yes"]*

Have you failed an audit from an ATTCP?

- Yes
- No
- Prefer not to answer

Section 5: How to improve Energy Code compliance

35. *[Required question]*

In response to a prior question, you selected the following aspects impact contractors' decision to submit Energy Code documentation when applying for permits:

[List the options selected; Note that the selected aspects from Q20 "In your personal experience, which of the following typically impacts contractors' decisions to apply for a permit to construct?" will be displayed following the question as a reference. The question will not be displayed if the respondent selected "I am not sure".]

What do you think could be done in these areas to reduce barriers and encourage contractors to submit accurate Energy Code documentation?

[Open response]

36. *[Required question]*

How effective do you believe acceptance testing is at improving Energy Code compliance?

- Effective
- Somewhat effective
- Neither effective nor ineffective
- Somewhat ineffective
- Ineffective
- Unsure

37. *[Required question]*

In your opinion, how can acceptance testing processes be improved to ensure better Energy Code compliance? (Select all that apply)

- ☐ Require that ATTs be included as part of the design process for consultation
- ☐ Provide better tools for completing the ATT forms
- ☐ Train contractors to incorporate acceptance testing as part of the construction timeline to allow time for fixes
- ☐ Enforce the requirement for acceptance testing with contractors and building departments/AHJs
- ☐ Train building departments/AHJs on how to verify that they are receiving the correct forms, the correct number of forms, and the forms are completed accurately
- ☐ Other, please specify
- ☐ I am not sure *[Exclusive]*

38. *[Required question]*

In your opinion, how can **contractors be encouraged** to ensure better Energy Code

compliance?

[*Open response*]

Section 6: Additional comments/feedback

39. Please share any additional comments and thoughts about Energy Code compliance in the box below.

[*Open response*]

40. As a thank you for participating in the survey research, you will be entered in a drawing for a \$500 gift card. If you would like to be included in the drawing, please provide your first name, last name, and email address so that we may contact you if you were selected. Your name and email address are collected only for contacting you about the raffle. Your name and contact information will not be associated with your responses.

- First name
- Last name
- Email address

Thank You Page

Thank you very much for participating in this survey! Your feedback is greatly appreciated and will help inform the California Energy Commission (CEC) on how to improve the awareness of and compliance with the Energy Code.

This survey was administered by Arup and the Center for Sustainable Energy on behalf of the California Energy Commission.

Arup is an employee-owned global sustainable development consultancy bringing technology, imagination and rigor to shape a better world. Center for Sustainable Energy® (CSE) is a national nonprofit that accelerates adoption of clean transportation and distributed energy through effective and equitable program design and administration.

For information about the California Building Energy Efficiency Standards, visit <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards>.

For information about Arup, visit www.arup.com. For information about CSE, visit www.energycenter.org.

APPENDIX E:

Contractor Survey Data Tables and Summary of Open End Responses

This appendix includes tabular data and summaries of open-ended responses for each question asked on the contractor survey. The questions are organized under the same sections and in the same order as the survey instrument.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. As such, due to survey logic (i.e., the question was only asked to a subgroup of respondents), some questions have a fewer number of responses. For context on the survey logic implemented by question, please reference Appendix B.

Section 0: Demographics/Firmographics

C1: Which of the following certification(s) or license(s) do you currently have? (Select all that apply; your selections will help determine which questions we ask you)

NOTE: This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.

Certifications or Licenses	Number of Responses (n=324)
California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)	77
CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer	12
CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer	14
CSLB license(s)	254
I am not currently certified in any of the certifications listed above or do not hold a CSLB license	5

C2: Which of the following applies to you?*NOTES:*

- *This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- *Question shown if response to C1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
I am in training, but am not yet certified or licensed	0
I do not currently have a certification nor a license, but was certified/licensed in the past	2
I have not pursued certification nor a license	3

C3: Which kind(s) of work have you done in the past 5 years (January 2020 to present)? (Select all that apply)*NOTES:*

- *This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- *Question shown if response to C1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
General Contractor work	3
HVAC and Mechanical systems work (Including refrigeration and sheet metal)	2
Lighting and Electrical systems work (Including elevator, signage, and solar)	1
Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)	0
California Home Energy Rating System (HERS) rater work	3
Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)	0
Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)	1

C4: Which kind(s) of work are you currently working on and have a CSLB license for? (Select all that apply)

Response Options	Number of Responses (n=230)
General Contractor	109
HVAC and Mechanical systems (Including refrigeration and sheet metal)	82
Lighting and Electrical systems (Including elevator, signage, and solar)	62
Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)	88

C5: Which of the following roles do you hold in your company?

Response Options	I hold this role	I do not hold this role
Work as a field technician/equipment installer or field supervisor/superintendent (n=230)	170	60
Work as part of operations (executive management, operations/staff management, estimator, sales, etc.) (n=230)	212	18
Work as a project manager (n=230)	191	39
Own/co-own the company (n=230)	212	18
Hold the CSLB license for the company (responsible managing employee) (n=230)	189	41

C6: Including yourself, how many people are currently employed at your company in California?

Response Options	Number of Responses (n=230)
1-4	131
5-9	21
10-49	49
50-99	7

Response Options	Number of Responses (n=230)
100+	3
Unsure	3

C7: What is the estimated total number of projects your company will work on in [currently certified: 2024 / not currently certified: in a typical year] within California?

Response Options	Number of Responses (n=230)
1-10	70
11-20	42
21-50	35
51-100	32
101-500	27
501+	8
Unsure	7
Prefer not to answer	9

C8: How do you most often define a single “project” or a “job” in your field of work?

Response Options	Number of Responses (n=230)
Anytime you go to a job site	71
A single permit application	64
A multifamily building	0
A floor of a multifamily building	0
A residential unit (such as an apartment or single-family home)	29
A whole building (hotel, motel, commercial, or industrial)	6
A floor of a hotel, motel, commercial, or industrial building	2
System maintenance, troubleshooting and repair (HVAC or electrical)	14

Response Options	Number of Responses (n=230)
New system(s) (such as an HVAC or electrical installation/upgrade)	16
Building envelope replacement or upgrade (such as windows, roof, etc.)	8
Other, please describe	20

C9: What type(s) of properties has your company typically worked on? (Select all that apply)

Response Options	Number of Responses (n=230)
Single-family homes (detached homes, townhomes, duplexes, or triplexes)	176
Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)	51
High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)	22
Hotels/motels	27
Other nonresidential buildings	97

C10: Which of the following type(s) of projects has your company worked on? (Select all that apply)

Response Options	Number of Responses (n=230)
Ductwork	66
Heating, ventilation, and air conditioning (HVAC) equipment	94
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)	74
Indoor or outdoor lighting, or lighting controls	58
Building envelope	43
Water heating or general plumbing	67

Response Options	Number of Responses (n=230)
Solar ready, photovoltaic, or battery storage	48
Pools or spas	28
Powered outdoor signs	10
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)	21
General construction	91
Other, please specify	39

C11: Which of the following does your company work on? (Select all that apply)

Response Options	Number of Responses (n=230)
New construction (ground-up build)	138
Additions (any change to a building that increases conditioned floor area and conditioned volume)	130
Alterations/retrofits (including repairs and replacements)	199

C12: Which of the projects were new construction (ground-up build)? (Select all that apply)

Response Options	Number of Responses (n=138)
Ductwork	28
Heating, ventilation, and air conditioning (HVAC) equipment	41
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)	35
Indoor or outdoor lighting, or lighting controls	30
Building envelope	25
Water heating or general plumbing	29
Solar ready, photovoltaic, or battery storage	24

Response Options	Number of Responses (n=138)
Pools or spas	15
Powered outdoor signs	5
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)	10
General construction	57
Other	16

C13: Which of the projects were additions (any change to a building that increases conditioned floor area and conditioned volume)? (Select all that apply)

Response Options	Number of Responses (n=130)
Ductwork	34
Heating, ventilation, and air conditioning (HVAC) equipment	46
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)	37
Indoor or outdoor lighting, or lighting controls	30
Building envelope	27
Water heating or general plumbing	29
Solar ready, photovoltaic, or battery storage	22
Pools or spas	12
Powered outdoor signs	4
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)	9
General construction	53
Other	13

C14: Which of the projects were alterations/retrofits (including repairs and replacements)? (Select all that apply)

Response Options	Number of Responses (n=199)
Ductwork	54
Heating, ventilation, and air conditioning (HVAC) equipment	81
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls)	51
Indoor or outdoor lighting, or lighting controls	44
Building envelope	29
Water heating or general plumbing	55
Solar ready, photovoltaic, or battery storage	21
Pools or spas	19
Powered outdoor signs	3
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods)	17
General construction	66
Other	27

C15: [Currently certified: From January 2023 to present / Not currently certified: From January 2020 to present], which areas of California has your company's work taken place within? (Select all that apply)

Region	Number of Responses (n=230)
Bay Area	77
Central Coast	30
Greater Central Valley	36
Central & Eastern Sierras	13
Imperial County	5
Inland Empire including High Desert and Coachella Valley areas	46
Los Angeles & Ventura Counties	82

Region	Number of Responses (n=230)
Orange County	54
Redwood Coast	11
Shasta & Cascades	13
Greater Sacramento	38
San Diego County	38

C16: What proportion of your company's work has taken place in each of the following areas of California?

Region	0%^a	1-9%	10-99%	100%
Bay Area (n=77)	1	7	26	43
Central Coast (n=30)	1	11	8	10
Greater Central Valley (n=36)	0	5	20	11
Central & Eastern Sierras (n=13)	1	5	6	1
Imperial County (n=5)	0	2	2	1
Inland Empire including High Desert and Coachella Valley areas (n=46)	1	8	23	14
Los Angeles & Ventura Counties (n=82)	0	6	50	26
Orange County (n=54)	1	10	38	5
Redwood Coast (n=11)	0	7	1	3
Shasta & Cascades (n=13)	0	6	4	3
Greater Sacramento (n=38)	0	8	17	13
San Diego County (n=38)	1	16	11	10

^a Regions in this question were populated based on the selections to question C15. Some contractor respondents selected a region but entered 0% in response to question C16.

Section 1: Contractor training on Energy Code compliance and process

C17: Based on your experience and knowledge, what are the top 3 aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)

Response Options	Number of Responses (n=230)
Find Energy Code requirements	61
Stay up-to-date with the Energy Code	130
Understand the purpose of the Energy Code	48
Design a project to meet Energy Code requirements	66
Obtain a permit	61
Install equipment/measures to meet the Energy Code requirements	74
Operate equipment to Energy Code standards	11
Document Energy Code compliance	46
Other, please specify	11
I am not sure ^a	29

^a Exclusive response option. Respondents that selected this option were unable to select other options.

Section 2: Contractor awareness of Energy Code requirements

C18: What percentage of new construction/addition projects

[manager/owner/sales/operations: do you consult or hire / technician/installer: does your company interact with] an Acceptance Test Technician (ATT) during the following project stages?

NOTE: The table below shows the frequency of responses to this question. Please reference Figure 14 in the report to see the survey question results focused on respondents who work on Energy Code related projects (i.e., general contracting, HVAC and mechanical systems, and lighting and electrical systems) for high-rise multifamily and nonresidential buildings.

Project Stages	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Partial construction mock-up (design phase) but before installation/implementation (n=92)	62	15	3	1	8	3

Project Stages	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Before installation/ implementation (n=90)	62	12	4	1	8	3
During installation/ implementation (n=89)	60	12	3	4	7	3
After installation/ implementation but before final building department / AHJ inspection (n=91)	56	8	6	2	13	6

C19: What percentage of new construction/addition projects [manager/owner/sales/operations: do you consult or hire / technician/installer: does your company interact with] a Home Energy Rating System (HERS) rater during the following project stages?

NOTE: The table below shows the frequency of responses to this question. Please reference Figure 11 in the report to see the survey question results focused on respondents who work on Energy Code related projects (i.e., general contracting, HVAC and mechanical systems, and lighting and electrical systems) for single-family homes and low-rise multifamily buildings.

Project Stages	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Partial construction mock-up (design phase) but before installation/ implementation (n=123)	81	13	6	2	16	5
Before installation/ implementation (n=123)	75	16	4	1	19	8
During installation/ implementation (n=124)	73	13	7	4	20	7
After installation/ implementation but before final building department / AHJ inspection (n=132)	60	14	6	2	42	8

Section 3: Challenges that affect comprehensive compliance with the Energy Code

C20: What percentage of the following customer types you work with are aware of the need to comply with the Energy Code requirements?

Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes) (n=176)	46	42	15	15	45	13
Owners/developers/managers of low-rise multifamily buildings (3 stories or fewer excluding the underground parking garage) (n=51)	8	16	2	7	17	1
Owners/developers/managers of high-rise multifamily buildings (4 stories or more excluding the underground parking garage) (n=22)	1	7	3	3	8	0
Owners/developers/managers of hotel/motel buildings (n=27)	4	6	3	3	11	0
Owners/developers/managers of nonresidential buildings (n=97)	15	14	15	8	31	14

C21: Thinking about single-family or low-rise multifamily residential additions or alterations/retrofits: What percent of the following project types [manager/owner/sales/operations: do you / technician/installer: does your company] submit a permit application (or have a subcontractor submit a permit on your behalf) that includes Energy Code compliance documentation?

NOTE: Frequency table is divided into two parts for this question due to the number of columns associated with the question.

Part 1

Project Types	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type
Ductwork (n=45)	2	5	4	3

Project Types	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type
Heating, ventilation, and air conditioning (HVAC) equipment (n=65)	1	1	12	4
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls) (n=49)	1	4	8	4
Indoor or outdoor lighting, or lighting controls (n=40)	3	6	11	1
Building envelope (n=31)	2	5	3	1
Water heating or general plumbing (n=43)	0	5	10	2
Solar ready, photovoltaic, or battery storage (n=36)	0	0	3	0
Pools or spas (n=18)	0	1	5	2
Powered outdoor signs (n=5)	0	1	0	0
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods) (n=8)	2	1	2	0
General construction (n=64)	4	6	10	7
Other (n=21)	3	3	2	2

Part 2

Project Types	51-75% of project type	76-100% of project type	Unsure	Prefer not to answer
Ductwork (n=45)	5	21	4	1
Heating, ventilation, and air conditioning (HVAC) equipment (n=65)	3	34	8	2
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls) (n=49)	4	24	2	2

Project Types	51-75% of project type	76- 100% of project type	Unsure	Prefer not to answer
Indoor or outdoor lighting, or lighting controls (n=40)	2	14	1	2
Building envelope (n=31)	1	17	2	0
Water heating or general plumbing (n=43)	2	19	5	0
Solar ready, photovoltaic, or battery storage (n=36)	3	25	4	1
Pools or spas (n=18)	0	9	1	0
Powered outdoor signs (n=5)	1	2	0	1
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods) (n=8)	0	1	1	1
General construction (n=64)	5	24	5	3
Other (n=21)	2	5	3	1

C22: Thinking about nonresidential, hotel/motel, or high-rise multifamily alterations/retrofits: What percent of the following project types [manager/owner/sales/operations: do you / technician/installer: does your company] submit a permit application (or have a subcontractor submit a permit on your behalf) that includes Energy Code compliance documentation?

NOTE: Frequency table is divided into two parts for this question due to the number of columns associated with the question.

Part 1

Project Types	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type
Ductwork (n=21)	5	3	2	2
Heating, ventilation, and air conditioning (HVAC) equipment (n=36)	9	2	5	0

Project Types	Does not apply to building types	Never submit permit for this project type	1-25% of project type	26-50% of project type
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls) (n=28)	5	1	5	1
Indoor or outdoor lighting, or lighting controls (n=23)	1	2	4	2
Building envelope (n=14)	0	3	2	2
Water heating or general plumbing (n=30)	6	3	3	1
Solar ready, photovoltaic, or battery storage (n=19)	4	0	2	0
Pools or spas (n=9)	2	0	1	1
Powered outdoor signs (n=2)	0	0	0	0
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods) (n=15)	3	2	2	1
General construction (n=30)	2	6	3	1
Other (n=11)	4	2	0	1

Part 2

Project Types	51-75% of project type	76-100% of project type	Unsure	Prefer not to answer
Ductwork (n=21)	2	7	0	0
Heating, ventilation, and air conditioning (HVAC) equipment (n=36)	3	12	5	0
Electric power distribution system (e.g., electrical service metering, separation of electrical circuits, voltage drop, circuit controls, demand response controls) (n=28)	2	12	1	1

Project Types	51-75% of project type	76- 100% of project type	Unsure	Prefer not to answer
Indoor or outdoor lighting, or lighting controls (n=23)	3	9	0	2
Building envelope (n=14)	1	5	1	0
Water heating or general plumbing (n=30)	3	11	3	0
Solar ready, photovoltaic, or battery storage (n=19)	0	11	1	1
Pools or spas (n=9)	0	4	1	0
Powered outdoor signs (n=2)	0	1	0	1
Specialized installations (such as escalators, elevators, computer rooms, commercial kitchens, laboratories, or fume hoods) (n=15)	1	4	1	1
General construction (n=30)	1	13	3	1
Other (n=11)	0	1	3	0

C23: Which of the following typically impacts your company's decision to apply for a permit? (Select all that apply)

Response Options	Number of Responses (n=230)
Project cost and profit margins (includes offering competitive pricing)	41
Competition from contractors performing unpermitted work	33
Deadlines and time pressures	28
Customer pressures for unpermitted work	30
Difficulty navigating permitting system	35
Other, please specify	32
I typically apply for permits and none of these issues impact my decision ^a	110
Prefer not to answer ^a	13

^a Exclusive response option. Respondents that selected this option were unable to select other options.

C24: Do you offer customers who are homeowners/property owners the choice to complete the work without a permit?

Response Options	Number of Responses (n=183)
Always	9
Sometimes	30
Never	129
Prefer not to answer	15

C25: How often have you personally experienced issues with your company's customers not wanting to comply with the Energy Code due to time pressures, expense, or other factors?

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (detached homes, townhomes, duplexes, or triplexes) (n=176)	64	39	23	28	9	13
Owners/developers/managers of low-rise multifamily buildings (3 stories or fewer excluding the underground parking garage) (n=51)	26	12	2	4	3	4
Owners/developers/managers of high-rise multifamily buildings (4 stories or more excluding the underground parking garage) (n=22)	13	5	1	1	0	2
Owners/developers/managers of hotel/motel buildings (n=27)	15	4	1	2	3	2
Owners/developers/managers of nonresidential buildings (n=97)	38	14	12	9	13	11

C26: Think about the other contractors who work in your territory. From your perspective, what percentage of the addition or alteration/retrofit projects (including repair and replacement) do you think are actually permitted?

Response Options	Number of Responses (n=230)
Other contractors never pull permits for alterations/retrofits (including repair/replacement)	6
1-25% of projects are permitted	51
26-50% of projects are permitted	33
51-75% of projects are permitted	38
76-100% of projects are permitted	32
Unsure	68
Prefer not to answer	2

C27: Which part(s) of the Energy Code compliance process, if any, [manager/owner/sales/operations: do your technicians / technician/installer: do you personally] find challenging to complete? (Select all that apply)

Energy Code compliance steps	Number of Responses (n=230)
1 - Building Design	43
2 - Permit Application	61
3 - Plan Review	46
4 - Construction & Installation	36
5 - Acceptance Testing or Field Verification	47
6 - Inspections (throughout)	51
7 - Occupancy	12
No parts of the Energy Code compliance process are challenging to complete ^a	60
Not aware of the Energy Code compliance process ^a	30

^a Exclusive response option. Respondents that selected this option were unable to select other options.

C28: What percentage of HERS raters, ATTs, and inspectors do not enforce Energy Code compliance (do not complete/request forms) during post-installation inspections for your company's projects?

