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CALIFORNIA ENERGY COMMISSION

California Energy Commission

STAFF REPORT

Technician Certification for Energy Code Required Mechanical Acceptance Testing

Mechanical Acceptance Test Technician Certification Provider Program

Gavin Newsom, Governor

Month Year | CEC-400-2021-001

California Energy Commission

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ABSTRACT

This staff report provides the necessary evidence, background, and implementation plan to allow the California Energy Commission (CEC) to require any person performing a mechanical acceptance test required by the Building Energy Efficiency Standards to be certified as an acceptance test technician.

Before an acceptance test technician certification is required to perform mechanical acceptance testing, Title 24. Part 1, Section 10-103.2(b) requires the CEC to find that the following conditions are met:

1. There is a minimum of 300 certified acceptance test technicians statewide (Section 10-103.2(b)1A).
2. Eligible professions have reasonable access to the requisite training to become a certified acceptance test technician (Section 10-103.2(b)2).

Staff has found that there are more than 350 certified acceptance test technicians capable of performing the required acceptance tests listed in Section 120.5 of the Building Energy Efficiency Standards and eligible professions have reasonable access to the certification training.

Staff will provide a report for the CEC to consider and approve by resolution. Staff has held a public workshop and will revise the initial staff report as necessary, address comments, and produce documents necessary for an April 2021 business meeting approval. Staff makes the following recommendations:

1. Make the requisite finding pursuant to Title 24, Part 1, Section 10-103.2, but, as necessary, exercise the CEC's discretion to not enforce the requirement to allow a reasonable time for training and implementation, not to exceed six months.
2. Actively engage the AHJs, builders, contractors, engineers, and architects to advise them of the program and the enforcement date and offer training.

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EXECUTIVE SUMMARY

This staff report provides the necessary evidence, background, and implementation plan to allow the California Energy Commission (CEC) to require any person performing a mechanical acceptance test required by the Building Energy Efficiency Standards to be certified as an acceptance test technician.

Acceptance testing is the final stage of equipment installation in a nonresidential building project. The goal of acceptance testing is to verify that the installations are operational and installed to approved design and meet the relevant Building Energy Efficiency Standards requirements. Acceptance tests are performed and documented by the installing technician, approved by the project's responsible party (typically an engineer, architect, general contractor, or project owner), and submitted to the authority having jurisdiction (typically the local building department or site inspector).

Under the *2013 Building Energy Efficiency Standards*, the CEC developed a program to help improve compliance with the lighting controls (Section 130.4) and mechanical systems (Section 120.5) acceptance test requirements called the acceptance test technician certification provider program. Acceptance test technician certification providers are professional organizations that are approved by the CEC to provide training, certification, and oversight of the acceptance test technicians, as well as the acceptance test employers that employ acceptance test technicians.

Before an acceptance test technician certification is required to perform mechanical acceptance testing, Title 24. Part 1, Section 10-103.2(b) requires the CEC to find that the following conditions are met:

1. There is a minimum of 300 certified acceptance test technicians statewide (Section 10-103.2(b)1A).
2. Eligible professions have reasonable access to the requisite training to become a certified acceptance test technician (Section 10-103.2(b)2).

Concerns raised at workshops in February 2017, and July 2019, will also be addressed:

1. Every county in California should have access to an adequate number of acceptance test technicians to perform the required mechanical acceptance tests.
2. Currently, there are too few technicians seeking certification because it is not yet a requirement.
3. Stakeholders are concerned that the CEC may delay the implementation of the certification requirement if small counties that do not have a significant amount of nonresidential construction and are not prepared, even when larger building markets in California (such as the Bay Area or Los Angeles Area) may be ready to proceed.
4. Stakeholders are concerned that some local jurisdictions will not enforce the certification requirement, which would put those contractors who are certified at a disadvantage during the project bidding process.

Staff requested information from the mechanical acceptance test technician certification providers to verify that the threshold requirements (Section 10-103.2(b)) have been met. There are more than 350 certified acceptance test technicians capable of performing the

required acceptance tests listed in Section 120.5 of the Building Energy Efficiency Standards and eligible professions have reasonable access to the certification training.