Response Options	HERS Raters (n=230)	ATTs (n=230)	Building department/AHJ Inspectors (n=230)
None	69	60	82
1-25%	16	18	11
26-50%	9	10	13
51-75%	3	2	6
76-100%	10	7	14
Unsure	80	80	72
Not applicable	43	53	32

C29: Thinking of the building departments/AHJs your company works with, what makes it easy or difficult to work with their code compliance systems?

Contractor respondent themes for ease of working with building departments/AHJ code compliance systems

Themes	Number of Mentions in Responses (n=45)
Clear communication and building departments/AHJs accessible for questions	15
System/forms/permits easy to access online	5
Easy-to-work-with inspectors	4
No Issues	11
Other	10

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Clear communication and building departments/AHJs accessible for questions (n=15)**
 - "Meeting with county to make sure we can provide what is needed"
 - "The specific professional person to answer and help"

- “Easy to contact and get information needed and HERS certificates and permits”
- “Good communication with the correct people makes it easier”
- “Clearly describing the narratives and requirements makes it easier”
- “Clear wording on compliance specifications”
- “When I pull permits for a particular city, the requirements are usually listed within the permit process”
- **System/forms/permits easy to access online (n=5)**
 - “Easily accessible via online”
 - “They finally just log into CHEERS and verify things so we don’t have to print out a book for them to throw away in the field”
- **Easy-to-work-with inspectors (n=4)**
 - “When the inspector is chill”
 - “Knowing the inspector personally makes it much easier”
 - “Disposition and a get ‘er done attitude”
 - “Attitude”

Contractor respondent themes for difficulty or circumstance of working with building department/AHJ code compliance systems

Themes	Number of Mentions in Responses (n=97)
Inspectors aren’t up to date with or don’t understand Energy Code	28
Increased time and costs associated with permitting and inspections	15
Inconsistency between building departments/AHJs	10
Inconsistency between inspectors	9
Difficult to get answers or support from building departments/AHJs	8
Difficulty navigating online permitting systems	2
Lack of online permitting	1
Other	24

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Inspectors aren't up to date with or don't understand Energy Code (n=28)**
 - Many contractors don't believe inspectors understand the Energy Code
 - "[AHJs] themselves do NOT understand the code requirements"
 - "The municipalities have no clue as to what the fed/state requirements are. We are constantly needing to educate them on the process."
 - Some say this lack of understanding is due to changes in the code
 - "Many times, due to the ever-changing codes, even inspectors are not aware of code updates. Changing the Energy Code every so often does not help the installers, inspectors, or certifiers. All this creates confusion."
 - Some think that a lack of field experience is to blame
 - "Very few [inspectors] have field experience or common sense. Most blindly follow the code until a lengthy appeal is made up the chain. It is an extremely slow and difficult process, and they have no liability whatsoever, but have complete control"
 - "It's difficult to work with administrators and inspectors with no background experience in the trades they oversee or inspect."
- **Increased time and costs associated with permitting and inspections (n=15)**
 - Several note that time is money that customers often don't have (n=3)
 - "It used to be easy most commercial TI's or like-for-like replacements were OTC with one or two quick inspections. Now a 5-Ton unit with a replacement cost of \$16,000 will have to add \$5,500 for fire, \$4,800 for engineering plus permit costs. It will take 4 months to get the permit, if the AC unit is down and the space is not safe to use because it's now 120 degrees in the office, they don't care. Then once you are done you will have 4 inspections, each requiring 8 hours to wait in a parking lot for an inspector. Even if the job is 100% to code, expect two failures and return inspections. The state of CA has now put on almost double the cost of the original 5-Ton unit. People just can't afford it, so they fix their 30-year-old energy hog unit because it's way cheaper to fix it then replace it."
 - Some feel AHJs don't respect project timelines and costs of delays (n=4)
 - "[AHJs] don't care about schedule or costs associated with delays of re-inspections"
 - "The building department takes too long to review plans and issue the permit. I will have all the energy documents all in order and it can be months for them to issue the permit. It makes the customer have issues on timelines of their projects."
 - "ALL building departments and environmental health departments consider my time as having NO value"
 - Some feel the time and costs of working with AHJs have no incentive or added benefit to the project (n=4)
 - "Everything from plan submittal to final is a complete waste of time and money - There is no 'added value' in getting permits, except compliance. No added protection. No discounted insurance. No one to point at for

approving plans. You just pay for a worthless 'partner' who adds nothing, except costs and time."

- "it's just costly and time consuming to jump through hoops yet all work is done to code. Not every client wants the county or city coming to their home, and they trust that the job is done right."
- "It's frustrating as the time an energy and money put into these programs feels like a waste, as they don't incentivize the consumer to want to participate."

- Scheduling difficulties (n=4)

- **Inconsistency between building departments/AHJs (n=10)**

- Forms and interpretations differ between jurisdictions (n=9)

- "We need a single UNIFORM permit application for all of California divided in no more than 4 categories. It is quite a challenge to navigate between hundreds of different formats each cities give."
- "Difficult to navigate requirements from jurisdiction to jurisdiction"
- "Inconsistency between different city interpretations of the code"

- AHJs handle HERS and ATT processes differently (n=1)

- "Building departments often request documents from HERS raters, but never from ATT's. AHJ's each handle the process differently. Some processes are simply too costly and time consuming to participate in. For a simple changeout of an HVAC component or system, there should be a simple statewide permit, and video appt for verification"

- **Inconsistency between inspectors (n=9)**

- Inspectors each have their own ways of inspecting (n=6)

- "Each inspector has their own way of inspecting. One inspector may not like me so I can't pass inspection the first time. [There is] job security for them if more inspections are needed"
- "Site inspector makes up his own rules, arbitrary enforcement of codes including Energy Code (usually no energy enforcement except for random arbitrary things"
- "One inspector is not consistent with another inspector. They often require things that aren't necessary for a particular job. Sometimes require changes that aren't needed and cost quite a bit."

- Some contractors blame inconsistencies on new inspectors (n=2)

- "Newly trained inspectors don't understand the rationale behind the code"

- One contractor noted that only a handful of inspectors are difficult (n=1)

- "It depends on the inspector. Most are helpful, some difficult"

- **Difficult to get answers or support from building departments/AHJs (n=8)**

- "What makes it difficult is that [AHJs] do not provide any guidance"

- "There's not clear and concise information on what to provide and when its applicable. It's difficult to find materials and forms to fill out, and when forms are available, they are hard to navigate."

- "Now that the plans are submitted electronically, it is extremely difficult to get ANY questions answered concerning plan check since they don't want you in their offices anymore."
- "The final clearances are time consuming especially with the building department having limited access."

- **Various opinions on online permitting (n=3)**

- While one contractor expressed a strong desire for more AHJs to switch to online permitting systems, two contractors noted that they experienced difficulty navigating online permitting systems they interacted with.

C30: What percentage of your company's projects have been affected by the following conditions to the extent that it impacted your company's ability to meet Energy Code requirements?

Conditions Impacted Contractor's Ability to Meet Energy Code Requirements (n=227)	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not Applicable
Finding compliant equipment available for purchase	75	45	25	17	15	21	29
Finding compliant equipment that meet clients' needs	72	44	29	18	14	19	31
Difficulty finding qualified trade partners/skilled workers	60	24	24	27	36	20	36
Difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls ATT certification, NATE, etc.)	62	19	24	18	30	27	47
Deadlines and cost/time pressures	48	42	24	21	30	23	39
Pressure from the homeowner or manager/owner	63	44	22	24	26	14	34
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers)	74	44	21	13	19	18	38

Conditions Impacted Contractor's Ability to Meet Energy Code Requirements (n=227)	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not Applicable
Energy Code is complicated to understand and difficult to comply with	57	34	31	14	34	27	30
Energy Code is not enforced by building departments/AHJs (don't ask for forms)	75	36	13	14	13	40	36
Building departments/AHJs do not review forms for accuracy/completeness	67	35	14	12	14	50	35

C31: What are the other conditions, if any, that affect your company's ability to build or install equipment in a way that meets Energy Code requirements?

Theme	Number of Mentions in Responses (n=223)
Code knowledge and interpretation issues	26
Equipment access issues	23
Cost issues	15
Coordination issues	14
Inspector issues	9
Other	9
None	67
Unsure	10
Unclear or Vague Response	7
N/A	51

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Code knowledge and interpretation issues (n=26)**
 - Code standard frustrations (n=11)
 - "Conflicts between adopted codes by other trades "
 - "title 24 requirement of ducts in conditioned space where the building design cannot accomplish that requirement"
 - "In Los Angeles the 100% electric and no gas is difficult. "
 - "Components installed do not have all required submittal documents such as economizer required documentation. Its my opinion all of these forms are too complicated and ask for too much. Modern systems are efficient, a good install and inspection should all that is required. I believe all of this paperwork is both expensive to do correctly and overwhelming to perform correctly."
 - Code knowledge issues (n=13)
 - Difficulty understanding code and code reasonings (n=7)
 - "Consistent understanding by all parties"
 - "Some codes are confusing or else"
 - "Code complexities, many of us do not understand how the code is written or applies to a building or installation, members of the energy commission and consultants should be smarter and think about simplifying it as field persons are not that sophisticated."
 - "I've been having trouble finding information on when certain Energy Code requirements are required. For example, do the ESS and car charger requirements apply for ADUs and home remodels or only for new construction. Really hard to find definitive information."
 - "Understanding the impact of Energy Code"
 - "Codes do not make sense on an engineering level for true energy efficiency, I feel code are implemented with true and logical performance, such as natural gas is much more energy efficient than electrical when used for all types of heating, also all electrical is overloading provider infrastructure causing rise in energy cost to consumers"
 - Difficulty understanding code changes and reasons for changes (n=6)
 - "Understand the new updated regulations"
 - "Keeping up with requirements"
 - "Too many changes without valid reasons. Elimination of natural gas and 100% electric Will never work efficiently on an ingrown spa."
 - "The continued changes we are faced with concerning utility, CEC, state, and federal mandated changes in regulation."
 - Design issues (n=2)

- “architects design to form over function which inhibits our installation clearances, and affects our code compliance”
 - “The plans do not always work with the on-site conditions.”
- **Equipment access issues (n=23)**
 - “An example: 4-pin florescent was mandatory, when LED was on the shelf, but CEC didn't allow for any thinking..... That was stupid, and now millions of fixtures are still 4-pin. CEC does the same thing with HVAC, devices, etc., etc.”
 - “Certain of Energy Code requirements at the end user level aren't convenient or functional and are often anecdotally replaced after final inspections.”
 - “Too many restrictions. Hard to find material and comply with Energy Codes that don't work”
 - “A lot of times suppliers don't have enough materials in stock
 - “Equipment are being bought in bulk by big company and has left us nothing or barely anything ”
 - “Hard to find the right equipment that meets everything.”
 - “Mainly just supply issues from time to time”
 - “Supply is the key to promotion and popularization, so it is essential to easily find energy products that meet the standards and have them in stock. Sometimes, the lead time is too long, and the owner will complain to us.”
 - “The appliances to meet the code requirements have long lead times. Water Heaters, HVAC units, Etc. Forced to install temporary units to pass final inspection and then move it to the next house for its final inspection. ”
 - “Timing of equipment - late delivery affects the Energy Code compliance indirectly”
 - “Ultra-low NOx products need to be re-evaluated.”
 - “Access to equipment”
 - “Demand for product is greater than supply. ”
 - “Availability of product”
 - “Equipment prices shortages customers not willing to pay for it”
 - “Expense and availability of approved products”
- **Cost issues (n=15)**
 - Cost impacts consumer willingness to comply with code
 - “Homeowners do not understand the complexity of today's code requirements. Even though they receive the long- and short-term benefits of compliance. The cost of investment makes them look elsewhere for non-permit pulling non-compliant contractors.”
 - “Energy codes have become more complex over time and sometimes add significant **cost** to projects. Clients are frustrated that they are no longer able to use products they have used for years.”
 - “Unrealistic standards. The new standards **cost** more and do less and do not last as long.”

- "It is expensive to comply with Energy Code Requirements."
- "Permits and compliance costs have gone through the roof making it unaffordable for most homeowners to comply. Not to mention the exorbitant property tax assessment that comes with the completion of the work. Most people would be happy to comply but can't afford the extortion-based fees and endless hoops to jump through required by the counties to comply."
- "Explaining to owners that they have to spend 2X on equipment and installation and will most likely not see a return on investment. Most of the time we just say "welcome to CA""
- **Coordination and Third-party Issues (n=14)**
 - Scheduling issues (n=10)
 - Third party testing coordination and cost (n=4)
 - "The only issue I see is when the plan check is given to a third party to complete. Each AHJ has their different focuses, and the third party generally asks for minutiae that the AHJ would not concern itself with, completely bogging down the process."
 - "Having to schedule a HERS test and a second day for inspection costs\$\$\$\$"
 - "Scheduling third party testing services"
 - "What I can say in this subject is that hiring additional testing agency to verify the insulation/ Equipment installation and performance of the equipment is additional cost and time to the project."
- **Inspector Issues (n=9)**
 - Inconsistency between inspectors (n=2)
 - "You people really need to get into the field more to see what is going on out here. The goal is to standardize the code but every single inspector we deal with has different criteria, so you get 50 different answers on what needs to be done to meet code."
 - "Building inspectors have no consistency from inspector to inspector and from property to property"
 - Inspectors don't know code (n=7)
 - "Fine if AHJs don't review forms, this makes it easier. When they do review forms, they don't know what they are looking at and they get stuck on things that are not actually issues, causing more problems for everyone. There is a wide spectrum of HVAC installers. I get the impression that most people don't know how HVAC works, don't know what Energy rules are, are not capable of testing their own work, and resist making corrections if a HERS Rater requires them. There are good HVAC installers to whom this list doesn't apply. I'm doing the HERS Rater training online through CHEERS and it's all about understanding how systems work, ETHICS, and understanding code. WHY IS THIS TRAINING NOT REQUIRED OF THE INSTALLERS THEMSELVES? Why create another layer of compliance on top of the bad installers?"

- "Bldg. & Safety and inspectors have different ideas of what the particular codes are"
- "Many inspectors do not know what the Energy Code is and isn't required. Many scenarios are not addressed on what is and is not to be compliant."
- "AHJ employees with basic understanding of how and when to apply CA Exist. Build. Code and realistic understanding of costs to comply, owner's needs, etc. It is 100% based on adherence to code, vs. overall improvement in building performance (incremental and realistic improvement)."
- "Ignorance and carelessness at the building department coupled with narrow minds and no accountability. They are incompetent and suffer no consequence, so they regularly screw up projects and are perfectly OK with that."

C32: As a percentage of projects, how often have you experienced issues complying with the Energy Code as pointed out by a building department/AHJ inspector, HERS rater, or ATT?

Percentage of Projects	HERS Raters (n=230)	ATTs (n=230)	Building Department/AHJs (n=230)
No projects	85	91	84
1-25% of projects	37	26	45
26-50% of projects	14	9	15
51-75% of projects	4	2	9
76-100% of projects	9	8	10
Not Applicable	50	57	40
Unsure	31	37	27

C33: If it is not feasible to get a permit for a project, which of the following measure(s) would your company take to ensure the work meets the standards for the California Building Code and the Energy Code? (Select all that apply)

Response Options	Number of Responses (n=117)
Purchase the same equipment/material as a code compliant permitted project	85
Install equipment in alignment with code requirements (but without permit and documentation)	60

Response Options	Number of Responses (n=117)
Test for what HERS raters/ATTs would do but test it with company staff	28
Be responsible for making sure design/build documents and installation comply with the Building Code and Energy Code standards	62
Other, please specify	13

Section 4: Contractor and HERS Rater/ATT interactions with Building Departments

C34: Prior to submitting a building permit application, on what percent of your projects do you or your company consult with the building department/AHJ about the following types of projects?

Percentage of Projects	New construction (n=129)	Additions (n=124)	Alterations/retrofits (including repairs and replacements) (n=182)
1-25% of projects	27	33	42
26-50% of projects	7	4	12
51-75% of projects	9	3	13
76-100% of projects	35	34	38
No projects	22	22	40
Not applicable	20	19	24
Unsure	9	9	13

C35: In your personal experience, in what percentage of the projects do the building departments/AHJs your company works with enforce the following?

Response Options	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable
Require a certificate of compliance (CF1R, LMCC, NRCC) form as part of Energy Code documentation with the permit application (n=214)	25	22	5	5	72	36	49

Response Options	Never	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable
Require the certificate of installation (CF2R, NRCI, LMCI) as part of review (n=214)	26	25	5	7	56	44	51
Enforce the use of the HERS program for code compliance, by reviewing the certificate of verification (CF3R, NRCV, LMCV) (n=212)	26	20	9	6	56	38	57
Enforce the use of the ATT program for lighting code compliance, by reviewing the certificate of acceptance (PSR, NRCA) (n=213)	31	23	7	6	30	46	70
Enforce the use of the ATT program for mechanical code compliance, by reviewing the certificate of acceptance (PSR, NRCA) (n=210)	27	22	4	5	41	48	63

Section 5: How to improve Energy Code compliance

C36: In response to a prior question, you selected the following aspects impact your company's decision to submit Energy Code documentation when applying for permits. What do you think could be done in these areas to reduce barriers and encourage accurate Energy Code documentation?

Themes	Number of Mentions in Responses (n=56)
Code education	17
Adjust permitting process	16
Adjust code	13
Enforcement	7
Other suggestions to reduce barriers and encourage accurate submission of accurate Energy Code documentation	3

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Code Education (n=17)**

- Contractor Education (n=11)
 - "Certify installing contractors so they are knowledgeable enough to provide the required documentation to local jurisdiction building inspectors finalizing the permitted project."
 - "Training - online in particular"
 - "Experience in the field"
- Homeowner/Customer Education (n=3)
 - "Let homeowners know how important it is to do projects with permission."
 - "Enforce more education about it to companies"
 - "Along with the rising costs of all building materials, upgrading to everything energy compliant can be prohibitive because of additional cost. If a project requires a permit to add these improvements the homeowner must be made aware that a licensed contractor is not allowed legally to take the project on without one."
- Inspector & Building Department/AHJ Education (n=3)
 - "Vet better people who are then held to better standards. Regular testing of building department workers. Penalties for mistakes and the ability to

fire bad people easily for incompetence. Only hire seasoned trades people who have passed tests for attitude.”

- “Getting building inspectors more educated with hand on training. Not just reading a book.”

- **Adjusting the permitting process (n=16)**

- “Make every area same rules”
- Simplify permitting (n=8)
 - “Make the process simple”
 - “Streamline the process so costs aren’t so high”
 - “Simplify the process of permit submission and city review”
 - “When you require 5 copies of 8 pages of forms that some of it is not even applicable it just gets ridiculous. I had 5 rooftop package units we replaced. The documentation literally was 15 inches high that I submitted to the inspector. I had to give it to him in a giant box. It should be a 1-page form, easy to fill out.”
 - “A helper supplied by the building department”
- Speed up permitting process (n=5)
 - “Faster turnaround from building dept.”
 - “Streamline permitting”
 - “Speed up the permitting process”
 - “Time is money and smaller companies can't afford the delays of test in and test out and permit hand holding... It slows the flow of business too much.”
 - “What I hear from other contractors getting permits on the city it's too complicated and takes a lot time to get approved. It's not my case because most of my job doesn't require permits. If I need to do a new construction, I definitely encourage my customer to get a permit to avoid any problem with the city inspectors.”
- Turn to online permitting (n=2)
 - “Consolidate paperwork into one app”
 - “The use of software for mechanical engineers when designing the project. Instead of a third-party individual submitting and prescribing the Title 24, I believe it should be done by the Mechanical Engineer who should understand this topic better.”