Staff proposes to address remaining concerns through an outreach and education implementation plan to communicate with authorities having jurisdiction, builders, engineers, and architects licensed in California. Staff will recommend the CEC approve the compliance of the threshold requirements and the staff proposed implementation plan at the April 2021 business meeting.

The CEC must give formal approval to enforce the requirement for certified acceptance test technicians to perform the mechanical acceptance tests required by the Building Energy Efficiency Standards (Title 24. Part 1, Section 10-103.2(b)). Given the complexity of the minimum requirements themselves and the concerns raised, staff prepared this report for the CEC to consider and approve by resolution. Staff has conducted a public workshop and will revise the initial staff report as necessary, address comments, and produce documents necessary for a business meeting approval. Staff makes the following recommendations:

1. Make the requisite finding pursuant to Title 24, Part 1, Section 10-103.2, but, as necessary, exercise the CEC's discretion to not enforce the requirement to allow a reasonable time for training and implementation, not to exceed six months.
2. Actively engage the AHJs, builders, contractors, engineers, and architects to advise them of the program and the enforcement date and offer training.

Chapter 1: Introduction

Under the *2013 Building Energy Efficiency Standards* (Energy Code), the California Energy Commission (CEC) developed a program to help improve compliance with the lighting controls and mechanical systems acceptance test requirements. The acceptance test technician certification provider (ATTCP) program provides training, certification, and oversight of acceptance test technicians (ATTs) who perform the acceptance tests required by the Energy Code, as well as the acceptance test employers (ATEs) that employ ATTs. ATTCPs are professional organizations that are approved by the CEC to provide training curriculum for ATTs and ATEs, certification procedures, complaint resolution (including disciplinary procedures), quality assurance, and accountability measures. This staff report provides the evidence and implementation plan for the CEC to consider when deciding to make ATT certification mandatory to perform mechanical acceptance tests as required by Energy Code (Section 120.5).

Acceptance testing is the final stage of equipment installation in a nonresidential building project. The goal of acceptance testing is to verify that the installations are operational and installed to design and Energy Code requirements. Acceptance tests are performed and documented by the installing technician, approved by the project's responsible party (typically an engineer, architect, general contractor, or project owner), and submitted to the authority having jurisdiction (AHJ).

Entities seeking to become mechanical ATTCPs must submit an application to the CEC that describes in detail its training, certification, and oversight of the technicians that they will certify. The CEC reviews and approves the ATTCP applications. The training to be provided must include both classroom and laboratory training, and the certification testing must be a proctored written and laboratory test. The ATTCP oversight requirements include a quality assurance program that has three points of inspection. The data entered by the ATT on the electronic compliance documents that are controlled by the ATTCP are verified based on its data type and range of value. Each ATT is also subject to random desk audits (at a rate of 1 to 5 percent of acceptance tests performed) where the acceptance test results are reviewed by a knowledgeable expert for consistency and accuracy with the project plans (as approved by the AHJ). Finally, the quality assurance program includes an unannounced on-site inspection (at a rate of 1 percent of submitted acceptance tests) as the ATT is performing the acceptance test.

The installing technician can provide the mechanical acceptance test required by the Energy Code for mechanical installations without an ATT certification for nonresidential building projects. However, many technicians do not know that acceptance testing is required or how to perform it. When the CEC makes certification mandatory, technicians performing the acceptance test must be certified ATTs and will be trained on how the tests are performed and how compliance is demonstrated to the AHJs. The ATTCP certification program will include quality assurance measures to ensure that the ATT is performing the acceptance tests to code and as prescribed in the design approved by the AHJ, with penalties for non-conformance.

As implemented, the ATTCP program is intended to help builders, building owners, and tenants of nonresidential projects to realize the energy savings provided by compliance with the Energy Code. AHJs will also be able to effectively rely on the ATTCP program to enhance its inspection and approval programs without the burden of additional time being required at the project site. AHJs will also be able to require on-site acceptance tests to be performed in its presence with the results in hand as an ultimate check of compliance.

For the CEC to consider making ATT certification mandatory to perform mechanical acceptance testing, the following requirements (Title 24. Part 1, Section 10-103.2(b)) must be satisfied (discussed in Chapter 2 of this staff report):

1. There is a minimum of 300 certified ATTs statewide (Section 10-103.2(b)1A).
2. Eligible professions have reasonable access to the requisite training to become a certified ATT (Section 10-103.2(b)2).

Staff requested information from the mechanical ATTCPs to verify that the code requirements have been met. There are currently more than 350 certified ATTs capable of performing the required acceptance tests listed in Section 120.5 of the Energy Code and eligible professions have reasonable access to the certification training.

The following concerns, raised at workshops held in February 2017, and July 2019, will also be addressed in Chapter 3 of this staff report:

1. Every county in California should have access to an adequate number of ATTs to perform the required mechanical acceptance tests.
2. Currently, there are too few technicians seeking certification because it is not yet a requirement.
3. Stakeholders are concerned that the CEC may delay the implementation of the certification requirement if small counties that do not have a significant amount of nonresidential construction and are not prepared, even when larger building markets in California (such as the Bay Area or Los Angeles Area) may be ready to proceed.
4. Stakeholders are concerned that some local jurisdictions will not enforce the certification requirement, which would put those contractors who are certified at a disadvantage during the project bidding process.

Staff proposes to address remaining concerns through an outreach and education implementation plan to communicate with AHJs, builders, engineers, and architects licensed in California. Staff will present this report and implementation plan to the CEC at a business meeting currently targeted for April 2021. At this meeting, staff will recommend the CEC formally make the findings required by Title 24, Part 1, Section 10-103.2(b), which will then immediately trigger the requirement that only certified mechanical ATTs can perform the required acceptance tests and staff's implementation plan.

Given the complexity of the minimum requirements themselves and the additional concerns raised, staff will submit this report for the CEC to consider as evidence for this approval.

Chapter 2: Requiring Certified Technicians

The Energy Code mechanical ATT certification requirements were developed to allow industry time to create the ATTCP certification program and to certify a minimum number of ATTs to demonstrate that the certification program is viable. In order to make the ATT certification mandatory to perform mechanical acceptance testing, the CEC must find that the Energy Code requirements in Title 24. Part 1, Section 10-103.2(b) have been satisfied. To provide the evidence of compliance with these requirements, staff requested information from the CEC-approved mechanical ATTCPs:

- National Energy Management Institute Committee (NEMIC)
- California State Pipe Trades Council (CSPTC)
- National Environmental Balancing Bureau (NEBB)
- Refrigeration Service Engineer Society (RSES)

Energy Code Requirements

The 2019 Energy Code specifies two tests that must be demonstrated to be satisfied for the CEC to make ATT certification mandatory for technicians performing the required acceptance tests. These requirements are referred to as the "Industry Certification Threshold" (threshold) in the Energy Code (Section 10-103.2(b)). Staff will provide the evidence of compliance with the Energy Code regulations.

The threshold includes two requirements:

1. The required minimum number of certified ATTs have two options:
    a. (Section 10-103.2(b)1A): There shall be no less than 300 ATTs certified to perform the complete set of mechanical acceptance tests as required in the Energy Code, Section 120.5, except as provided in Subsection 10-103.2(b)1B.
    b. (Section 10-103.2(b)1B): If there are less than 300 ATTs certified to perform all the acceptance tests in Building Energy Efficiency Standards, Section 120.5, then there shall be at least 300 ATTs certified to complete the following tests:
        i. NA7.5.1 Outdoor Air Ventilation Systems
        ii. NA7.5.2 Constant Volume, Single Zone Unitary Air Conditioners and Heat Pumps
        iii. NA7.5.4 Air Economizer Controls
        iv. NA7.5.5 Demand Control Ventilation Systems
        v. NA 7.5.6 Supply Fan Variable Flow Controls
        vi. NA7.5.7, NA7.5.9 Hydronic System Variable Flow Controls
        vii. NA7.5.10 Automatic Demand Shed Controls
2. Access to Training by ATTCPs (Section 10-103.2(b)2) has two components. First is the requirement for industry to provide reasonable access to certification training for