- **Adjusting the Energy Code (n=13)**

- Simplify code and code language (n=3)
 - “Establish a clear list or requirements (in order) for preparing for Energy Codes.”
 - “Issue technical information in a friendly language”
 - “Make the Energy Code more logical.”
- Adjust recommended products (n=2)

- "Work with manufacturers to give us the possible matchups and have a universal compliance, make up your mind so manufactures have time to comply"
- "Energy code must be supported with more product choices to help customers for final decisions"
- Adjust code requirements in certain conditions (n=3)
 - "Don't ask for architectural quality drawings from an HVAC installer."
 - "Apply code in a realistic manner on older buildings."
 - "Do Not have c20 HVAC equipment contractors complete c38 refrigeration equipment contractor service."
- Reduce or eliminate Energy Code (n=5)
 - "Make the codes based on energy rather than political/social guidance."
 - "Stop building an impregnable bureaucratic castle in the sky, requiring heroic and complicated paperwork. Do something about carbon pollution and global heating and do it now!"
 - "Eliminate this crap and stop trying to steal our money with your left-wing liberal agenda [expletive]!"
 - "The unnecessary compliance with the alleged global warming hoax ignores the reality that the planet naturally undergoes climate change by itself and that human efforts have minimal impact on this process."
 - "Too hard to do for designers because aspects change in the field. WUI, Energy Code, Building Code, Clean air, common sense all overlap- very difficult. AHJs should be allowed to error toward fire safety and indoor air quality-- we need outdoor air in CA and buildings are too tight and moisture issues are occurring ALL THE TIME and huge investments are rotting due to Energy Code requirements, this is a fact."
- **Code enforcement (n=7)**
 - Enforce contractor licenses and permits (n=5)
 - "Clamp down on unlicensed contractors"
 - "Have more control of unlicensed contractors"
 - "...Patrol on the weekends, those are the days people without permits usually do the work. I have reported people in the past working without permit and no one shows up"
 - "Reduce contractors without permits"
 - Enforcement through incentives (n=2)
 - "Offer incentives from insurance co., utilities, etc. for projects built to code. Stop adding more layers of people who want money."
 - "Provide some Rebate to promote upgrades"

C37: In your opinion, how can HERS raters' processes be improved to ensure better Energy Code compliance?

Themes	Number of Mentions in Responses (n=57)
Education	20
Code language and process simplification	10
Reducing scope of/doing away with HERS program	9
Improve HERS program	5
Reduce costs	4
Improving communications	4
Other suggestions	5

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Education (n=20)**

- AHJ education (n=4)
 - "Many building departments are not fully aware of all the required codes and regulations. As a result, they often request numerous forms and information that are unnecessary for obtaining permits. This leads to delays and complications in the permit acquisition process. The clerk and staff at the building department desk occasionally state they are unsure what the final inspector will require and will, as a safeguard, require additional forms and information."
 - "Train inspectors to advise and help uninformed contractors"
- Contractor education (n=10)
 - "Rules can be confusing"
 - "Send out emails when code changes"
- Customer education (n=2)
 - "Better education of customers to better understand benefits of HERS raters processes and what he bring."

- **Code language and process simplification (n=10)**

- Simplify code and code language (n=7)
 - "Ease off on new codes"
 - "Keep it simple. Use plain English when describing Energy Codes"
- Simplify permitting processes and online systems (n=3)

- “Make the process simpler and quicker”
 - “Simplify the process and the Title 24 requirements. Create more options in order to comply that are actually practical. The cost of construction is already too high. Specialized products that meet the Title 24 are driving up the cost. The uploading to the state website is terrible.”
 - “Make software simpler so layman could process our own requirements.”
- **Reducing scope of/doing away with HERS program (n=9)**
 - Program not needed (n=6)
 - “HERS it's just add more cost to owners and contractors”
 - “Common sense over the counter consulting from the city agencies rather the sending projects to 3rd party agencies.”
 - “If one follows the 2017 UBC Codes and local governing requirements, then the addition HERS would not exist. Again, an unnecessarily additional layer to construction to add fees!”
 - “Allow installing contractor to HERS rate his own work. But only after the company has a HERS certified tester. Plus any company that self tests would get random inspections/verifications for the first two years. That way they are accountable for their testing. If they fail more than 2 random inspection/verifications they should lose their HERS rating ability.”
- **Improving HERS program (n=5)**
 - “More testing staff and the contractor does all of the paperwork and rater's sign off. Let the building department inspectors sign off.”
 - “Have more [HERS Raters] available.”
 - “Have [HERS Raters] possess a minimum BS degree in physics.”
 - “Get [HERS Raters] involved in each project.”
- **Reducing costs (n=4)**
 - “Find a way to do it less expensively. Homeowners don't like to pay more than they have to.”
 - “lower rates” “too costly” “ease and cost”
- **Improving communications (n=4)**
 - “Good communication prior, during, and after with clear expectations and facilitation.”
 - “Prompt replies”
- **Other (n=5)**
 - “Increase penalty mechanism for violations”
 - “HERS are doing things right, it's the residential HVAC contractors who are terrible. If they could do work to code, we wouldn't need HERS. I'm not sure that the HERS layer is a solution to terrible residential HVAC contractors. It just moves the problems onto the HERS Rater”
 - Three respondents mentioned to reduce the number of unlicensed contractors.

C38: In your opinion, how can ATT inspection processes be improved to ensure better Energy Code compliance?

Theme	Number of Mentions in Responses (n=27)
ATT program improvements	10
Education	7
Simplification to compliance process	4
Enforcement of ATT inspections	3
Enhanced communication	2
Reduced costs	1

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **ATT program improvements (n=10)**

- Improve personnel (n=2)
 - "Require ATT inspectors have current field experience installing products. Not just recent experience or previous experience, but current experience."
- Make ATTs independent entities (n=1)
 - "This ATT thing is a dog that won't hunt. No contractor wants to hire their competitor to be a subcontractor on their job where they have exposure to their clients. When there whole motivation is to make other contractors look bad so they can steal the business."
- Improve access to ATTs by publishing a list of ATT authorized service providers (n=2)
- Simplify the program (n=3)
- Remove requirement for ATTs on small jobs and retrofits (n=1)
- Speed up field review (n=1)
- Replace the ATT program (n=1)
 - "Dump it and start over. The problem is they won't let the contractor that did the job test his own work. So you hire an outside company that is actually one of your competitors that their whole goal is to make you look bad so they can then try and take the account."

- **Education (n=7)**

- Provide education to contractors and AHJs (n=4)

- “Make the Energy Code simpler and provide more training for contractors, inspectors and others.”
 - “Hold ongoing open workshops that bring inspectors and contractors together in good spirits and sharing of knowledge and experience”
 - “Building department should understand the code first”
 - “Encourage Contractors to Document and follow all regulations, provide training for those lacking the understanding and importance of it.”
- Educate consumers on the need for the program (n=2)
 - “Focus on educating consumers and incentivizing these programs for the consumer.”
 - “Explain the need for [the ATT program] to the customer”
- Other general education (n=1)
- **Simplification to compliance process (n=4)**
 - One respondent noted they wanted to see ATTs “look for ways to say yes, not just wield the big fail sword.”
 - One respondent wanted fewer steps to the Energy Code including fewer regulations.
 - One respondent would like an adjustment of the code to appropriately apply to old buildings.
 - One respondent suggested Energy Code compliant equipment be exempt from inspections.
- **Enforcement of ATT inspections (n=3)**
 - Three contractors noted they wanted to see more enforcement of ATT inspections and general enforcement of the Energy Code.
 - Two noted they wanted to see AHJs enforce the ATT inspection requirement more while one wanted to see a enforcement on unlicensed contractors participating in the program.
- **Enhanced communication (n=2)**
 - “Good communication prior, during, and after with clear expectations and facilitation.”
 - One respondent wanted prompt replies from ATTs.
- **Reduced costs (n=1)**
 - One respondent noted that the ATT program could be improved by improving “ease and cost.”

C39: In your opinion, how can contractors be encouraged to ensure better Energy Code compliance?

Themes	Number of Mentions in Responses (n=121)
Education	44
Simplify the Energy Code	26
Enforcement through incentives	16
Enforcement through penalties	10
General enforcement	3
Equipment-related improvements	7
Simplify the permitting process	5
Lower costs	5
Other suggestions to encouraging contractors to ensure Energy Code compliance	5

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Education (n=44)**
 - Additional classes or information sessions for contractors (n=15)
 - "More free training for contractors"
 - "Training sessions on site by code educators"
 - "More classes to be aware"
 - Education on code impacts and purpose (n=5)
 - "Get people to study their trade theory and science and the reasons why the code got written the way it is. Contractors need to be reading books, diagrams, charts, and tables, and taking seminars and classes."
 - "Contractors need to know the importance of doing projects with the proper permit."
 - Require training for contractors (n=2)
 - "Quick training/test before and/or an attestation statement before the license they are working under is renewed."
 - Online training courses (n=2)
 - "Online training -CEU credit program"

- "Make education available online for CE courses from state not from third party charging for it"
- Training other parties on the Energy Code (n=2)
 - AHJs: "Maybe train the building department to know what they are looking at, so project doesn't get held up for months. All energy report and plan submitted, and the building department doesn't seem to know what needs to be done to submit the permit."
 - Homeowners: "Make sure homeowner know about the requirements and contractors cost to meet."
- Assist contractors with questions (n=2)
 - "Open offices for walk-ins, the process is becoming digitized which is difficult for the aging contractors."
 - "Supply a helper"
- Unique education ideas (n=2)
 - "Print hand-outs and display at contractor supply store"
 - "Make all new Energy Code requirements available on the plans. Maybe noting with a star that it is new."
- Other contractor education requests (n=14)
- **Code enforcement (n=29)**
 - General enforcement (n=3)
 - Enforcement through incentives (n=16)
 - General incentives needed (n=8)
 - Offer rebates for those who comply (n=6)
 - "Offer rebates to contractor and customer"
 - "Create incentives for contractors who comply with code, maybe provide rebate programs to motivate us and get a rebate for every project that we finish successfully, BUT AGAIN KEEP IT SIMPLE AND STRAIGHTFORWARD."
 - "Offer Rebates for investors. Right now, the occupant/renter reaps the benefit of getting a higher SEER rating. Not the owner of the property."
 - Other incentive ideas (n=2)
 - "Offer incentives from Insurance Co., Utilities, etc. for projects built to code. However, nobody but the CEC thinks there's value in these codes, which is why nobody buys in."
 - "Give incentives or credits toward taxes or something"
 - Enforcement through penalties (n=10)
 - "Risk to their license for not installing to manufacturer's instructions, for not meeting code, for not pulling permits"
 - "Penalize those who do not pull permits"
 - Enforce with fines (n=2)

- “Give contractors fines for those who don’t comply with Energy Code”
- Ensure contractors have a license (n=4)
 - “Strengthen the inspection of non-contractors and increase penalties for non-contractors”
 - “Look for non-licensed ‘contractors’ and enforce existing laws”
 - “There are a lot of unlicensed persons doing work in my particular field of roofing. The licensed roofer will comply if it is a requirement. The unlicensed persons will not particularly care if they comply.”
- **Simplify the Energy Code (n=26)**
 - Simplify code language (n=14)
 - “Make the code compliancy easier to understand. Send out notifications to contractors that changes in code are coming. Explain what the changes are and what needs to be done to become compliant.”
 - “Streamlined verbiage/sheets/checklists for compliance (more basic language where possible rather than technical)”
 - “Simple instructions on how to comply rather than hundreds of pages of legalese”
 - “Make sure the code is reasonable, understandable, and communicated to general public. Customers typically feels blindsided by requirements and aren't prepared for the costs that code compliance puts on them for both time and money.”
 - Slow down changes to Energy Code (n=3)
 - “Slow down on the code changes and extent of the code changes. Codes change and equipment changes so fast due to the code changes, you get systems being installed without proper training on installation that equipment. The sales engineers are selling equipment they haven't been trained on because the industry moved too fast to comply with the new Energy Codes.”
 - “Don't change the requirements so much. Requiring multiple outside inspections and testing adds too much cost for smaller projects and makes my job harder.”
 - Reduce regulations (n=3)
 - “Provide more flexible rules”
 - “Accept 49 state policies”
 - “Far too many regulations already in comparison to our peers throughout the country”
 - Additional substantive responses:
 - “Apply the code in a realistic manner for older buildings”
 - “Like a lot of things in California it needs to practice the Bill Clinton principle of KISS. Keep it simple, I will leave the last word out of it.”
- **Equipment-related improvements (n=7)**
 - Only sell compliant products (n=3)

- "If the supply were comprised only of compliant material that would help but, in all honesty, the current processes seem to work when the rules are followed."
 - "Work with manufacturers to give us the best possible matchups and have a universal compliance."
 - "The new equipment could be just as good or better than the old equipment. Which it is currently not."
 - "Keep material prices affordable"
 - "Permit required at point of purchase. Same for DIY stores direct to consumer."
- **Simplify the permitting process (n=5)**
 - Three contractor respondents noted they wanted shorter building department/AHJ timelines (n=1) or a general simplified permitting process (n=2). Two noted they wanted specific permits for HVAC system changeouts and refrigeration upgrades simplified.
- **Lower costs (n=5)**
 - Five contractor respondents noted they wanted lower costs and a more affordable process.
- **Other responses to encouraging contractors to ensure Energy Code compliance (n=5)**
 - "Allow solar to account more towards the Energy Codes. Not the 6-8 panel minimum. Then bring back NEM 2.0 so that solar is worth the cost. Create basic check off sheet for Title 24 calculations as a minimum using readily available products. Texas does this. "
 - "Encourage joint leak testing in contract."

Section 6: Additional comments/feedback

C40: Please share any additional comments and thoughts about Energy Code compliance in the box below.

- "1. Give automatic QII pass for using dense-pack insulation and passing a blower door (leakage set at 2021 IRC). No arbitrary and capricious 'checklist' QII inspections. No HERS verification required. The AHJ can collect the blower door results. 2. Eliminate CF2Rs completely. If the contractors do these at all (never), they are just self-certifying their work met code. Of course they will fake the entire form if necessary. Why would they not. This is a useless step. And anecdotally, most contractors have never completed a CF2R or even heard of one. The HERS rater ends up doing these to move the project along. So it's again a useless extra layer that adds cost and complexity but no value."
- "Although necessary, the simple fact that all regulation and permitting adds to the final cost of your project. In this state it is nearly impossible to build an affordable home."
- "As stated previously. IF the building inspectors and plans examiners have basic minimum checklists for the different types of new construction it would simplify the process. I am a design build contractor and I have to send off for title 24 calcs on every project and gamble on what they are going to add to the project cost to comply. I have

no idea on the budget until I put the project out to bid. That is too late in the game to find out we are over budget."

- "Can't speak for others but we are trying to improve dwellings to make them more efficient. You should provide Pass stickers out like we did for FAU replacement in the 90's once you approved 3 HERS and Permit approvals we could sign off ourselves 6 times before we had to have test and inspection again."
- "Communicate with all other divisions and their management to make sure the code will work before adopting things that conflict in either the planning process or installation process in the field. Leaving companies to argue with each other over which code is more important is not the way compliance should be."
- "Deadlines and Bureaucracy are challenging aspects of the world we live in. Energy Code is important but its doing a lot of damage also. Energy and emissions from transportation and transient transportation are HUGE in terms of energy and pollution."
- "Energy Code compliance print in multi language."
- "I applaud your interest in reducing the bureaucracy inherent with government oversight. Please develop a downloadable program that links to a phone, and you may get more compliance."
- "I honestly think things have gotten a little bit carried away Nothing is cut and dry creating more and more Energy Codes also takes a lot more time and money which has a result. Doesn't really have any benefit at the end of the day."
- "In the state of California, I believe there are more unlicensed contractors then there are Licensed contractors, and most homeowners and developers will use these type of contractors to save money"
- "It would be cool for the Board to have an online course or a Webinar on selling the benefits of getting permits and compliance with the Energy Code. Saying it's the law is not enough. We lose a lot of work because we will not engage in non-permitted work. Owners would rather take the risk than deal with the delays, expense and the unmotivated government employees."
- "It's important but it's hard -- things take a long time at AHJ desks to get anything done, the customer is always in a rush, and the customer is always tight with money and just wants the system 'fixed' or 'up and running' and don't seem to care much about energy impacts."
- "Many times we are doing remedial work for non-contractors. The market is flooded with non-contractors, and our business is being taken away. Customer needs cannot be met, specifications are violated, and there is a lot of cutting corners. And we contractors have to bear all kinds of costs. How can we compete in the market?"
- "The perception is that 90% of codes are developed with product/industry and code professionals in a back room..... Few active/field contractors have the time to be involved. ICC, etc. should make it easier and think about who their customers really are.... Hint...It's not the energy commission....ultimately it's owners and taxpayers and they are beginning to revolt (in the form of not wanting any permits)."
- "There are so many ways this could be improved way more than I can list here. But it all starts with making the process simple. If you have to spend more than 1 hour complying then it's too much. Look at it this way, in CA about 500,000 HVAC units are

replaced annually. Currently it takes about 6 hours of labor to comply. That is 3 million hours of labor lost just in compliance.”

- “Nothing will change except to make it tougher for legitimate contractors - As long as our state is overwhelmed with undercutting illegal alien non-licensed contractors our state will remain a [expletive].”

APPENDIX F:

HERS Rater Survey Data Tables and Summary of Open End Responses

This appendix includes tabular data and summaries of open-ended responses for each question asked on the HERS Rater survey. The questions are organized under the same sections and in the same order as the survey instrument.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. As such, due to survey logic (i.e., the question was only asked to a subgroup of respondents), some questions have a fewer number of responses. For context on the survey logic implemented by question, please reference Appendix C.

Section 0: Demographics/Firmographics

H1: Which of the following certification(s) or license(s) do you currently have? (Select all that apply; your selections will help determine which questions we ask you)

NOTE: This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.

Certifications or Licenses	Number of Responses (n=324)
California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)	77
CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer	12
CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer	14
CSLB license(s)	254
I am not currently certified in any of the certifications listed above or do not hold a CSLB license	5

H2: Which of the following applies to you?

NOTES:

- This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- Question shown if response to H1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
I am in training, but am not yet certified or licensed	0
I do not currently have a certification nor a license, but was certified/licensed in the past	2
I have not pursued certification nor a license	3

H3: Which kind(s) of work have you done in the past 5 years (January 2020 to present)? (Select all that apply)

NOTES:

- This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- Question shown if response to H1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
General Contractor work	3
HVAC and Mechanical systems work (Including refrigeration and sheet metal)	2
Lighting and Electrical systems work (Including elevator, signage, and solar)	1
Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)	0
California Home Energy Rating System (HERS) rater work	3
Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)	0
Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)	1

H4: Which HERS Provider(s) have you received training from?

Response Options	Number of Responses (n=71)
Both HERS Providers	41
CalCERTS	14
CHEERS	16

H5: Which of the following best describes your HERS certification status?

Response Options	Number of Responses (n=69)^a
I am only certified with CHEERS	14
I was certified with CalCERTS and am currently certified with CHEERS	50
I was only certified with CalCERTS and am NOT going to transition to CHEERS	2
I was only certified with CalCERTS and am transitioning to CHEERS	3

^a Two HERS rater respondents were not certified at the time of taking the survey and did not see this question due to programming logic.

H6: What building type(s) have you conducted HERS testing on? (Select all that apply)

Response Options	Number of Responses (n=71)
Single-family homes (detached homes, townhomes, duplexes, or triplexes)	71
Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)	38
High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)	17

H7: Please indicate the type(s) of new construction, addition, or alteration/retrofit in which you have typically conducted HERS testing for. (Select all that apply)

Type of Project Work	New construction (ground-up build)	Additions	Alterations/ retrofits (including repairs and replacements)	Not applicable
Ducts (n=69)	59	56	58	2
Heating and cooling equipment (n=69)	59	56	60	2
Mechanical ventilation (n=68)	59	48	44	3
Building envelope (n=58)	52	45	37	13
Domestic hot water (n=51)	47	38	32	20
Other (n=30)	29	23	22	41

H8: Would you find it beneficial for your business to expand into HERS verification and testing of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)?

Response Options	Number of Responses (n=54)
No	20
Yes	30
It depends, please specify	3
Unsure	1

H9: What percent of your projects required testing the following measures for additions and alterations/retrofits?

Type of Project Work	1-25% of HERS projects	26-50% of HERS projects	51-75% of HERS projects	76-100% of HERS projects
Duct measures (n=63)	6	11	10	36
Heating and cooling equipment measures (n=63)	7	7	11	38
Mechanical ventilation measures (n=55)	14	11	12	18

Type of Project Work	1-25% of HERS projects	26-50% of HERS projects	51-75% of HERS projects	76-100% of HERS projects
Building envelope measures (n=49)	18	15	9	7
Domestic hot water measures (n=40)	15	15	6	4
Other (n=24)	9	7	4	4

H10: For each of the following building types, what is the total number of projects that you expect to conduct HERS testing on [currently certified: in 2024 / not currently certified: in a typical year]?

Total number of projects	Single-family homes (n=71)	Low-rise multifamily buildings (n=38)	High-rise multifamily buildings (n=17)
0	5	6	6
1-9	8	9	6
10-19	9	6	1
20-49	6	5	2
50-99	7	3	2
100-199	15	4	0
200-499	12	4	0
500-999	4	1	0
1000+	5	0	0

H11: How do you most often define a single “project” or a “job” in your field of work?

Response Options	Number of Responses (n=71)
Anytime you go to a job site	24
A single permit application	31
A multifamily building	0
A floor of a multifamily building	0
A residential unit (such as an apartment or single-family home)	10

Response Options	Number of Responses (n=71)
A whole building (hotel, motel, commercial, or industrial)	1
A floor of a hotel, motel, commercial, or industrial building	0
System maintenance, troubleshooting and repair (HVAC or electrical)	0
New system(s) (such as an HVAC or electrical installation/upgrade)	3
Building envelope replacement or upgrade (such as windows, roof, etc.)	1
Other, please describe	1

H12: On average, how many different contracting companies do you work with for HERS testing in a given year?

Response Options	Number of Responses (n=71)
1-4	16
5-6	12
10-24	17
25-50	8
51+	8
I do not work with any contracting companies	6
Prefer not to answer	4

H13: Which areas of California has your work taken place within? (Select all that apply)

Response Options	Number of Responses (n=71)
Bay Area	27
Central Coast	9
Greater Central Valley	15
Central & Eastern Sierras	3

Response Options	Number of Responses (n=71)
Imperial County	3
Inland Empire including High Desert and Coachella Valley areas	18
Los Angeles & Ventura Counties	23
Orange County	20
Redwood Coast	7
Shasta & Cascades	3
Greater Sacramento	21
San Diego County	13

H14: What proportion of the HERS testing you have conducted took place in each of the following areas of California?

Regions	1-9%	10-99%	100%
Bay Area (n=27)	4	15	8
Central Coast (n=9)	3	4	2
Greater Central Valley (n=15)	2	10	3
Central & Eastern Sierras (n=3)	1	2	0
Imperial County (n=3)	3	0	0
Inland Empire including High Desert and Coachella Valley areas (n=18)	3	10	5
Los Angeles & Ventura Counties (n=23)	5	15	3
Orange County (n=20)	4	16	0
Redwood Coast (n=7)	3	2	2
Shasta & Cascades (n=3)	0	2	1
Greater Sacramento (n=21)	4	15	2
San Diego County (n=13)	6	4	3

Section 1: HERS rater training on Energy Code compliance and process

H15: Based on your experience and knowledge, what are the top 3 aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)

Response Options	Number of Responses (n=71)
Find Energy Code requirements	28
Stay up-to-date with the Energy Code	38
Understand the purpose of the Energy Code	21
Design a project to meet Energy Code requirements	18
Obtain a permit	8
Install equipment/measures to meet the Energy Code requirements	36
Operate equipment to Energy Code standards	3
Document Energy Code compliance	21
Other, please specify	12
I am not sure ^a	4

^a Exclusive response option. Respondents that selected this option were unable to select other options.

Section 2: HERS rater involvement in Energy Code compliance

H16: Thinking about the new construction/addition projects where you were involved as a HERS rater, what percent of those projects included consultation at the following stages?

Stages involved	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	No projects	Unsure
Partial construction mock-up (design phase) but before installation/implementation (n=61)	23	1	3	5	25	4

Stages involved	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	No projects	Unsure
Before installation/ implementation (n=62)	27	9	2	5	17	2
During installation/ implementation (n=61)	22	8	11	10	9	1
After installation/ implementation but before field verification and diagnostic testing (n=63)	10	6	10	26	10	1

H17: In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with are aware of the need to comply with HERS testing requirements?

HERS Rater Customer Types	Not aware	1- 25%	26- 50%	51- 75%	76- 100%	Unsure
Owners/developers/managers of single-family homes (n=71)	5	21	17	11	15	2
Owners/developers/managers of low- rise multifamily buildings (n=38)	3	10	7	4	11	3
Owners/developers/managers of high- rise multifamily buildings (n=17)	1	4	3	3	4	2
Contractors who work on single-family homes (n=71)	1	12	16	18	22	2
Contractors who work on low-rise multifamily buildings (n=38)	2	6	7	6	14	3
Contractors who work on high-rise multifamily buildings (n=17)	1	7	1	3	3	2

Section 3: Challenges that affect comprehensive compliance with the Energy Code

H18: In your personal experience, which of the following typically impacts contractors' decisions to apply for a permit to construct? (Select all that apply)

Response Options	Number of Responses (n=71)
Project cost and profit margins (includes offering competitive pricing)	46
Competition from contractors performing unpermitted work	40
Deadlines and time pressures	18
Customer pressures for unpermitted work	25
Difficulty navigating permitting system	29
Other, please specify	9
I am not sure ^a	7
Prefer not to answer ^a	1

^a Exclusive response option. Respondents that selected this option were unable to select other options.

H19: How often have you personally experienced issues with the following entities/individuals not wanting to comply with the Energy Code due to time pressures, expense, or other factors?

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of single-family homes (n=71)	13	22	13	11	7	5
Owners/developers/managers of low-rise multifamily buildings (n=38)	9	14	4	5	2	4
Owners/developers/managers of high-rise multifamily buildings (n=17)	4	6	2	2	1	2
Contractors who work on single-family homes (n=71)	9	24	14	10	8	6
Contractors who work on low-rise multifamily buildings (n=38)	11	8	7	4	3	5

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Contractors who work on high-rise multifamily buildings (n=17)	4	4	3	1	2	3

H20: Think about the contractors who work in your territory. Of the addition or alteration/retrofit projects (including repair and replacement) that are supposed to comply with the Energy Code, from your perspective, what percentage do you think are actually permitted?

Response Options	Number of Responses (n=71)
Contractors never pull permits for alterations/retrofits (including repair/replacement)	3
1-25% of projects are permitted	22
26-50% of projects are permitted	10
51-75% of projects are permitted	8
76-100% of projects are permitted	12
Unsure	16

H21: When you find a problem onsite that would cause a project to not meet Energy Code requirements, in what percentage of projects have you passed a HERS test after correction (without recording a fail) during the same testing visit instead of retesting at a later date?

Response Options	Number of Responses (n=71)
Never	16
1-25% of projects	22
26-50% of projects	7
51-75% of projects	7
76-100% of projects	14
Prefer not to answer	5

H22: In your opinion, what percentage of HERS raters and building department/AHJ inspectors skip some Energy Code compliance requirements during post-installation inspections?

Response Options	HERS Raters (n=71)	Building department/AHJ inspectors (n=71)
1-25%	21	17
26-50%	9	11
51-75%	17	12
76-100%	2	9
None	11	7
Unsure	11	15

H23: In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the HERS test forms?

Response Options	Number of Responses (n=71)
None	5
1-25%	16
26-50%	14
51-75%	14
76-100%	11
Unsure	11

H24: If a HERS rater falsifies a HERS test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)

Response Options	Number of Responses (n=71)
Company culture pressures	16
Unable to record a fail in the HERS registry system and allow for corrections before submitting paperwork	9

Response Options	Number of Responses (n=71)
Not paid enough to cover the time required for testing, thus testing for the most important items only	20
Building departments/AHJs do not validate the HERS testing results, so recording accurate test results does not matter	13
CF2R is not likely filled out accurately	9
Other, please describe	13
Unsure ^a	15
Prefer not to answer ^a	4

^a Exclusive response option. Respondents that selected this option were unable to select other options.

H25: Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)

Response Options	Number of Responses (n=71)
1 - Building Design	18
2 - Permit Application	16
3 - Plan Review	11
4 - Construction & Installation	31
5 - Acceptance Testing or Field Verification	28
6 - Inspections (throughout)	20
7 - Occupancy	0
No parts of the Energy Code compliance process are challenging to complete for contractors ^a	4
Unsure ^a	13

^a Exclusive response option. Respondents that selected this option were unable to select other options.

H26: What are the biggest challenges, if any, that HERS raters face while performing testing and verification in the field?

Theme	Number of Mentions in Responses (n=67)
Contractors overlook the significance of HERS rater involvement throughout the construction process	16
Equipment installation challenges impede testing	15
Knowledge gap surrounding HERS requirements and testing	14
Competition with other HERS Raters who pass systems without proper testing and those who bundle pulling permits and testing	12
Incomplete or incorrect completion of CFR forms	7
Competitive price market	6
Site limitations impede testing	6
Insufficient enforcement from building departments/AHJs	5
Other challenges	11

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Contractors overlook the significance of HERS Rater involvement throughout the construction process (n=16)**
 - Seven respondents mentioned that contractors involve HERS Raters too late in project stage.
 - “Finding the contractor has completed a major portion of the project without realizing testing or verification was required at an earlier stage. This happens more when QII is required.”
 - “HERS testing at the end of a project is counterproductive and cost prohibitive if/when problems are found.”
 - A couple of respondents include suggestions such as:
 - “We should be assigned [as part of the design process or change process]. And then required to stick with the project and [be] made aware of all changes so that we can mitigate changes that [can] destroy the plan after already installed components exist.”
 - “[...] reaching them beforehand to gain input for their selection options.”

- Six respondents mentioned there is poor coordination with scheduling HERS testing.
 - Three respondents mention timing coordination with other trades, with one sharing, "Timing before or after other trades. Examples: QII framing before insulation goes in; purchasing items before they may know if item is compliant i.e. range hoods."
- Five respondents mentioned contractors pressure HERS Raters to pass testing.
 - One shared that a HERS Rater may be contacted last minute for testing, "[...] to verify shoddy work and threatening various forms of financial/professional coercion if [a HERS Rater] should refuse to 'rubber-stamp' it."
 - One provided further detail on a reason for contractors to pass testing regardless of the outcome, stating, "Contractors don't want to pay for full set of HERS verifications listed on CF1R, because building departments that receive only duct leakage CF3R don't ask for the rest."
- Two respondents shared that contractors do not provide HERS Raters ample time for testing.
 - One shared that there are time pressures where, "Deadlines and rushed schedules can lead to insufficient time for thorough testing and verification."
- **Equipment installation challenges impede testing (n=15)**
 - Thirteen respondents identified equipment installation challenges impede testing.
 - Seven respondents noted that they encounter incorrect equipment installed and installation of non-compliant components prior to testing, with two specifying inconsistent field conditions as an issue.
 - "Many projects are not ready for testing due to incomplete installations or incorrect setups."
 - "The CF2R MCH-01 is rarely (never) completed before the HERS Rater arrives for testing and verification, and then the test requirements are not clear because the tests do not populate until the CF2R is completed. Sometimes, the consultant will deviate from the standard requirements, and it is not obvious on the CF1R."
 - Three respondents indicated there is a lack of follow-up between the energy analyst or consultant who designs the project and the contractor who installs the project.
 - "Because an Energy Analyst doesn't follow the project to ensure all correct energy items are installed, HVAC, Kit Hood, DHW, etc. that are installed many times do not meet the T24 and must be replaced, which is cost prohibitive."
 - "Equipment designed for a project is not available and different unit was installed but doesn't comply with AHRI. Energy consultants that produce Title 24 have NO IDEA how much BTUs can be produce on a heat pump system. Cap 47 and Cap 17 are routinely wrong and have to be corrected with a new Title 24."

- One respondent shared that contractors are not verifying their installation as installers, “[...] never pre-test their own work despite requirement that they do so.”
 - One respondent mentioned that they are unable to set up the equipment required for testing in residential homes for alterations.
- Two respondents indicated systems are not ready for testing.
 - One respondent shared that supply chain issues result in homes not being ready for HERS testing during their scheduled time.
 - One respondent mentioned that often times an engineer would design a system that “doesn't exist, or [is] not read[ily] available” and a HERS rater would be informed by the construction management to “do the best you can” to test the equipment.
- **Knowledge gap surrounding HERS requirements and testing (n=14)**
 - Eight respondents touched on the topic that the property owner and tenants are uninformed about HERS testing.
 - Five respondents mentioned that homeowners do not understand the HERS requirement or testing process.
 - “Homeowners/tenants being uninformed or under-informed of HERS protocols and difficult to contact prior to the appointment time.”
 - “Homeowners are not aware of this type of requirement, so it has become harder to find clients because contractors or installers use their own raters which defeats the purpose of a competitive market.”
 - “Lack of communication between the homeowner/property owner/manager and contractor about the existence of the HERS industry as a whole.”
 - Two respondents shared that customers are unaware of the HERS requirements and cost associated with verification.
 - “People are not aware a HERS test is required and they think we're just trying to charge extra money. I also occasionally have a hard time getting the responsible signer to create an account so it will be even harder now that you guys want to charge a monthly fee.”
 - One respondent mentioned the need for transparency between the homeowner, contractor, and HERS Rater.
 - Six respondents mentioned insufficient knowledge of HERS requirements and testing from builders and contractors.
 - One respondent specified on HVAC and insulation, stating there is a “Lack of basic knowledge in HVAC & insulation installation causing testing to fail.”
 - Four respondents noted that builders, contractors, and energy consultants do not completely understand or are aware of HERS testing or Energy Code requirements.

- “Contractors often do not fully understand Energy Code requirements, leading to improper installations that fail compliance testing.”
- “The complete lack of understanding by most energy consultants on the requirements they are asking for. i.e. ducts in conditioned space (which is rarely accomplished) or requiring Geothermal Heat Pumps without understanding the installation challenges for these types of measures. Also the lack of understanding by installers on when to call a HERS Rater and what the requirements for testing are.”
- “[...] HERS Raters are educators. HERS Raters are creating average trades installers into great installers.”
- One respondent noted that builders and homeowners conflate building department/AHJ inspections with HERS inspections or, “[...] trying to assert the fact of an AHJ inspection as 'superseding' the need for HERS inspection.”
- **Competition with other HERS Raters who pass systems without proper testing and those who bundle pulling permits and testing (n=12)**
 - Nine respondents mentioned competition with other HERS raters who pass systems without proper testing.
 - Four of the nine respondents noted they are competing with HERS Raters who pass HERS verifications without conducting the tests.
 - “Being undercut by “rubber-stampers.””
 - “Having other HERS Raters fill out documents without going to the jobsite. They make it so much easier for the contractors when you falsify documents.”
 - Five of the nine respondents shared there is the pressure from their employer to pass the HERS tests, and two of the five respondents noted potential conflict of interest with competing HERS Raters and contractors.
 - “Pressure to pass the project because other HERS [Rater] competitors will. So, we sometimes find it hard to keep a client for the long term.”
 - “As a HERS Rater who will not pass a job if there is a failure, I cannot compete with other raters who will pass jobs to keep their contractors happy.”
 - “Competition from the very large firms guaranteeing a pass the first time. Tough to compete against this.”
 - “Contractors hiring another HERS Rater that will pass the failed HERS process like QII for framing or insulation. Small and large HERS companies that will have their HERS Raters pass failed HERS steps and then hire another HERS rater after that HERS rater is suspended from CHEERS. These HERS companies will stay in business as it is a revolving door for their HERS raters. These HERS companies should be suspended along with their HERS raters.”
 - Three respondents mentioned concerns about losing a contractor customer.

- "Holding contractors accountable at the risk of losing them as a customer."
- "Contractor pressure to pass projects regardless of test results -- I'd be fired/not hired for next project if I'm not "cooperative"."
- "The duct leakage requirement (10% for existing ductwork) is too low. I have to fail at least [a number of] houses every day and it worries me that my contractors might find another HERS Rater. The 15% allowance was already a hard target to hit but 10% is almost impossible. Most customers in my area can't afford to replace ductwork. Maybe 12.5% would be a more acceptable target and work into 10% in the future."
- One respondent mentioned competition with other HERS Raters who bundle pulling permits and testing.
- **Incomplete or incorrect completion of CFR forms (n=7)**
 - Six respondents identified CF1Rs, CF2Rs completed incorrectly; CF2Rs not completed.
 - "Inaccurate, impossible, or nonsensical CF1R and/or unwillingness of CF1R 'mills' to fix them. I always hear, "I built it to plan," only to have to explain over and over that the "plan" and the "CF1R" are contradictory. [...] Refusal or inability of installers to complete CF2R forms, or to complete them accurately."
 - "Almost all installers have no idea how to fill out CF2Rs. By far that is my biggest issue."
 - "Incomplete information given and CF1R and CF2R's not being completed unless done by HERS Rater."
 - "Access to Accurate Documentation: Incomplete or inaccurate CF2Rs and project documentation make it difficult to verify compliance accurately."
 - One respondent mentioned form completion issues.
 - "Too much information/requirements is need to complete the HERS filing."
- **Competitive price market (n=6)**
 - Four respondents mentioned a competitive price market.
 - "HERS Raters are not supported enough by their companies. It's a volume game that is set low by price wars to get in with large scale builders. Builder[s] like low prices, and often overlook the quality of inspection, or services they are paying for. Higher price points will allow the inspectors better wages to take their time while on the job to "correctly" perform their job. Noting: There are hundreds of measures to be collected in CA. It takes time to cover them all. If you are rushed. You will only pursue big ticket items. Causing a disservice to everyone (Self, Builder, CEC, and of course, the Homeowner)."
 - "Price competition from "drive by Raters"."
 - Two respondents mentioned contractors not pulling permits.
- **Site limitations impede testing (n=6)**

- Four respondents mentioned inaccessible equipment location for verification and testing.
 - "Access to equipment or duct systems such as crawling under a house or in an attic."
 - "Getting access to supply and return air registers in houses with occupants (Rooms locked or blocked with storage)."
 - "Equipment and Accessibility Challenges: Limited access to specialized testing equipment or difficulties in testing certain systems due to site constraints (e.g., duct systems in hard-to-reach areas)."
- One respondent shared being able to perform HERS testing with temporary power.
- One respondent mentioned gathering information without the contractor present.
- **Insufficient enforcement from building departments/AHJs (n=5)**
 - "AHJs under-enforcing T24 compliance, causing confusion about what is and is not required and threatening our business' integrity."
 - "City inspectors are closing out permits without a HERS report. Contractors and HVAC installers are not requesting HERS reports unless the city inspector actually requests a HERS report."
 - "Failure of building department plan check to require proper CF1R."
 - "Push back to comply with the Energy Code by contractors, homeowners, builders and AHJ. [...] Even if a HERS test fails or install doesn't meet minimum requirements of the CF1R, the AHJ will pass it anyway. We have no authority to enforce the Energy Code."
- **Other challenges mentioned by 11 respondents include:**
 - Contractor unwillingness to adapt to Energy Code revisions (n=3)
 - "Unwillingness of long-time builders to adapt to new Energy Code features, especially the newfound prevalence of QII."
 - "Push back to comply with the Energy Code by contractors, homeowners, builders and AHJ."
 - Energy Code is not taken seriously or is outdated (n=3)
 - "Non-res/high-rise MF bldgs. Title 24 has no HERS measures listed in older codes, but has to have a HERS rater do inspections for above code programs."
 - Holding contractors accountable (n=2) as they "don't care."
 - Determining the cause of failed HERS tests (n=1).
 - HERS verification and testing on older residential homes (n=1).
 - Printing the amount of paper documents required (n=1), such as "[...] 410 pages for new construction and 36 for an HVAC change out."
 - Hard to find contractor clients and the need to "[...] pay a lot of money to purchase the tools for the testing" (n=1).