qualified technicians. Second is the criteria that the CEC may use to determine "reasonable access":

a. ATTCPs approved by the CEC, in its entirety, provide reasonable access to certification to the following industry groups:
    i. Professional engineers
    ii. Licensed architects
    iii. Heating, ventilation, and air conditioning (HVAC) installers
    iv. Mechanical contractors
    v. Testing and Balancing (TAB) certified technicians
    vi. Controls installation and startup contractors
    vii. Certified commissioning professionals (who have verifiable training, experience, and expertise in HVAC systems).
b. The CEC will determine reasonable access by considering factors such as certification costs commensurate with the complexity of the training being provided, certification marketing materials, prequalification criteria, class availability, and curriculum.

Evidence of Compliance

To provide the evidence to demonstrate compliance with the threshold requirements, staff requested that that four CEC-approved mechanical ATTCPs submit a report to the CEC in docket 20-ATTCP-01. Staff requested the following information from each of the ATTCPs concerning the threshold requirements:

1. A list of certified ATTs and the following information for each:
    a. Name, mailing address, phone number, and email
    b. Type of certification
2. A discussion of the minimum requirements for application to the ATT training and the likelihood that the professionals listed in Section 10-103.2(b)2 of the 2019 Energy Code would apply for the ATTCP training.

Required Number of Certified ATTs

To evaluate the reported information from the ATTCPs, staff developed the following criteria. Staff first compared the lists of certified ATTs provided by each ATTCP and determined that there are no ATTs that are counted in two (or more) ATTCPs, meaning that each certified ATT is unique and not double counted. Staff then contacted several individual ATTs to determine if they were certified and could provide a description of the certification process. ATTs that were contacted were able to describe the certification process to staff, as well as the major steps common to acceptance tests.

The ATTs listed by each ATTCP are presumed to have met the minimum pre-qualification requirements, completed the classroom and hands-on training requirements, and passed the certification exam. As of September 2, 2020, each ATTCP has certified the following number of ATTs to perform the acceptance tests required in the 2019 Energy Code (Section 120.5):

- NEMIC has certified 258 ATTs.[1]
- CSPTC has certified 105 ATTs.[2]
- NEBB has certified 1 ATT.[3]
- RSES is in the process of certifying ATTs.[4]

This demonstrates that the ATTCP programs are viable and that the total number of certified ATTs is 364, satisfying this requirement.

Access to Training

Staff used the following criteria to establish what the Energy Code refers to as "reasonable access" to certification training for the industry groups identified above. Staff will consider the following criteria based on the Section 10-103.2(b)2 of the 2019 Energy Code and additional criteria developed by staff:

- Certification costs including marketing materials and complexity of training. This is the cost that the ATTCP will charge the ATT or ATE for certification. However, both NEMIC and CSPTC do not charge its union members an additional fee for the ATT certification. This is covered by its members union fees. The estimated costs and time to become a certified ATT is summarized in Table 1 (below).
- Prequalification criteria. The Energy Code requires a minimum of three years installation experience. However, the ATTCPs are permitted to require additional pre-qualifications commensurate with its program. For example, NEMIC and CSPTC restrict certification training to its respective union members. While NEBB and RSES require the applicant to take and pass a written exam as a prequalification, in addition to the three years minimum experience.
- Class availability and curriculum. The classes and laboratories must be physically or remotely available to the technician applying for certification across California. While NEMIC and CSPTC have training centers throughout the state, NEBB and RSES rely on live-remote training and mobile laboratories. However, these mobile training facilities can be setup at virtually any university, college, or community college in California.
- Likelihood of engineer or architect application. While most of the ATTs will be technicians or contractors, the Energy Code recognizes the experience and benefits of training professional engineers and architects to perform (or at least understand) the required acceptance tests as well. However, the likelihood of an engineer or architect to submit to the ATT application process is in question. While staff cannot gauge the

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1 20-ATTCP-01, Mechanical Acceptance Test Technician Implementation Proceedings. TN #: 235060, National Energy Management Institute Committee (NEMIC) Comments - NEMI Industry Threshold Report 200930. October 6, 2020.