- Getting paid for the job (n=1) as the respondent shared, “If you are hired by the owner and the system fails, you cannot really charge the owner for a re-test, and usually, the installer is hostile towards you and will not pay you either.”

H27: What additional support would you like to have from a HERS Provider? Please provide specific examples.

Themes	Number of Mentions in Responses (n=56)
HERS Provider support on enforcing Energy Code compliance or working with entities to enforce compliance	14
Increase education and marketing about HERS requirements and testing	10
Offer additional training for building department/AHJ inspectors, HERS raters, and contractors	10
Provide real-time phone support or a support system for HERS Raters in the field	10
Improvements to the HERS registry	8
Offer quick and easy-to-understand resources on Energy Code compliance	8
Other aspects would like support from a HERS Provider	19

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **HERS Provider support on enforcing Energy Code compliance or working with entities to enforce compliance (n=14)**
 - Five respondents mentioned working with building departments/AHJs to require a HERS Rater to be assigned/contracted as part of plan approval and issuance of a permit.
 - “If you want a more impartial and honest system, maybe you should work on getting more contractors to pull permits and then assigning random HERS Raters as they do with building inspectors. The CEC says that 95% of HVAC change-outs are unpermitted. Shouldn't that be your starting point instead of making it more stringent for the < 5% who are actually complying.”
 - “[...] when a CF1R is issued they should be required to pick a HERS person to consult and then follow [the] project from day 1.”

- “The requirement to be officially assigned to a project when applying for permit (as a HERS rater or CEA), to ensure all parties are on board to meet the CF1R throughout the building process.”
 - “[...] there needs to be a concerted effort to notify the builder [that they] should meet with [their] HERS person before breaking ground when QII is required. A big red stamp on the plans or a signature required on a specific document pertaining to HERS.”
- Three respondents noted informing the building departments/AHJs to verify correct documentation of passing tests from a HERS Rater.
 - “Call the building departments, provide guidance that QII from a HERS Rater is needed. A[n] “installation certificate” from insulation contractor is not a QII.”
 - “Someone to make the contractors aware they have to follow the program”
- Two respondents mentioned providing HERS Raters a way to report un-permitted jobs or to cancel a HERS test report that was submitted inadvertently.
 - “Being able to cancel or pull a HERS report that should not have been provided to the contractor, city inspector, or homeowner.”
- Two respondents shared that they would like the HERS Provider to advocate for HERS Raters.
 - “If a failure happens then to be back by it.”
 - “Advocacy for Industry Improvements: Representation to communicate challenges faced by raters to policymakers or regulatory bodies.”
- **Increase education and marketing about HERS requirements and testing (n=10)**
 - Three respondents mentioned educating homeowners.
 - “Seek funding with CEC to create more marketing material that encourages homeowners to pull permits for projects. During these marketing campaigns discuss current “Fair Consumer Act” that protects consumers from products and services. Persuade homeowners and contractors to contact their local jurisdictions to see if and when a permit is required. Then talk about the benefits and differences from an efficiency standpoint.”
 - “HERS Provider's educating contractor's and homeowners about the testing being performed, why we do it, and situations HERS run into that calls for certain tests to be changed once's they arrive at the job.”
 - “Sending out information on how a test or verification should look like to a homeowner or building owner. I have heard owners say that the HERS rater simply did a “virtual duct test” to pass the CF3R MCH-20. I cannot compete with that.”
 - Five respondents mentioned educating or outreach to contractors.
 - “I think the CEC and CLSB need to work together to increase awareness and education for contractors. I think there should be an entire section on

HERS rating on the C20 test. or better yet, a certification similar to the 608 cert that must be presented when pulling a permit or buying equipment.”

- “Require contractors to read and understand the Title 24 pages in a plan set. QII is not always understood that inspections by local officials is not the same as QII before drywall goes in.”
- “Stressing to engineers that high efficiency isn't always to go, that there [are] better ways, example; many seem to want a 96% AFUE [Annual Fuel Utilization Efficiency] furnace and yet an 80% variable speed is better cost savings and higher EER [Energy Efficiency Ratio] and SEER [Seasonal Energy Efficiency Ratio] overall, coastal areas, desert areas, etc.”
- One respondent noted keeping building department/AHJ inspectors educated on Energy Code requirements.
- **Offer additional training for building department/AHJ inspectors, HERS raters, and contractors (n=10)**
 - “Explanation of forms, example questions and tutorials of how to perform tests and fill out forms.”
 - “[...] better training for contractors using the registry.”
 - “[...] to seek "better" compliance to given energy measures. [...] provide them with the tools to do so. Cheat Sheets, Improved Checklists, Trade Training Docs for Builder/Trades, Measure illustrations etc. Hand holding if you will, but with "Validation or Accountability oversight" included with these docs.”
 - “Require contractors to read and understand the Title 24 pages in a plan set. QII is not always understood that inspections by local officials is not the same as QII before drywall goes in.”
 - “Quality control; inspectors should receive additional training in house to make sure they know what they are doing.”
 - “Training and Educational Resources: Regular updates and workshops on changes to the Energy Code. More field-based training to handle complex or unusual scenarios.”
- **Provide real-time phone support or an improved support system for HERS Raters in the field (n=10)**
 - “A field support phone number where a knowledgeable person can always be contacted in real-time.”
 - “Better Communication Channels: Dedicated support lines or representatives to assist with real-time issues in the field. Timely updates on regulatory changes or new testing protocols.”
 - “CHEERS could use a somewhat more robust tech-support system since so often our clients' getting to final is being held up by technical difficulties or confusions with the CHEERS registry by those of us who have 'migrated' from being predominantly users of CalCERTS.”
 - “Feedback. Letting raters know what QA is testing, what QA is looking for, what means nothing. Letting us know the mistake rather than we just failed. We call

- support after trying to fix a problem and hear, they don't care about this item we wasted hours working on."
- "[...] more clarity and faster responses to specific questions or clarifications of the code."
 - "Immediate registry help online. CHEERS had no online help, I have waited weeks to get simple help."
 - "More technical support for filling out documents."
- **Improvements to the HERS registry (n=8)**
 - One respondent shared to allow HERS Raters to cancel a HERS test report that was submitted inadvertently.
 - Five respondents mentioned to improve and simplify forms to aid better completion.
 - "I would like Providers to make it easier to access the testing required for projects. [...] I would like to see a more user-friendly CF1R."
 - "Improved Registry Tools: Simplified and user-friendly HERS registry systems to streamline data entry and corrections. Faster system responses to reduce downtime during on-site work."
 - Three respondents mentioned to improve the record keeping process for HERS testing.
 - "More flexibility in generating some interim form or document to provide to the AHJ during various phases in new construction projects."
 - "Routine and meaningful on-site Quality Assurance reviews. Meaningful repercussions for companies employing HERS Raters who pass verifications that should be failed. Automated review of CF2Rs/CF3Rs to spot inconsistent info -- tonnage listed as different on different forms, impossible or unlikely test results. Flag those projects for on-site QA review."
 - "Standardized Reporting Templates: Templates for common compliance scenarios to ensure uniform documentation."
 - **Offer quick and easy-to-understand resources on Energy Code compliance (n=8)**
 - "A faster way to lookup climate code."
 - "Easier to find back-up documentation for code compliance for HERS measures. i.e., installer has to test at 100%, HERS rater does sampling."
 - "I would like to see more clarity and faster responses to specific questions or clarifications of the code. I would like to have an official document that I can present to installers, architects, homeowners, contractors, and energy consultants, listing the exact definition, interpretation, and requirements for specific measures that are easily accessible without having to wait for hours, days, or sometimes weeks for clarification."
 - "More documentation of measures to hand out to installer and builder. Easier read than the CEC codes."

- "To have T24 code cycle fact sheets available on the Provider's website. A breakdown of HERS measures and mandatory requirements handouts so we [can] send to our builders, installers and owners. Ex. QII handout, list of measures per zone."
- **Other aspects would like support from a HERS Provider (n=19)**
 - Four respondents mentioned receiving financial support through getting discounts on the purchase of testing tools or a pricing guide, with one adding receiving assistance in finding job opportunities for new HERS Raters.
 - "Access to Reliable Testing Equipment: Partnerships or discounts for purchasing high-quality, compliant testing tools."
 - Three respondents mentioned having a different way to get paid for conducting HERS testing to reduce conflict of interest or prevent contractors from hiring another HERS Rater who will pass their projects.
 - "Have HERS Raters paid by the state, so there is not any conflicts and reporting fails is not an issue for the HERS Rater."
 - "When an installation does not comply, contractors simply hire another HERS Rater to execute the CF3R. That undermines those of us who try to follow the law--we don't get paid for our time. It would be nice to have a report process that does not further victimize honest raters."
 - "Additional resources and tools for contractors that don't pay a HERS rater when a project fails and instead hires a different HERS rater or HERS company for the completion of the project."
 - Two respondents would like to see additional HERS Providers in addition to CHEERS as "having one HERS Provider is a monopoly."
 - Two respondents would like to see feedback on the reasons for failed tests.
 - "When performing a QA it would be better if [the HERS system] can explain why they failed the project. We can't learn if we don't know why they are failing us."
 - Two respondents would like to see "Better enforcement of the HERS requirements on the HERS Raters" to create "an even playing field for raters."
- **Other responses with one respondent each were:**
 - "Push for contractors to fulfill their end of the things (CFR's, third party verification, and universal registry of contractors who fail to pay)."
 - "Streamline the process starting from the building department to the homeowner. I believe they should be given a platform to utilize to search for raters without other parties being involved."
 - "Someone in quality control who has experience in the HVAC field. Not someone that talks down to us like we are children. Most of us come from HVAC industry. [...] Quality control; inspectors should receive additional training in house to make sure they know what they are doing."
 - "Don't charge the contractor or responsible signer an \$8 monthly fee, it is easier if you charge us the fee and for us to just quote a price accordingly."
 - "No last-minute closing of a registry, i.e. CalCERTS."

- “Work with CSLB, equipment manufacturers and local building departments to increase the permit rate.”

H28: Thinking about the HERS tests you conducted, in your experience as a HERS rater, what percentage of the projects have been affected by the following conditions to the extent that it impacted the contractors’ ability to meet Energy Code requirements?

NOTE: Frequency table is divided into two parts for this question due to the number of columns associated with the question.

Part 1

Conditions impacting code compliance	No projects	1-25% of projects	26-50% of projects	51-75% of projects
Finding compliant equipment available for purchase (n=71)	20	20	10	8
Finding compliant equipment that meet clients' needs (n=71)	19	20	13	6
Difficulty finding qualified or skilled workers (n=71)	8	20	11	11
Difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls acceptance test technician (ATT) certification, NATE, etc.) (n=71)	9	18	10	7
Deadlines and cost/time pressures (n=71)	7	21	11	10
Pressure from the homeowner or building manager/owner (n=71)	8	22	13	11
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers) (n=71)	15	23	6	5
Energy Code is complicated to understand and difficult to comply with (n=71)	8	19	18	11
Energy Code is not enforced by building departments/AHJs (don't ask for forms) (n=71)	9	16	15	10
Building departments/AHJs do not review forms for accuracy/completeness (n=71)	10	14	12	11

Part 2

Conditions impacting code compliance	76-100% of projects	Not Applicable	Unsure
Finding compliant equipment available for purchase (n=71)	2	4	7
Finding compliant equipment that meet clients' needs (n=71)	2	4	7
Difficulty finding qualified or skilled workers (n=71)	7	5	9
Difficulty finding workers or subcontractors with specific certifications (e.g., HERS, mechanical or lighting controls acceptance test technician (ATT) certification, NATE, etc.) (n=71)	8	5	14
Deadlines and cost/time pressures (n=71)	7	4	11
Pressure from the homeowner or building manager/owner (n=71)	6	4	7
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers) (n=71)	3	6	13
Energy Code is complicated to understand and difficult to comply with (n=71)	7	3	5
Energy Code is not enforced by building departments/AHJs (don't ask for forms) (n=71)	8	4	9
Building departments/AHJs do not review forms for accuracy/completeness (n=71)	8	4	12

H29: For each type of work below, in what percent of projects do you see compliance issues the first time you arrive on-site for verification?

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects
Ducts (n=69)	8	26	18	12	5
Heating and cooling equipment (n=69)	9	39	7	7	7
Mechanical ventilation (n=68)	12	31	13	7	5

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects
Building envelope (n=59)	8	21	13	9	8
Domestic hot water (n=52)	15	27	5	0	5
Other (n=32)	15	10	2	1	4

H30: We have heard that HERS raters are sometimes pressured to pass projects that don't fully meet Energy Code requirements for various reasons. Thinking about the building features that you verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

Type of Work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Duct measures (n=69)	18	28	10	3	6	4
Heating and cooling equipment measures (n=69)	25	22	10	6	2	4
Mechanical ventilation measures (n=68)	23	26	9	3	3	4
Building envelope measures (n=59)	20	18	8	5	5	3
Domestic hot water measures (n=52)	26	18	5	0	1	2
Other (n=32)	17	7	1	2	2	3

H31: Thinking about the projects that you verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

Pressures to pass projects	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Skip parts of the review due to lack of time (n=71)	43	18	4	1	1	4

Pressures to pass projects	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Prefer not to answer
Skip parts of the review due to contractor pressure (n=71)	35	22	7	1	1	5
Skip parts of the review due to pressure from your boss/colleague/company (n=71)	50	13	2	0	1	5
Testing results were close enough to warrant a pass (n=71)	25	26	9	3	2	6
Contractor asks you to "turn a blind eye" to pass a project that should not pass (n=71)	31	21	7	4	1	7
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass (n=71)	50	11	3	0	2	5

Section 4: Experience with HERS Provider Quality Assurance Audits

H32: Have you been audited by a HERS Provider?

Response Options	Number of Responses (n=71)
Yes	46
No	19
Prefer not to answer	6

H33: Have you failed an audit from a HERS Provider?

Response Options	Number of Responses (n=46)
Yes	14
No	30
Prefer not to answer	2

Section 5: How to improve Energy Code compliance

H34: In response to a prior question, you selected the following aspects impact contractors' decision to submit Energy Code documentation when applying for permits. What do you think could be done in these areas to reduce barriers and encourage contractors to submit accurate Energy Code documentation?

Themes	Number of Mentions in Responses (n=54)
Education on HERS requirements and testing	19
Simplify and streamline the Energy Code compliance portion of the permitting process	14
Proactive support from the building department/AHJ and proper enforcement, applying penalties where needed	13
Engage HERS raters throughout the construction process	8
Revisions to the CSLB licensing process	4
Other suggestions to reduce barriers and encourage accurate submission of accurate Energy Code documentation	11

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Education on HERS requirements and testing (n=19)**

- Eighteen respondents shared that contractors should be more informed and educated about the HERS requirements and testing process, which includes scheduling and evolving testing procedures when Energy Code requirements change.

- “[...] would like to see more communication from Title 24 companies/designers about the measures with builder and homeowner.”

- “Better transparency for contractors to understand how to meet the code requirements instead of slap stick installs.”
- “Contractors need to be educated on when they should engage with a HERS rater. They have always relied on their HVAC installer to bring in a HERS rater at the end of the project when it's too late.”
- “Offer regular workshops or webinars for contractors on Energy Code requirements and documentation processes. Develop short instructional videos or visual guides tailored to common compliance challenges.”
- “Education on the Code, what it is [contractors] actually need to do to get these homes to pass. Educating homeowners on what it would take to get their home to pass. Understanding the different testing procedures and why the tests sometimes can change from one code to another because of certain situations. My whole thing is transparency. If a permit gets pulled for a job. Telling the truth to people, contractors telling the homeowner and HERS Rater one thing. But turns out it wasn't the case, then the contractor being upset with the HERS rater and the homeowner upset with the contractor.”
- “Information upon purchase of equipment or materials.”
- “Scare the contractors and homeowners with facts of how lawsuits have been won and the declined insurance claims from damage cause by un-permitted and or un-licensed contractors.”
- “Similar to distributor and manufacturing visits. Could have Providers visit, meet, and educate contractors on measures. Registry of contractor relations and history of competence.”
- Five respondents mentioned they would like to see more communication about HERS requirements and testing with the property owner or homeowner, so they are informed on how to pass a HERS test.
- Two respondents shared that “Title 24 companies and designers” should communicate the Energy Code details to the contractor and homeowner.
 - “Contractors do NOT understand how to read or understand Title 24 docs. Architects and Title 24 companies know that contractors don't understand the Title 24 docs and will assume that contractors do understand. Architects and Title 24 companies will add unnecessary efficiency until their software program is sufficient enough to complete. Higher EER [Energy Efficiency Ratio], SEER [Seasonal Energy Efficiency Ratio], and refrigerant charge verification, is added into projects that do not actually need them, especially in Bay Area and coastal climate zones.”
- One respondent shared that building departments/AHJs can help educate folks on Energy Code compliance.
 - “[...] having inspectors in AHJ that are knowledgeable about the codes they are required to enforce and work with the parties to help them meet compliance by providing online and in person education, options, and solutions instead of threats delays and fines for those parties (homeowners, contractors, and builders).”

- **Simplify and streamline the Energy Code compliance portion of the permitting process (n=14)**
 - Nine respondents suggested streamlining the permit process by making it uniform or simpler.
 - “Simplify the permitting process with user-friendly online platforms that reduce paperwork and processing time. Provide clear guidance and checklists for Energy Code documentation requirements.”
 - “Permitting is different in each jurisdiction, some online some in person, some take credit cards and others cash. The costs vary from \$50 to \$525 for the same job/cost! The number of CF2Rs is daunting and not written for someone without a PHD to understand. Test results and info could be produced on one page for an HVAC change out instead of 36.”
 - Four respondents shared that the current Energy Code permit increases project cost.
 - “Change the Title 24 rules so that cost of installation and operation have a balance, get rid of the point system.”
 - “Contractors claim that energy features are expensive and their costs are usually higher than those working without a license and unlicensed individuals [are] not pulling permits.”
 - “It costs more to do a passable job, to have someone on site during testing, to fix what doesn't pass. Contractors tell the customer, I do the job to spec[ifications] so no need [for] testing unless you have an extra 500 to 1000 plus to spend for no reason. By the way, when I get calls from homeowners who chose after to pull a permit, they always say, ‘you'll have no problems, he replaced this according to specs.’ Those turn out to, on average, the worst possible jobs.”
 - “I'm told by many contractors that pulling permits is very expensive and can very difficult because of the building department shortcomings.”
- **Proactive support from the building department/AHJ and proper enforcement, applying penalties where needed (n=13)**
 - “Clean up the industry. Unlicensed contractors and unpermitted projects keep legitimate contractors from getting jobs and producing compliancy.”
 - “Education for and “buy in” from building inspectors.”
 - “AHJs don't enforce the codes, so the contractors don't find it necessary.”
 - “Strengthen enforcement against unpermitted work by conducting random inspections and imposing penalties on non-compliance. Increase awareness of the risks and liabilities associated with unpermitted work for both contractors and clients.”
- **Engage HERS raters throughout the construction process (n=8)**
 - Five respondents mentioned the need for builders and installers to start involving a HERS Rater early in the project stages.
 - “For Alterations use a carrot, not just a stick, for homeowners that promotes early involvement of the HERS rater in the project.”