2 20-ATTCP-01, Mechanical Acceptance Test Technician Implementation Proceedings. TN #: 235496, CSPTC Response to Request for Information. November 3, 2020.

3 20-ATTCP-01, Mechanical Acceptance Test Technician Implementation Proceedings. TN #: 235480, NEBB Resubmission Letter. November 2, 2020.

4 RSES did not reply to the staff request for information through the docket. RSES does not have additional data but is currently holding training classes and scheduling laboratory classes.

interest of such professionals in the ATTCP program, staff can evaluate the accessibility of the program to consider its applications.

NEMIC

Training for the NEMIC ATT certifications takes place at 11 training centers located throughout California and operated jointly by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and the International Association of Sheet Metal, Air, Rail and Transportation Workers (SMART). NEMIC provides ATT training and certification to employees of SMART-signatory contractors. Employees of these contractors include professional engineers, licensed architects, HVAC installers, mechanical contractors, TAB certified technicians, controls installation and startup contractors, and certified commissioning professionals. Accordingly, NEMIC's training alone covers industry groups listed in Section 10-103.2(b)2.

Through the National Energy Management Institute, the International Certification Board, and the International Training Institute, NEMIC provides ATT and ATE training. The International Certification Board charges $125 for new certifications and $125 for renewals (2 Year Cycle) as a prerequisite for ATT certification. Fees are waived for SMART members.
Fees are waived for SMART members. NEMIC provides Mechanical Acceptance Test Technician training at no cost.

NEMIC has two levels of training available. MATT Level 1 is focused on the most used acceptance tests for typical HVAC installations in nonresidential buildings. The total training and examination time is between 32 and 80 hours depending on the technician's previous experience. The training is spread out between 6 and 12 weeks, depending on the schedule offered by the training center, to accommodate the technician's work schedule.
MATT Level 2 includes all mechanical acceptance tests, including hydronic base HVAC. The total training and examination time is between 24 and 30 hours depending on the technician's previous experience. The training is spread out between 1 and 2 weeks, depending on the schedule offered by training center. ATE total training and examination time is between 5 and 7 hours and training is completed the training between 1 and 2 days.

CSPTC

Any eligible professional who is a United Association (UA)[5] member may participate in the training program at no cost. Training for CSPTC Title 24 certification is paid through employer fringe benefits. The CSPTC ATT instruction program is offered only to US apprentices and journeymen. The UA heating, ventilation, air conditioning, and refrigeration (HVACR) apprenticeship program is a five-year program that consists of 180 hours of classroom training and 10,000 hours of on the job training. The ATT instruction is incorporated into the UA HVACR apprenticeship program and certification is provided upon passage of the certification exam at the end of the fifth year of the Apprenticeship program. UA Journeymen, who are not ATT certified as part of its apprenticeship program, may still be certified by taking the fifth-

5 The United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States, Canada (UA), affiliated with the national building trades, represents approximately 355,000 plumbers, pipefitters, sprinkler fitters, service technicians and welders in local unions across North America.

year apprentice program ATT courses and passing the certification exam. All CSPTC ATTs are certified to perform all required mechanical acceptance tests.

In order to obtain the ATT certification training, the technician must meet four prerequisites classes:

- 24 hours spent on Green Professionals Building Skills Training
- 21 hours spent on Energy Audit
- 45 hours on Start, Test and Balance
- 42 hours total spent on the UA Star Exam

The ATT training and testing requires an additional 48 hours. All the training, including the prerequisites, total to 180 hrs. Approximately eight months of training at six hours per week.