- “Have us be involved early on to warm and guide its education, if you know and communicate the goal you can meet it. Energy code is a moving target that is not consistent across construction types.”
 - “Involving the HERS Rater at the bidding stage. Helps reduce the unknowns on the project to pass Title 24 compliance. In my opinion, builders, owners and installers should have [a] working relationship with the Title 24 class company as well as the HERS Raters, so they know how to comply during the building phase. There has been so many times all building professionals fail to read the CF-1R requirements and wait till they need final inspections. If the Title 24 and designer relay and breakdown the measures at the very beginning, it will be much easier to comply.”
- Two respondents mentioned having quality assurance inspections take place in earlier construction stages.
 - “We are hired by the building owners and installers and HERS raters that are too strict are not hired again. I think the solution is in pre-testing, thus making test failures a rarer occurrence.”
- One respondent noted to have additional quality control checks, “[...] that are independent HERS raters.”
- **Revisions to the CSLB licensing process (n=4)**
 - “Energy Code Compliance should be part of the CLSB testing requirements.”
 - “More enforcement from CSLB.”
 - “Require contractor education courses on the workings and compliance documentation involved in the HERS industry as a prerequisite of attaining a license.”
- **Other suggestions to reduce barriers and encourage accurate submission of accurate Energy Code documentation (n=11)**
 - Three respondents mentioned requiring documentation of permits.
 - “Like City of Davis, require at sale of property documentation of permits for all work done.”
 - “Require permits to be issued before sales of HVAC equipment.”
 - Three respondents noted providing an incentive to those that comply with the Energy Code.
 - “Give more incentive to those looking to comply with building and Energy Codes, reducing plan & permit process time.”
 - “Incentives for Compliance: Introduce financial incentives, such as rebates or reduced fees, for contractors who consistently submit accurate Energy Code documentation. Recognize contractors with a proven track record of compliance to enhance their market reputation.
 - Two respondents shared making the registry easier to navigate and with clear notices.
 - “Providing clear instruction from your end. Stating: Providing false, and inaccurate information will result in a “trigger audit” or automatic failure

on builder certification. Some type of written language to steer compliance from these contractors.”

- Additional responses shared by three respondents.
 - “Require contractors to certify understanding of the Title 24 pages in the plan sets. Most never look at those pages [...].”
 - “It's already difficult enough to explain the process to the homeowner or contractor so don't charge an \$8 monthly fee.”
 - “There are a few things that I would say are SYSTEMATICALLY ignored. This includes especially the visual components of duct leakage testing, particularly the requirement for appropriately lined plenums and for the filter sizing requirement. I constantly tell contractors to install 2” filters (since for 1” filters to comply they must be gigantic to the point that I have almost never seen one be compliant, see section L (I think it's L?) in every Mech-01 form) and they deliberately ignore me. People who do changeouts NEVER offer quotes to line the plenum with sheet metal or venture tape because they would be undercut by their competition if they did. I think one thing that should be enforced more thoroughly in particular is the idea that HERS FV&DT [Field Verification & Diagnostic Testing] operatives are never permitted to actively fix problems, such as uncaulked registers, while they are testing, since that would have us be undercut by duct testers who carry cans of caulk around to fix the installers' mistakes.”

H35: How effective do you believe the HERS program is at improving Energy Code compliance?

Response Options	Number of Responses (n=71)
Effective	32
Ineffective	3
Neither effective nor ineffective	2
Somewhat effective	29
Somewhat ineffective	3
Unsure	1

H36: In your opinion, how can the HERS rater processes be improved to ensure better Energy Code compliance?

Themes	Number of Mentions in Responses (n=56)
Educate contractors, installers, and property owners/managers about Energy Code compliance and HERS requirements and testing	14
Proper enforcement	14
Simplify and streamline the Energy Code compliance portion of the permitting process	11
Engage HERS Raters throughout the construction process	8
HERS Rater accountability	8
Contractor accountability	4
Other improvements	15

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Educate contractors, installers, and property owners/managers about Energy Code compliance and HERS requirements and testing (n=14)**
 - "Work on Builder/Trade training programs to improve their compliance "before" they are inspected. Lead them into compliance."
 - "Better contractor education. But you can't make contractor attend classes. Maybe make a C or B license dependent on CEU's [Continuing Education Units]."
 - "Have building departments educate the need for a HERS rater during the application process. Flyers and materials (both paper and online) explaining the process and need for compliance."
 - "Promote HERS raters as someone to call first, before calling a contractor."
- **Proper enforcement (n=14)**
 - "Enforce the code. Enforce HVAC design and load calcs. Crack down on unpermitted/unlicensed work. When someone reports unreported work, investigate."
 - "Force compliance. Right now it's a Potemkin village. That 90% of existing housing stock that's not being tested are the most inefficient, that need compliance the most. Huge potential to gain efficiencies, i.e., cut carbon. Double digit efficiency improvements easily. Instead you're doing nonsense like change the duct leakage from 6 to 5 percent. Basically a rounding error that will have zero impact on energy use. While we have that 80 to 90 percent of jobs, the

ones of inefficient housing stock that require the energy to condition, are being ignored. So you PR will say you cut energy leakage from 6 to 5 percent. But you won't say you ignored those 80 to 90 percent of jobs with obscenely high leakage. Just mentioning ducts as an example. The joke is. You're ignoring the 90% homes, and you're hellbent on micromanaging the efficiently built new homes that require little to condition."

- "Get us involved and give us authority to enforce."
- "HERS Raters should be on record and contracted prior to permit issuance."
- "I imagine some kind of 'red flag' system where a HERS rater would be able to anonymously report abusive developers trying to circumvent and strongarm the code."
- "[...] having the HERS rater or a CEA being involved throughout the process, instead of all testing/verifications being completed at the end of a project. Maybe the building departments require a CF2a be on site at frame inspection to insure HVAC and DHW equipment is correctly installed. If QII is required, have those forms on site at each stage for building inspectors?"
- "Making sure that building inspectors don't give certificates of occupancy before the HERS verifications and testing are completed."
- "We need authority to enforce the codes we are inspecting and testing. Otherwise, we are just a band aid for contractor's that actually care about their customers. When a contractor gets upset because we failed a job, they move to another rater until they find one that passes the work."
- **Simplify and streamline the Energy Code compliance portion of the permitting process (n=11)**
 - Five respondents mentioned simplifying all documents and forms, removing redundant forms, and adding illustrations.
 - "Simplify and reduce code compliance. Code compliance should consider current technology and available equipment. Prioritize the 'big bang for the buck' energy features and back off on the requirements that are expensive/difficult."
 - Five respondents noted making the Energy Code permit process easier and more uniform statewide.
 - "Make the permit pulling process more uniform statewide. Use LADBS [Los Angeles Department of Building and Safety] as an example."
 - "Standardized Testing Protocols: Develop and implement clear, consistent testing protocols across all projects to minimize ambiguity."
 - Additional response shared by one respondent.
 - "Put list of HERS verifications on front page of CF1R. On the top corner of front of each CF2R and CF3R, include a small box that indicates if all the CF3Rs for the project have been completed. Green star or red X. Meaningful QA inc[ur] repercussions for company employing the HERS Rater."
- **Engage HERS Raters throughout the construction process (n=8)**

- "Have raters present earlier in project; during installation to ensure proper installation and function."
- "Incentivize builders, contractors, and homeowners to look for a HERS rater early in the building process."
- "Letting builders know when to schedule testing."
- "More automation and meeting with contractors before project starts."
- "Not test only at end of project."
- **HERS Rater accountability (n=8)**
 - Five respondents mentioned maintaining accountability of HERS Raters and HERS Rater companies.
 - "Careful, close monitoring of companies with multiple raters, especially HVAC."
 - "HERS is supposed to be a verification of a contractor's work. Instead, if a contractor is non-performing, they just find a HERS rater that will pass them. A HERS rater should be picked from a pool of other raters, and not be affiliated with the contractor in any way."
 - "Not to allow HERS Raters to be permit pullers. The company cannot provide correct HERS passing results if they are pressured by the installer to pull the permit and pass the HERS test. I will tell you if they fail a test the installer will go find someone else who will."
 - Four respondents touched on conducting quality assurance or audits of HERS Rater efforts.
 - "Auditing and Feedback: Conduct regular audits of HERS raters and provide constructive feedback to improve performance and accountability."
- **Contractor accountability (n=4)**
 - "Have trades upload photos of installed equipment."
 - "Ensure that installers pre-test their own work before HERS rater performs test."
 - "Having proof the builders, contractors and home owners have read and understand what the Title 24 document means for their before they start building and ordering materials."
 - "The Title 24 company needs to be more involved with the builder to ensure QII and other measures are met."
- **Other improvements (n=15)**
 - Four respondents mentioned having additional training for HERS Raters.
 - "[...] more robust training and certification requirements."
 - "More training would be beneficial."
 - Three respondents mentioned reducing conflict of interest by not getting compensated by the contractor.
 - "Remove the financial conflict of interest for alterations between raters and contractors. Have the homeowner pay the rater."

- “Not be paid by homeowner or contractor.”
- “It would make the process better and make HERS Raters not feel pressure to pass tests just because they don't want to deal with the party that is paying for them to test. The payment should come from a third party, like the Energy Commission so there is no conflict of interest whatsoever.”
- Two respondents mentioned improving communication between all responsible parties involved in HERS verification and testing.
 - “Better Communication: Create stronger communication channels between HERS raters, contractors, and building departments to resolve issues promptly.”
 - “The problem is the communication. If HERS raters are given freedom to talk about what's going on to the homeowner and contractor without one if not both of them being upset.”
- Additional responses shared by seven respondents.
 - “Enhanced Registry Tools: Upgrade HERS registry systems to improve usability, speed, and the ability to make real-time corrections on-site.”
 - “Take complaints about bad HERS Raters from building jurisdictions seriously.”
 - “Provide a list of qualified equipment for homeowners and builders so they don't deviate from it.”
 - “Have easy-to-understand hand-outs for each measure available at the Building and Safety Dept when you pull a permit.”
 - “Add conditioned attics to volumes.”
 - “Helping new hers raters find work.”
 - “Higher profit margins for raters.”

H37: In your opinion, how can contractors be encouraged to ensure better Energy Code compliance?

Themes	Number of Mentions in Responses (n=63)
Trained on the Energy Code, HERS requirements and testing, and related documentation	19
Enforcement from building departments/AHJs and implement penalty fees for noncompliance	19
Simplify the permit process, connect with a HERS Rater in early project stages, and hold contractors accountable	15
Provide accessible resources or support system while on the field	4
Offer incentives for those that follow the Energy Code	3

Themes	Number of Mentions in Responses (n=63)
Modify process for equipment purchasing	2
Other ways contractors can be encouraged to ensure better Energy Code compliance	11

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Train contractors on the Energy Code, HERS requirements and testing, and related documentation (n=19)**
 - "By having more knowledge of the requirements. Maybe require a cert[ification] for them."
 - "CSLB to require contractors to understand how to use CHEERS Energy Code Hotline - So they can call or email with questions."
 - "Know how to fill out a CF-1R form and CF-2R so they know how to comply on a project. Make sure your HERS rating company informs you about changes to the current and code cycle."
 - "Education and Awareness Campaigns: Run campaigns to educate contractors on the importance of compliance for energy efficiency, safety, and long-term cost savings. Highlighting Competitive Advantages: Emphasize how compliance can serve as a selling point to environmentally conscious customers and improve their professional reputation."
- **Enforcement from building departments/AHJs and implement penalty fees for noncompliance (n=19)**
 - Thirteen respondents mentioned the need for all building departments/AHJs to verify compliance with the Energy Code.
 - "AHJs need to enforce ALL the building codes, not just the ones they want to. Currently, the inspector tells the contractor it's ok to not install IAQ ventilation and we say it's required."
 - "Building departments need to continue to require they show proof for final occupancy."
 - "Collaboration with Building Departments: Foster collaboration between contractors and building departments to ensure better understanding and smoother implementation of Energy Code standards."
 - "Having building inspectors more knowledgeable on the verification/testing timing during a project that they can call something out before signing off. Builders are very confused by the fact that building inspectors and HERS raters don't work together at least in my county."

- "If the Builder (new construction, additions, etc.) was required to have (and pay for) a HERS rater or CEA to be involved from time of permit being pulled, he would be more inclined to follow the process and pass the HERS testing at the end of the project [without] any issues. This person would have skin in the game to ensure all CF1R items are met."
 - "Make it mandatory. Otherwise, you're not serious about it. Because right now they have zero reason to. It's a competitive disadvantage to do the HERS Testing. Permit fee, HER's testing fee, labor costs to have tech guys there to fix it when they don't pass. And they very seldom do the first time. Even on Title 24 jobs many don't call at the end till the inspector calls them on it. To their credit, most inspectors are now asking for it."
 - "More building department training. Plan Set Reviewer training to assure they make sure CF1R is consistent with plan set -- fix inconsistencies in building assemblies, specified HVAC equipment, omission of ventilation details, claimed credit for no hot water recirculation, insulated doors, etc. Building Inspector training on how to read key features of CF1R, what to look for when on-site, how to read CF3Rs, which ones are needed."
- Six respondents mentioned the implementation of penalty fees for failing to comply.
 - "Scare them with the facts that one un-permitted job can cost their license with the CSLB."
 - "There needs to be a monetary penalty for failing. 99% of contractors are too lazy or busy or both to take the time to take courses on the HERS process."
- **Simplify the permit process, connect with a HERS Rater in early project stages, and hold contractors accountable (n=15)**
 - Five respondents mentioned simplifying the permitting process.
 - "Dumb down the code to contractor's language. Simplify the CF2R certificates. Outreach!! Those contractors that care, will listen if the code was easier to understand and there is proof it works."
 - "Simplify the code. We inspect things that other people issue certificates for. Example QII the insulation contractor issues a compliance form then we do."
 - Five respondents noted getting connected with a HERS Rater early in the project stages, with mentions of including a HERS Rater as part of the bidding process.
 - "Have raters present earlier in project; during installation to ensure proper installation and function."
 - "Involve the HERS Rater early. Get a bid from the HERS Rater before they bid on a project."
 - Five respondents mentioned capturing a paper trail of contractors' agreement to understanding Energy Code requirements.
 - "Have them sign something that they have read the Title 24 section of the project plans."

- “Provide them with a Cheat Sheet Training List. For e.g. Insulation, Framers, HVAC trades etc. should all have a compliance checklist builders can provide to them with their specific measures with Signature requirements to confirm “all installation measure requirements” have been taught/reviewed/confirmed and on file. This will establish accountability and a paper trail if measures fail.”
- **Provide accessible resources or support system while on the field (n=4)**
 - “Have a HERS Rater be available to answer any questions that may come about with complying with the Energy Code.”
 - “Access to Support Resources: Provide contractors with access to technical support, compliance tools, and simplified guides for meeting Energy Code standards.”
- **Offer incentives for those that follow the Energy Code (n=3)**
 - “Recognition Programs: Establish recognition programs or certifications for contractors who consistently meet or exceed compliance requirements.”
 - “Make an incentive of cheaper permit applications and quicker process for quality installations.”
 - “More education and financial incentives. If they take a class, they get a better rate on equipment or tools to do the job.”
- **Modify process for equipment purchasing (n=2)**
 - “[...] in particular regarding mechanical ventilation requirements: by requiring warning labels or even outright banning the sale of noncompliant kitchen ventilation equipment i.e. at Home Depot.”
 - “Take out permits when buying the equipment.”
- **Other ways contractors can be encouraged to ensure better Energy Code compliance (n=11)**
 - Four respondents provided short responses with mentions of pre-testing, inspection, permits, and updating code often.
 - Additional responses shared by seven respondents.
 - “A HERS rating can help a contractor do better, learn better ways of operating that will give better client satisfaction and results. A good contractor will welcome real test results and work towards continuous improvement instead of skirting rules.”
 - “By making it impossible or unfeasible for their competition, who do not install compliant work, to undercut them.”
 - “By stopping unlicensed HVAC repairs and replacements, the licensed contractors won't have to compete with cheap bids. Without competing with cheaper (unlicensed) bids, the contractors won't have to rush jobs and cut corners.
 - “Contractors are motivated by money. Maybe create a rating system and give them a score that is available to the public, like restaurants have.”
 - “It should not be encouragement, regulation is more practical.”

- "Stop making it more difficult for them including starting to charge a monthly fee."
- "Strike system, failures or questionable morals lead to some hinderances. HERS Rater shopping could be limited."

Section 6: Additional comments/feedback

H38: Please share any additional comments and thoughts about Energy Code compliance in the box below.

- "1. Contractors/builders all know they have to comply, they just choose not to due to lack on enforcement. 2. I have little experience with contractors not wanting to comply because they don't call me. I just see all the trucks driving around, but no permits pulled when you research activity at the building departments."
- "First off, there are too many people authoring Title-24 reports who should not be. Their understanding of the code and building process is minimal. Also, designers are signing off on the CF1R when their plans do not match the compliance report. Projects are built to meet the plans and no one cares about the CF1R. Assigning a HERS rater or CEA (or new entity, hopefully not as the process is already confusing) who is responsible for sub's following the CF1R throughout the building process, so the verification/testing passes w/o issues at the end of the project, would cement a much higher compliance rate."
- "I do not think Energy Code as is actually improving construction and low[er]ing energy usage. Rampant fraud throughout."
- "I encourage more education for the HVAC installers, builder, design firm, building departments. They should hold some certification training in regards with complying with the Energy Code in the state of California. My hope is the CEA's and the Companies performing the energy calculations for a addition/new construction project will follow through with communication with the builder, owner and HVAC installer on what is required for the project to comply. 90% of my installers and builders have know clue where there cf-1r is on their plans or who their t24 company is. Which results in projects not complying when the hers testing is started. Why I think this? The EC thinks its only clients are the designer on the project. Which is incorrect it's all of the above! Also EC's should start modeling realistic HVAC spec's. They throw in the highest SEER/EER rating or QII (which not practical) just to get the project to comply and move on to the next."
- "I feel that the state is not being honest about the performance of heat pump water heaters and heat pump air conditioners. I do not think it is ethical to require people to install systems that will potentially be more expensive to operate. I believe if you are going to force this technology on the general public then the state should fund technology research. I think the State should have a cooperative development program to help manufacturers and installers develop whole house systems incorporating refrigeration, water heating and air conditioning into one system that uses heat transfer and a single DC condenser without burdening home owners with the cost of poor performing emerging technologies that they will be stuck with for years."
- "I have lost 70% of my business in the last 2-3 years due to the city inspectors closing out city permits without a HERS report. My contractors and HVAC installers will not

request a HERS report unless the city inspector ask for one. My HVAC installers are finding HERS companies that will pass all jobs whether they meet the HERS requirements or not. These HERS companies will continue to stay in business since they will just hire another HERS rater to replace the ones that get suspended. The entire HERS company needs to be banned to prevent this revolving door."

- "I realize the HERS system came about due to contractors not policing themselves over the years regarding quality control. When studies showed average duct leakage to be between 25% to 40%, outside policing became necessary. But what I don't understand, when the HERS systems seems to be making a difference, why did the CEC go backward by letting commercial HVAC contractors self-certify? I think that was/is a mistake."
- "If the Contractors and HERS raters have to follow the rules why doesn't the AHJ."
- "If the HERS system doesn't improve it is costly to the builder/owner/homeowner, and only adds to the burden of inefficient and shoddy workmanship."
- "It's a dog eat dog and the bigger companies are not playing fair."
- "On CF1R, eliminate credit (or require them to be HERS-verified) for most frequently misused non-verified features: carpeted fraction of slab floors, & insulated exterior doors. Change DHW 'standard distribution' to 'no recirc'. Contractors think they can put in a continuous recirc pump on all projects. Enforce HERS Provider's QA requirement. CHEERS advertised that they will not comply."
- "Speaking from a HERS rater perspective, we must consider educating HERS raters more in the areas of energy modeling so as to not have such a disconnect in the compliance process. I believe this would make HERS raters more of an asset early on in the process for homeowners, developers, builders, and contractors. Education for all parties should be more available and accessible with the potential for financial incentives for those looking to comply. Streamlining the compliance process can be difficult task since there are many jurisdictions that have their own process. Sometimes less is more. Let us not penalize the use of natural gas/propane/wood for the sake of demonizing carbon. Freedom to choose will always lead to better options for all. It has been a pleasure helping people to create homes and structures that are safe, healthy, and efficient. Let's work together to make sure we are all playing by the Golden Rule here in the Golden State. Thank you for taking the time to read my thoughts on these matters. Lux et Veritas."
- "T24 is well intentioned, saving customers money, strain on the grid, the planet, etc.... However it's gone way too far requiring extra things that are difficult, expensive and really not necessary. Focus on the big energy saving features and how to make it easier for more people to comply."
- "The A.T.T. system is an absolute dumpster fire for nonresidential. Anyone living outside of the few major metros where A.T.T.s live and operate is getting absolutely shafted by this program and they have /NO/ idea how any of it works because the A.T.T. program has been /systematically/ un-enforced for its entire life so far. This creates a paradox where suddenly enforcing the A.T.T. program in one city basically derails the entire city's commercial construction as contractors first learn about A.T.T. and try to implement it. A.T.T.'s under-enforcement has actively encouraged skullduggery and prevented the program from becoming robust enough for A.T.T.s to

be findable by the vast majority of builders outside of, say, Los Angeles, San Diego, the Bay, and Sacramento. They simply don't exist on the Central Coast; and part of our job, now that A.T.T. is starting to actually be enforced, is basically to co-ordinate the contracting and performance of A.T.T. testing. We literally have to survey all buildings for A.T.T. requirements so that the builders aren't spending tens-of-thousands of dollars on getting a distant A.T.T. to visit and fail them - and I can't even do that in a robust fashion since, if I could, I myself would /be/ an A.T.T. technician and the training isn't available to me. So I have to know A.T.T. requirements and how to pass them even though I'm not authorized to be an A.T.T. You can imagine how confusing that is to our clients, and how much like a 'scam' it must seem to them. (The alternative is hiring Crocker to drive three hours and fail them.)"

- "The more restrictions we place on contractors, the more they rebel. As a HERS rater, all we can do is tell them to comply but can't enforce it. Dialogue with all parties would be a start. It would be really nice not to print 36 pages of garbage for an AC & furnace change out. Even more for new construction, 410 pages for the last new house. My energy costs go up with every code change! Using the KISS method would be very helpful. Currently, between the permit and HERS testing, it's an addition \$1200 to an HVAC change out in Sacramento county. After 20 years, we still have not been able to win over the builders and HVAC contractors. Time to look at this program from their perspective."
- "This process fails from the top down. It's too easy to become a HERS Rater. It's too easy to game the system. Because the system is easily gamed, quality HERS Raters can't grow their business when in competition with the low prices of Raters who sell compliance documents instead of testing services."
- "Two issues. The business changed when large companies began offering guaranteed pass, first test. Contractors began asking us to do drive by testing. Some had to be turning a blind eye to this. Because it's harder that hell to pass these jobs with contractors on site. That must change. As stated earlier, as long as you focus on the efficiently built houses that will use little energy, trying to make them more efficient, while ignoring the true energy hogs, that is existing home stock. The ones few pull permits for. The ones that require more energy, the ones with the worst installed systems. In other words, inspect to tight standards the ones the need it the least, and ignore the problem houses that need it the most. Until you stop ignoring and address the problem buildings, it's a facade. Finally the raters have zero power or input. At one of the meetings, the guy from the energy commission went through all these proposals for making Raters jobs more difficult. He finally admitted for many proposals that it wouldn't make for a better program, but it would cost the Raters dearly. The Energy commission guy made it clear, they were putting all these burdens on raters. By contrast, the Energy Commission rep made it clear, they were willing to put raters out of business, but anything, even the slightest actions to inconvenience the powerful contractors, was a non starter. So you have raters with no power, the contractors with all the power, and you can't expect it to work well. Hey rater, let me pay you to check my work, if you don't pass me, you'll never be called by. Amazing the business I've lost. I'd be thriving had I passed all those. But some other rater has passed many of these."

APPENDIX G:

ATT/ATE Survey Data Tables and Summary of Open End Responses

This appendix includes tabular data and summaries of open-ended responses for each question asked on the ATT/ATE survey. The questions are organized under the same sections and in the same order as the survey instrument.

This survey included programming logic, where certain questions show up on the survey depending on the response selection to a prior question. As such, due to survey logic (i.e., the question was only asked to a subgroup of respondents), some questions have a fewer number of responses. For context on the survey logic implemented by question, please reference Appendix D.

Section 0: Demographics/Firmographics

A1: Which of the following certification(s) or license(s) do you currently have? (Select all that apply; your selections will help determine which questions we ask you)

NOTE: This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.

Certifications or Licenses	Number of Responses (n=324)
California Home Energy Rating System (HERS) Rater Certification (issued by CalCERTS or CHEERS)	77
CLCATT or CLCATE – Certified Lighting Controls Acceptance Test Technician/Employer	12
CMATT or CMATE – Certified Mechanical Acceptance Test Technician/Employer	14
CSLB license(s)	254
I am not currently certified in any of the certifications listed above or do not hold a CSLB license	5

A2: Which of the following applies to you?*NOTES:*

- *This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- *Question shown if response to A1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
I am in training, but am not yet certified or licensed	0
I do not currently have a certification nor a license, but was certified/licensed in the past	2
I have not pursued certification nor a license	3

A3: Which kind(s) of work have you done in the past 5 years (January 2020 to present)? (Select all that apply)*NOTES:*

- *This is a shared question between the contractor, HERS rater, and ATT survey. Frequency shown in the table is repeated across Appendix E-G.*
- *Question shown if response to A1 is "I am not currently certified in any of the certifications listed above or do not hold a CSLB license"*

Certifications or Licenses	Number of Responses (n=5)
General Contractor work	3
HVAC and Mechanical systems work (Including refrigeration and sheet metal)	2
Lighting and Electrical systems work (Including elevator, signage, and solar)	1
Other building trade related work (Concrete, drywall, framing and rough carpentry, glazing, insulation and acoustical, landscaping, masonry, plumbing, roofing, structural steel, swimming pool, etc.)	0
California Home Energy Rating System (HERS) rater work	3
Lighting Controls Acceptance Test Technician/Employer work (CLCATT or CLCATE)	0
Mechanical Acceptance Test Technician/Employer work (CMATT or CMATE)	1

A4: Which Acceptance Test Technician Certification Provider (ATTCP) were you certified with in the past 5 years (January 2020 to present)? (Select all that apply)

Response Options	Number of Responses (n=1)
National Lighting Contractors Association of America (NLCAA)	0
California Advanced Lighting Controls Training Program (CALCTP)	0
California State Pipe Trades Council (CSPTC)	0
National Energy Management Institute Committee (NEMIC) (also referred to as The Testing, Adjusting, and Balancing Bureau (TABB))	0
National Environmental Balancing Bureau (NEBB)	0
Refrigeration Service Engineers Society (RSES)	1

A5: Which Acceptance Test Technician Certification Provider (ATTCP) are you currently certified with? (Select all that apply)

Response Options	Number of Responses (n=22)
National Lighting Contractors Association of America (NLCAA)	9
California Advanced Lighting Controls Training Program (CALCTP)	3
California State Pipe Trades Council (CSPTC)	1
National Energy Management Institute Committee (NEMIC) (also referred to as The Testing, Adjusting, and Balancing Bureau (TABB))	5
National Environmental Balancing Bureau (NEBB)	3
Refrigeration Service Engineers Society (RSES)	6

A6: Which of the following roles do you hold in your company?

Response Options	Number of Responses (n=23)
Acceptance test technician (ATT)	4
Acceptance test employer/supervisor (ATE)	3
I hold both roles	16

A7: What percentage of projects requiring at least one acceptance test were conducted as the following?

Percent of Projects	A member of the project team (e.g., installing technician, other technician, commissioning agent) (n=20)	A supervisor of the project team (n=12)	An ATT hired from outside of the project team (n=15)
0%	2	3	2
1-10%	2	1	4
11-50%	9	2	4
51-75%	0	3	1
76-100%	7	3	4

A8: What building type(s) [ATT: have you / ATE: have you or ATTs reporting to you], conducted acceptance testing on? (Select all that apply)

Response Options	Number of Responses (n=23)
Low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage)	11
High-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage)	6
Hotels/motels	7
Other nonresidential buildings	21

A9: Please indicate the type(s) of new construction or addition projects [ATT: you / ATE: you or ATTs reporting to you] have typically conducted acceptance testing for.

Response Options	New construction (ground-up build)	Additions	Not applicable
Building envelope (fenestration thermal performance, envelope leakage blower door test) (n=15)	9	4	6

Response Options	New construction (ground-up build)	Additions	Not applicable
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems) (n=12)	9	6	0
Outdoor lighting controls (n=12)	9	4	1
Simple HVAC replacements without duct alterations/retrofits (n=15)	5	11	3
New or altered duct systems (n=15)	11	9	3
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery) (n=16)	11	10	2
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD)) (n=15)	12	8	1
Hydronic systems (including variable flow, temperature reset, and water chillers) (n=15)	5	5	8
Energy storage systems (n=15)	3	1	11
Mechanical Energy management control system (EMCS) (including automatic demand shed) (n=15)	8	3	6
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD) (n=15)	5	3	10

A10: Which of the following types of alterations/retrofits (including repairs and replacements) [ATT: have you / ATE: have you or the ATTs reporting to you] conducted acceptance testing on? You may select both required acceptance tests and other tasks you are asked to complete. (Select all that apply)

Response Options	Number of Responses
Building envelope	3
Indoor lighting controls	10
Outdoor lighting controls	5
Simple HVAC replacements without duct alterations/retrofits	12
New or altered duct systems	9
Outside air ventilation and exhaust controls	11
HVAC equipment and fan controls	12
Hydronic systems	6
Energy storage systems	1
Mechanical Energy management control system (EMCS)	5
Covered Systems	2
I do not conduct acceptance testing for alterations/retrofit projects	2

A11: For each of the following building types, what is the estimated total number of projects requiring at least one acceptance test [currently certified ATT: that you expect to work on in 2024 / currently certified ATE: that you and the ATTs reporting to you expect to work on in 2024 / not currently certified ATT: that you to work on in a typical year / not currently certified ATE: that you and the ATTs reporting to you work on in a typical year] within California?

Estimated number of projects	Low-rise multifamily buildings (n=11)	High-rise multifamily buildings (n=6)	Hotels/motels (n=7)	Other nonresidential buildings (n=21)
0-20	7	3	6	15
21-50	4	3	0	3
51-100	0	0	1	1
101-500	0	0	0	2
501 or more	0	0	0	0

A12: How do you most often define a single “project” or a “job” in your field of work?

Response Options	Number of Responses (n=23)
Anytime you go to a job site	6
A single permit application	11
A multifamily building	3
A floor of a multifamily building	0
A residential unit (such as an apartment or single-family home)	0
A whole building (hotel, motel, commercial, or industrial)	3
A floor of a hotel, motel, commercial, or industrial building	0
System maintenance, troubleshooting and repair (HVAC or electrical)	0
New system(s) (such as an HVAC or electrical installation/upgrade)	0
Building envelope replacement or upgrade (such as windows, roof, etc.)	0

A13: Including yourself, how many people are currently employed at your company in California?

Response Options	Number of Responses (n=23)
1-4	5
5-9	5
10-49	5
50-99	1
100+	4
Unsure	0
Prefer not to answer	3

A14: [Currently certified: From January 2023 to present / Not currently certified: From January 2020 to present], which areas of California has your work taken place within? (Select all that apply)

Response Options	Number of Responses (n=23)
Bay Area	10
Central Coast	9
Greater Central Valley	8
Central & Eastern Sierras	2
Imperial County	0
Inland Empire including High Desert and Coachella Valley areas	10
Los Angeles & Ventura Counties	13
Orange County	11
Redwood Coast	4
Shasta & Cascades	1
Greater Sacramento	5
San Diego County	6

A15: What proportion of the acceptance testing [ATT: you / ATE: you and the ATTs reporting to you] have conducted took place in each of the following areas of California?

Regions	0%^a	1-9%	10-99%	100%
Bay Area (n=10)	0	3	6	1
Central Coast (n=9)	0	4	4	1
Greater Central Valley (n=8)	1	4	3	0
Central & Eastern Sierras (n=2)	0	2	0	0
Imperial County (n=0)	0	0	0	0
Inland Empire including High Desert and Coachella Valley areas (n=10)	0	3	6	1
Los Angeles & Ventura Counties (n=13)	0	2	9	2
Orange County (n=11)	0	0	11	0
Redwood Coast (n=4)	0	3	1	0
Shasta & Cascades (n=1)	0	1	0	0

Regions	0%^a	1-9%	10-99%	100%
Greater Sacramento (n=5)	0	1	4	0
San Diego County (n=6)	0	1	5	0

^a Regions in this question were populated based on the selections to question A14. One ATT respondent selected a region but entered 0% in response to question A15.

Section 1: ATT training on Energy Code compliance and process

A16: Based on your experience and knowledge, what are the top 3 aspects of the Energy Code that are challenging for people in your industry to understand how to do? (Select up to 3 options)

Response Options	Number of Responses (n=23)
Find Energy Code requirements	5
Stay up-to-date with the Energy Code	8
Understand the purpose of the Energy Code	10
Design a project to meet Energy Code requirements	7
Obtain a permit	0
Install equipment/measures Installing to meet the Energy Code requirements	10
Operate equipment to Energy Code standards	3
Document Energy Code compliance	7
Other, please specify	4
I am not sure ^a	4

^a Exclusive response option. Respondents that selected this option were unable to select other options.

Section 2: ATT involvement in Energy Code compliance

A17: Thinking about the new construction/addition projects where you were involved as an ATT/ATE, what percent of those projects included consultation at the following stages?

Project stages	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects
Partial construction mock-up (design phase) but before installation/implementation (n=22)	12	6	0	1	3
Before installation/implementation (n=21)	7	4	4	3	3
During installation/implementation (n=23)	4	5	1	2	11

Section 3: Challenges that affect comprehensive compliance with the Energy Code

A18: In your opinion, what percentage of the contractors and building owners, developers, or managers that you have interacted with are aware of the need to comply with acceptance test requirements?

Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage) (n=11)	3	6	1	1	0	0
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage) (n=6)	3	1	0	1	1	0
Owners/developers/managers of hotel/motel buildings (n=7)	3	3	0	1	0	0
Owners/developers/managers of nonresidential buildings (n=21)	6	6	5	1	3	0

Customer Types	Not aware	1-25%	26-50%	51-75%	76-100%	Unsure
Contractors who work on low-rise multifamily buildings (n=11)	2	4	4	0	1	0
Contractors who work on high-rise multifamily buildings (n=6)	1	2	1	2	0	0
Contractors who work on hotel/motel buildings (n=7)	3	3	1	0	0	0
Contractors who work on nonresidential buildings (n=21)	3	5	3	5	5	0

A19: How often have you personally experienced issues with the following entities/individuals not wanting to comply with the Energy Code due to time pressures, expense, or other factors?

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Owners/developers/managers of low-rise multifamily buildings (3 habitable stories or fewer excluding the underground parking garage) (n=11)	2	4	2	0	2	1
Owners/developers/managers of high-rise multifamily buildings (4 habitable stories or more excluding the underground parking garage) (n=6)	2	1	0	0	2	1
Owners/developers/managers of hotel/motel buildings (n=7)	2	2	0	1	1	1
Owners/developers/managers of nonresidential buildings (n=21)	4	8	1	0	6	2
Contractors who work on low-rise multifamily buildings (n=11)	2	2	2	1	4	0
Contractors who work on high-rise multifamily buildings (n=6)	2	0	0	0	4	0
Contractors who work on hotel/motel buildings (n=7)	0	2	1	0	4	0

Customer Types	Never	1-25%	26-50%	51-75%	76-100%	Unsure
Contractors who work on nonresidential buildings (n=21)	5	4	2	3	7	0

A20: In your personal experience, which of the following typically impacts contractors' decision to apply for a permit? (Select all that apply)

Response Options	Number of Responses (n=23)
Project cost and profit margins (includes offering competitive pricing)	8
Competition from contractors performing unpermitted work	7
Deadlines and time pressures	3
Customer pressures for unpermitted work	5
Difficulty navigating permitting system	3
Other, please specify	5
I am not sure ^a	8
Prefer not to answer ^a	1

^a Exclusive response option. Respondents that selected this option were unable to select other options.

A21: Think about the contractors who work in your territory. Of the addition or alteration/retrofit projects (including repair and replacement) that are supposed to comply with the Energy Code, from your perspective, what percentage do you think are actually permitted?

Response Options	Number of Responses (n=23)
Contractors never pull permits for alterations/retrofits (including repair/replacement)	2
1-25% of projects are permitted	3
26-50% of projects are permitted	1
51-75% of projects are permitted	4
76-100% of projects are permitted	8
Unsure	4

Response Options	Number of Responses (n=23)
Prefer not to answer	1

A22: How often do you encounter projects during acceptance testing that do not meet Energy Code requirements and have issues that cannot be resolved with quick fixes during the same testing visit before submitting the Certificate of Acceptance forms?

Percentage of Projects	Number of Responses (n=23)
Never	3
1-25% of projects	8
26-50% of projects	3
51-75% of projects	3
76-100% of projects	5
Prefer to answer	1

A23: In your opinion, what percentage of ATTs and building department/AHJ inspectors skip some Energy Code compliance requirements during acceptance test?

Response Options	ATTs (n=23)	Building department/AHJ inspectors (n=23)
None	4	1
1-25%	6	2
26-50%	2	5
51-75%	4	3
76-100%	2	8
Unsure	5	4

A24: If an ATT falsifies an acceptance test (pass a test that failed without correction), what are the likely reasons? (Select all that apply)

Response Options	Number of Responses (n=23)
Company culture pressures	4
Unable to record a fail in the ATTCP form submission software system and allow for corrections before submitting paperwork	7
Not paid enough to cover the time required for testing, thus testing for the most important items only	5
Building departments/AHJs do not validate the ATT testing results, so recording accurate test results does not matter	4
NRCC/NRCI is not likely filled out accurately	9
Other, please describe	4
Unsure ^a	4
Prefer not to answer ^a	1

^a Exclusive response option. Respondents that selected this option were unable to select other options.

A25: In your opinion, what percentage of building department/AHJ inspectors don't know to look for all the acceptance test forms?