NEBB

Minimum requirements for application to ATT training is three years of verifiable field experience in HVAC and controls systems and the ability to successfully pass the appropriate entrance exam. The likelihood that these professionals would apply for the ATTCP training is shown using the following scale. NEBB has marked each category with a likelihood these professionals would apply for ATTCP training as either an ATT or an ATE. Scale is as follows (Very Likely, Likely, Neutral, Not Likely or Very Unlikely):

- Professional Engineers – Neutral
- Licensed Architects – Not Likely
- HVAC Installers – Very Likely
- Mechanical Contractors – Very Likely
- Certified Testing and Balancing Technicians – Very Likely
- Controls Installation and Startup Contractors – Likely
- Certified Commission Professionals – Neutral

Each acceptance test compliance document requires (1) initial testing to prove the experience level, (2) online training on the specific acceptance test, and (3) hands-on mobile training, currently located in southern California. The mobile training system is capable of being loaded onto truck beds and shipped to various locations throughout California. The ATTCP has been in conversation with several local Community Colleges that currently provide apprentice level degrees, continuing education, and certifications for HVAC professionals. Once interest improves, NEBB and RSES expect to host classroom training and laboratory training in southern California, the Bay Area, the Central Valley, and northern California on a rotating basis.

Without taking travel time into consideration, the time required to complete all three aspects of NEBB's training would be a minimum of four hours per acceptance test. Cost associated with each test individually is approximately $410.00. NEBB offers package deals when tests are bought in bulk. Pricing for a four (4) test package reduces the price from $1640 to $1280. Additional fees include one (1) application fee of $40.00 and two (2) certification fees of $50.00. It is staff's opinion that a basic application for a typical air-side HVAC system

installation would require an ATT versed in eight acceptance tests for an approximate fee of $2,560 (offered as Package 2 in the NEBB system).

RSES

Technician participation in the RSES certification program will be limited to individuals who have a least three years of verifiable professional experience and expertise in mechanical controls and systems for the specific acceptance test for which they are applying.[6] The applicant must pass a written entrance exam to show competency to perform acceptance tests. Individual prequalification exams will verify the applicant's knowledge as it pertains to each acceptance test. RSES will score the exam and notify the applicant of the results. There are no other restrictions to the application for the RSES ATTCP ATT certification program.

Summary of Evaluation

Based on the ATTCP reports, the certification training costs range between zero and $2,560 and between one and four weeks (see Table 1). ATT certification covers a given code cycle and is a onetime fee. Since nonresidential projects can take years to develop, staff estimates that the useful life of a certification is approximately six years.

Table 1: Summary of Costs and Time for ATT Certification

ATTCP	Estimated Cost of Training	Estimated Time Required for Training
NEMIC	No Cost	32 – 80 Hours
CSPTC	No Cost	48 Hours
NEBB	2,560	24 Hours
RSES	2,560	24 Hours