Response Options	Number of Responses (n=23)
None	2
1-25%	5
26-50%	3
51-75%	3
76-100%	7
Unsure	3

A26: Which part(s) of the Energy Code compliance process, if any, do contractors (not technicians) find challenging to complete? (Select all that apply)

Response Options	Number of Responses (n=23)
1 - Building Design	10
2 - Permit Application	3
3 - Plan Review	10
4 - Construction & Installation	9
5 - Acceptance Testing or Field Verification	6
6 - Inspections (throughout)	4
7 - Occupancy	1
No parts of the Energy Code compliance process are challenging to complete for contractors ^a	3
Unsure ^a	1

^a Exclusive response option. Respondents that selected this option were unable to select other options.

A27: What are the biggest challenges, if any, that [ATT: ATTs / ATE: ATEs and ATTs] face while performing acceptance testing in the field?

Themes	Number of Mentions in Responses (n=19)
Understanding Energy Code compliance	15
Having on-site issues	7
Encountering issues with the compliance forms	6

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Understanding Energy Code compliance (n=15)**
 - Eight responses mentioned stakeholders (contractors, owners, AHJs) having difficulty understanding the various elements and purpose of complying with the Energy Code
 - One respondent said "In my territory, only one AHJ requires the forms and this confuses contractors and owners"

- Another respondent highlighted the need "to note when either an NRCA test or specific lines on an NRCA does not apply"
 - Four responses mentioned difficulty finding contractors that understand the Energy Code requirements
 - One respondent said, "Having electrician/ contractors that understand HOW to accomplish the requirements of the code."
 - Three responses mentioned that many contractors either do not know or agree with the Energy Code
 - One respondent said, "Stubborn contractors that don't believe energy compliance is needed."
 - Three responses mentioned a lack of education and training on the Energy Code
 - One respondent said "contractors do not know what is required, don't know how to do paperwork to obtain permit, don't know what equipment is needed to meet compliance"
 - Two responses mentioned difficulty keeping up to date with Energy Code revisions
 - One respondent commented "With the code changing every 3 years and suppliers continually changing their product line the learning curve for the crews to stay up to date is overwhelming"
- **Encountering issues with the compliance forms (n=6)**
 - Five responses mentioned discrepancies with forms
 - One respondent said "Incorrect NRCC that results in unnecessary installations such as daylight sensors or correctly omitted installations that are incorrectly shown on NRCC. The problem is how to justify that "correct installation" does not match the "incorrect plan". NRCI not reflecting actual installation. No contractor is aware of NRCI requirements, and they have no idea on how to prepare one"
 - Another said " Most don't read that they failed and even more either don't require them or still accept the old printed out forms from 2016. Second would be that engineers constantly require forms that are not necessary. Like MCH-18 for a building that has no controls"
 - One response mentioned issues with the Website and online forms
 - One respondent said "Having to use the website on site for NRCA forms. CEC assumes the site functions correctly, and if it doesn't, you have to email them and wait for a response. This slows down the job since we end up waiting for assistance. Also, mechanical rooms typically are deep in a building, and sometimes there's no Wi-Fi/cell connections to access the website. Some form of downloadable forms to use when offline would be a huge lifesaver."
- **Having on-site issues (n=7)**
 - Three responses mentioned having design and access issues with equipment
 - One respondent said "Design and access of equipment to test. I often need scissor lifts brought back."

- Three responses mentioned issues with timelines and testing schedule
 - One respondent said "GC/Ownership schedule. They don't understand the time it takes, the impact it has to schedule and the time in which you need to test."
- One response mentioned challenges with test fails

A28: What additional support would you like to have from an ATTCP? Please provide specific examples.

Themes	Number of Mentions in Responses (n=15)
Training on code compliance	11
Internal process improvements	4

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

• **Training on code compliance (n=11)**

- Eight ATT respondents mentioned that they would like more timely education and training support for all stakeholders involved.
 - "We need to educate contractors and then building departments, in that order, because we can't teach contractors when the job is finished by that time it's too late."
 - "Help with city building & safety to notify builders and owners of all ATT/HERS features and requirements during permit approval."
 - "Make contractors and owners aware of the requirements. Some even ask us jokingly if we are still doing ATT work. If the final inspector does not ask for NRCA, it will never be done. I hope that the same way that an NRCI is required to complete the NRCA online process, a final inspection also requires an NRCA or it will never be completed online. What is not clear to me is how the final inspector is checking the authenticity of the NRCA. I always make sure to point to the QR code and have them check online, but maybe many are just satisfied with any printed document."
 - "Please inform the project team or development team about these items and ensure that the GC team is aware and knowledgeable enough to reach out to a trusted ATT company. It is important to choose a company that will not falsify documentation, similar to the HERS raters we refer to as 'fly by night.'"
- Two ATT respondents highlighted the need for clarity on the Energy Compliance Code, including guides that use realistic examples.

- “Better clarity as to why T24 and CALGreen are different.”
- “Easy to understand guides for what acceptance tests are needed for what types of systems that are being installed (using realistic examples). Include any exemptions in clear language.”
- One ATT respondent emphasized the need to establish better communication channels between ATTs in order to improve learning on testing methods.
 - “A sharing of testing methods between ATTs. I am the sole ATT at my company. Projects do not typically have more than 1 ATT, since 2016 [...]. I have had the ability to talk to exactly 1 other ATT that had different test methods. Having the ability to learn about other methods would be helpful.”
- **Internal process improvements (n=4)**
 - Two ATT respondents mentioned the need to resolve issues with discrepancies on forms.
 - “Forms should allow a section for ATT to note what specific steps may not apply based on project SOP. ATT's should be able to note when NRCA's are incorrectly checked. NRCA's should have an option for the tech to state why it is not applicable. The tech is not responsible to correct NRCC's but should be able to make note to what is wrong with what was selected. For instance quite often we find MCH-13A checked for a DX package unit when really MCH-12A should have been checked instead. Or MCH-8A gets checked when the scope was to replace a pump. MCH-8A requires manipulation of existing values if the only scope was to replace a pump the contractor is not responsible for existing valves if they leak by or the building may not be able to globally command all closed based on what type of space it serves or type of controls. MCH-8A should not be checked unless an entire pumping system is new or replaced. Not just a pump. I can note quite a few discrepancies that we find.”
 - Two ATT respondents indicated improvements could be made to Energy Code related websites and online forms.
 - “The main issue I've encountered is both EnergyCodeAce, and the MechCheck sites having issues/bugs where information entered shows as not compliant, even when it is, or data not showing up on a completed form.”

A29: Thinking about the projects requiring at least one acceptance test that you conducted, in your experience as an ATT/ATE, what percentage of projects have been affected by the following conditions to the extent that it impacted the contractors' ability to meet Energy Code requirements?

Conditions that affect ability to meet requirements	No projects	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable
Finding compliant equipment available for purchase (n=23)	13	7	1	1	0	1	0
Finding compliant equipment that meet client's needs (n=23)	10	8	1	1	1	2	0
Difficulty finding qualified trade partners/skilled workers (n=23)	10	3	4	1	2	2	1
Difficulty finding workers or subcontractors with specific certifications (e.g., Home Energy Rating System (HERS), mechanical or lighting controls ATT certification, NATE, etc.) (n=23)	13	3	1	1	2	2	1
Deadlines and cost/time pressures (n=23)	1	8	7	2	5	0	0
Pressure from the homeowner or building manager/owner (n=23)	6	7	4	1	5	0	0
Pressure from other responsible parties (e.g., architects/designers, financial departments, engineers) (n=23)	6	11	2	0	2	2	0

Conditions that affect ability to meet requirements	No projects	1-25%	26-50%	51-75%	76-100%	Unsure	Not applicable
Energy Code is complicated to understand and difficult to comply with (n=23)	7	4	2	4	4	1	1
Energy Code is not enforced by building departments/AHJs (don't ask for forms) (n=23)	6	6	0	3	8	0	0
Building departments/AHJs do not review forms for accuracy/completeness (n=23)	4	2	3	4	8	2	0

A30: For each type of work below, in what percent of projects do you see compliance issues the first time you arrive on site for testing?

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Building envelope (fenestration thermal performance, envelope leakage blower door test) (n=9)	0	5	2	1	1	0
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems) (n=12)	1	5	2	2	2	0
Outdoor lighting controls (n=11)	4	3	3	1	0	0
Simple HVAC replacements without duct alterations/retrofits (n=13)	0	7	1	1	4	0

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
New or altered duct systems (n=12)	0	5	3	1	1	2
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery) (n=14)	0	5	1	4	4	0
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD)) (n=14)	0	4	1	5	4	0
Hydronic systems (including variable flow, temperature reset, and water chillers) (n=8)	0	6	0	1	0	1
Energy storage systems (n=4)	1	0	0	0	0	3
Mechanical Energy management control system (EMCS) (including automatic demand shed) (n=11)	2	4	1	1	2	1
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD) (n=5)	1	3	0	1	0	0

A31: We have heard that ATTs/ATEs are sometimes pressured to pass projects that don't fully meet Energy Code requirements for various reasons. Thinking about the building features that [ATT: you / ATE: you or ATTs reporting to you] verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Building envelope (fenestration thermal performance, envelope leakage blower door test) (n=7)	2	3	0	0	2	0
Indoor lighting controls (including daylighting, demand response, tuning & energy management control systems) (n=10)	7	1	0	1	1	0
Outdoor lighting controls (n=9)	7	0	1	0	1	0
Simple HVAC replacements without duct alterations/retrofits (n=10)	5	2	1	1	1	0
New or altered duct systems (n=9)	5	0	0	1	2	1
Outside air ventilation and exhaust controls (including demand control, occupancy sensing and energy/heat recovery) (n=11)	7	2	0	0	2	0
HVAC equipment and fan controls (including airside economizers and fault detection & diagnostics (FDD)) (n=11)	5	3	1	0	2	0

Type of work	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure
Hydronic systems (including variable flow, temperature reset, and water chillers) (n=8)	6	2	0	0	0	0
Energy storage systems (n=3)	1	1	0	0	0	1
Mechanical Energy management control system (EMCS) (including automatic demand shed) (n=10)	7	2	0	1	0	0
Covered Systems (compressed air, commercial kitchen, enclosed parking garage, refrigerated warehouses, elevator/escalator, laboratory exhaust/fume hood, steam trap FDD) (n=5)	2	3	0	0	0	0

A32: Thinking about the projects that [ATT: you / ATE: you or ATTs reporting to you] verified and tested, in what percent of the projects do you experience these pressures to pass projects that don't fully meet Energy Code requirements?

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Skip parts of the review due to lack of time (n=23)	15	1	1	3	2	1	0
Skip parts of the review due to contractor pressure (n=23)	17	1	0	2	2	1	0

Pressures Experienced	No projects	1-25% of projects	26-50% of projects	51-75% of projects	76-100% of projects	Unsure	Prefer not to answer
Skip parts of the review due to pressure from your boss/colleague/company (n=23)	16	1	2	2	2	0	0
Testing results were close enough to warrant a pass (n=23)	16	4	0	1	2	0	0
Contractor asks you to "turn a blind eye" to pass a project that should not pass (n=23)	15	3	2	1	2	0	0
Your boss/colleague/company asks you to "turn a blind eye" to pass a project that should not pass (n=23)	18	2	2	0	1	0	0

Section 4: Experience with ATTCP Quality Assurance Audits

A33: Have you been audited by an ATTCP?

Response Options	Number of Responses (n=23)
Yes	12
No	7
Prefer not to answer	4

A34: Have you failed an audit from an ATTCP?

Response Options	Number of Responses (n=12)
Yes	0
No	12
Prefer not to answer	0

Section 5: How to improve Energy Code compliance

A35: In response to a prior question, you selected the following aspects impact contractors' decision to submit Energy Code documentation when applying for permits. What do you think could be done in these areas to reduce barriers and encourage contractors to submit accurate Energy Code documentation?

Themes	Number of Mentions in Responses (n=13)
Increase knowledge of the Energy Code	8
Need for thorough and consistent inspections from inspectors	4
Competitive pricing	3
Other responses to reduce barriers and encourage accurate submission of accurate Energy Code documentation	4

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Increase knowledge of the Energy Code (n=8)**
 - "Education before regulation"
 - "More education but in very dense cities this will always be a big problem."
 - "The primary needs to be knowledgeable or have a dedicated ATT person on the already designated during the permitting process so that there are no confusions or last-minute gatherings at the end of the project."
 - "Not enough education for contractors or enough people to care."
 - "Train building inspectors and make them enforce it! Everything else will fall in line."
- **Need for thorough and consistent inspections from inspectors (n=4)**

- "Have the city inspections be present at the job sight."
- "If a project has a building permit then Energy Code documentation is done as part of the plan check process. A majority (in my opinion) of plan checkers are only looking to see if the documents are there, not to see if they are accurate."
- "If all projects were treated the same by each AHJ and Building Departments. Companies take the chance and do not complete forms unless asked for them and usually can get away with not doing NRCA's."
- **Competitive pricing (n=3)**
 - Three respondents mentioned competitive pricing as a barrier to compliance.
 - "Many quote competitively to get the job and then start cutting cost to make profit."
 - "When you are a company that bids to include the testing your pricing is not competitive."
- **Other responses to reduce barriers and encourage accurate submission of accurate Energy Code documentation (n=4)**
 - One respondent mentioned the need for simplified forms.
 - One respondent mentioned the website and online forms having technical issues.
 - One respondent mentioned offering a helpline for support.
 - "Offer more training and support/helplines. Having to wait for assistance due to website issues make it difficult to submit finalized reports."
 - One respondent mentioned the Energy Code is impractical.
 - "Nothing. I don't believe you're helping anyone out with these codes. It's hurting the owner on cost and efficiency. The Energy Code requirements are not practical. Sounds great on paper. Doesn't work in the field. Not enough education for contractors or enough people to care. Also the cost of what the code is asking for is outrageous. No contractor will pay the cost and if the owner has an option to have equipment at a lower cost they should have the right!"

A36: How effective do you believe acceptance testing is at improving Energy Code compliance?

Response Options	Number of Responses (n=23)
Effective	6
Somewhat effective	9
Neither effective nor ineffective	0
Somewhat ineffective	0
Ineffective	5
Unsure	3

A37: In your opinion, how can acceptance testing processes be improved to ensure better Energy Code compliance? (Select all that apply)

Response Options	Number of Responses (n=23)
Require that ATTs be included as part of the design process for consultation	13
Provide better tools for completing the ATT forms	9
Train contractors to incorporate acceptance testing as part of the construction timeline to allow time for fixes	14
Enforce the requirement for acceptance testing with contractors and building departments/AHJs	12
Train building departments/AHJs on how to verify that they are receiving the correct forms, the correct number of forms, and the forms are completed accurately	13
Other, please specify	6
I am not sure	2

A38: In your opinion, how can contractors be encouraged to ensure better Energy Code compliance?

Themes	Number of Mentions in Responses (n=18)
Improve training requirements and overall education	9
Modify the code compliance process	8
Increase enforcement	5
Need for support from the CEC	3
Economic incentives	2

Quotes by Theme

NOTE: Short responses submitted that were similar in phrasing or meaning were included in the count of mentions. Not all open responses were included to reduce repetitiveness. Responses that were notable or may provide additional insight were included as quotes below the respective theme or subtheme.

- **Improve training requirements and overall education (n=9)**
 - “Pull all NRCC forms into a dedicated section that would be required to be a part of the 100% CD set to obtain a permit. Educate AHJs and contractors on this section and what forms are required based on what types of systems are

- installed (lighting/mech). Create a comprehensive guide/fact sheet with examples of different project scenarios (new and alterations) and what forms are required for what type of systems (mainly mechanical since lighting is fairly well understood)."
- "Require any CSLB renewals to be aware of the T24 forms specific to that license/trade, and what the penalties are for not filling them out. Also explain step by step how to get a hold of a MATE."
 - **Modify the code compliance process (n=8)**
 - Five ATT respondents mentioned the need to simplify the compliance process, specifically the forms.
 - "One platforms for all forms, (NRCC, NRCI & NRCA) would be ideal. When NRCC's check the wrong forms have a means for the ATT to document why the form does not apply. I checked the first box to have ATT's be included but logistically I am not sure how that would work. I just think feedback from the individuals that install or test the system should be implemented."
 - Two ATT respondents mentioned it would be beneficial to update the compliance code requirements to modern standards.
 - "Products being made are energy efficient more than they've ever been. Would much rather see NEC code start accounting for watts per square foot based on LED rather than old, antiquated metrics with halogen bulbs."
 - One ATT respondent expressed frustration with the compliance process suggesting the need for improving the process.
 - "Get rid of the compliance! Why are we trying to make equipment smaller, more expensive all electric. When we don't have enough electricity to power our life's? It's a joke Energy Code Compliance. [...] no one from the CEC has even helped or taught anyone I know about codes, been to a job site to inspect or test. There's no help there's no incentive only to hand the building department paperwork so the owner can get CFO."
 - **Increase enforcement (n=5)**
 - "Contractors will do the minimum amount to pass enforcement. So maybe push enforcement. No such thing as encouragement. Businesses will complete the project at the lowest cost. If inspectors are not asking for forms or don't read them contractors will not incur the unnecessary expenses."
 - **Need for support from the CEC (n=3)**
 - "CEC to work more closely with Building and Safety departments so they can understand what is and is not required."
 - **Economic incentives (n=2)**
 - Two ATT respondents mentioned the need for economic incentives for all stakeholders involved in the process.
 - One ATT respondent suggested awarding contractors with "vacation hours" after passing the test.

- One ATT respondent suggested providing rebates to “help off-set costs of construction.”

Section 6: Additional comments/feedback

A39: Please share any additional comments and thoughts about Energy Code compliance in the box below.

- “Daylighting and demand response are not worth the effort that is spent on them. The shift from fluorescent, HID, mercury vapor, HPS and incandescent to LED coupled with timer shutoff controls accomplishes the energy saving that is relevant. The amount of \$\$ spent on daylighting and demand response is an added cost that ultimately is passed on to the citizens of the state in the form of higher costs for whatever product or service the company provides.”
- “OSA lockout for economizers is ridiculous. In my climate zone, the economizer locks out cooling up to 71 degrees. This is horrible for end users. Also, why is dual enthalpy for economizers not allowed. This would be the most efficient use of an economizer.”
- “People need more education on demand response. The only documentation of the requirements are buried in the NRCCs, but they are barely looked at by anyone on the project team apart from the ATT (assuming they are even included in the plan set at all). This should be more thoroughly checked by the AHJs for correctness and completeness.”
- “The MechCheck website is the one I have access to, but it only gives me information for TABB contractors. It would be nice to see what the other certified contractors are through NEBB, etc., so we have more resources available. Also, the websites have issues and turnaround is horrible on getting help. That needs to be fixed because it kills job profits.”
- “The software that engineers are using to figure out what tests need to be performed on any given project are heavily flawed (energy ace). Incorrect tests chosen and correct tests not chosen is a common theme. PRF-E forms do not list the equipment that needs to be tested leaving us to guess what needs to be tested. These two issues make it extremely difficult to bid these projects accurately. We should not be guessing what work needs to be performed.”
- “The state of California has the right intentions however went about making a difference the wrong way. You can’t just pass rules and regulations expect contractors to comply when they don’t understand or even have the diagnostic tools to learn there is a better way.”
- “Unwatermarked NRCA forms should never be distributed, it creates falsification, and destroyed viability of the program under 2019 and 2022 code cycles. Beyond that, the program as a whole is failing from lack of AHJ enforcement.”
- “What happened to CALCERTS ???? the way the energy commission handled that shows everyone what a joke the process is. No cares or wants to care about Energy Codes. What people want is an option to buy whatever they can afford.”