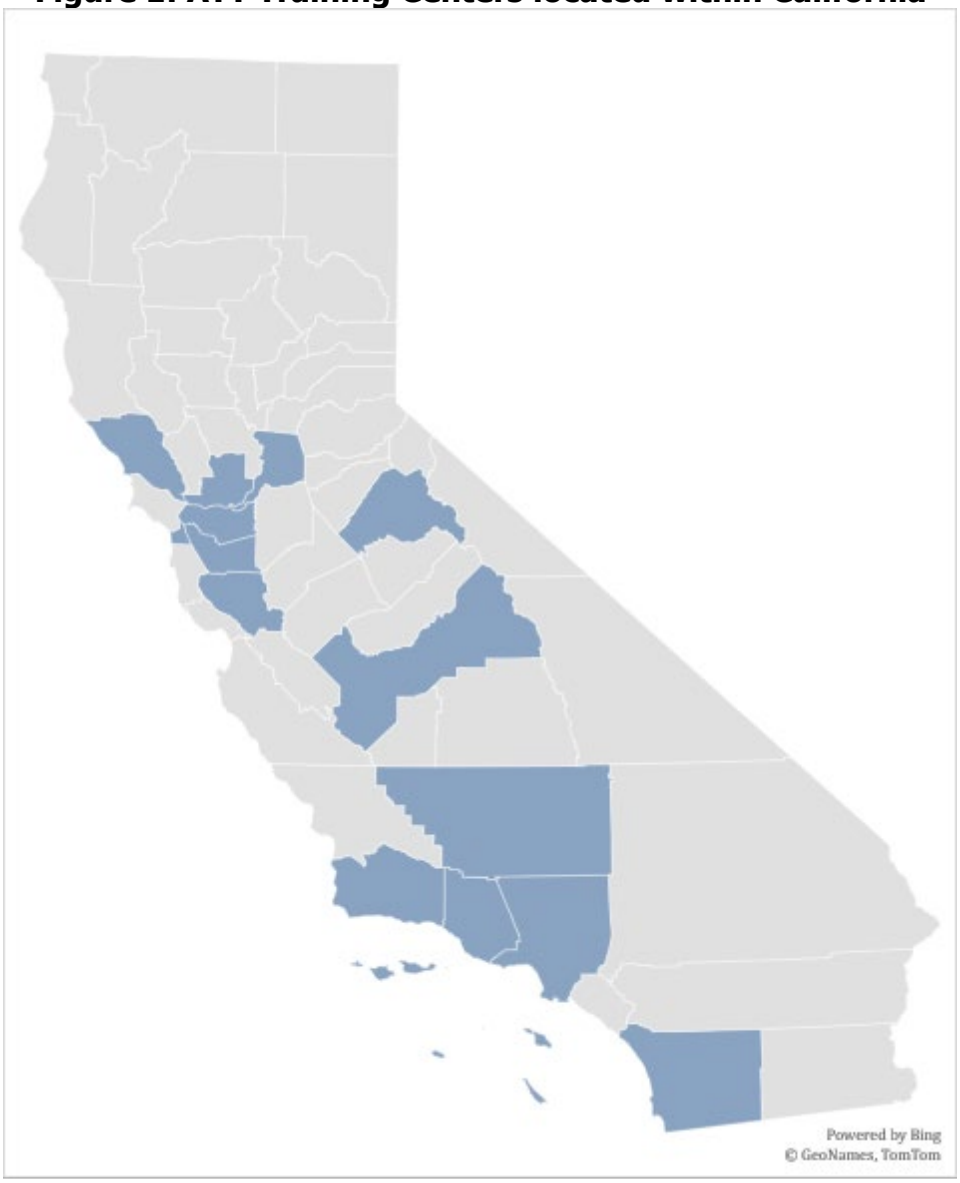
Source: CEC Staff based on the submission from ATTCPs, Docket 20-ATTCP-01 TN Numbers 236448-1, 236448-2, 236448-3, 236448-4.

Prequalification requirements are generally similar between ATTCPs (minimum of three years of experience) except for the two-union restricted ATTCPs (NEMIC and CSPTC).

NEMIC and CSPTC combined have many training centers across California (approximately 25), while NEBB and RSES utilize a mobile training facility (currently located in southern California) that may host training in a variety of locations across California. So, while Figure 1 shows training facility only as far north as the Bay Area, the mobile training center can go further to any suitable site, such as a university, community college, or even some high schools.

6 13-ATTCP-01, Acceptance and Training Certification. TN #: 217256, Mechanical Acceptance Test Technician Certification Provider Application Review - Refrigeration Service Engineers Society. April 21, 2017.

Figure 1: ATT Training Centers located within California



Source: California Energy Commission[7]

While NEMIC does allow professional engineers and architects to apply to the ATT certification program, these professions are generally not union members. However, RSES and NEBB are viable programs available to both engineers and architects. From the ATTCP reports and its original applications, staff finds that the training for ATT certification is reasonably available to the professions listed in Section 10-103.2(b)2 of the 2019 Energy Code satisfying this requirement.

7 Staff combined the training center data provided by the ATTCPs and indicated the counties in which each are located. The map does not include the California community colleges that can also host ATT certification training.

Summary of Staff Conclusions

Staff believes that the evidence submitted to the docket (20-ATTCP-01 and 13-ATTCP-01) by the ATTCPs demonstrates compliance with the threshold requirements:

1. (Section 10-103.2(b)1A): The evidence submitted by the ATTCPs shows that there are more than 300 ATTs certified to perform the complete set of mechanical acceptance tests as required in the Energy Code, Section 120.5.
2. (Section 10-103.2(b)2): The evidence submitted by the ATTCPs shows that all qualified technicians listed below have reasonable access to the ATT (and ATE) certification program:
    a. Professional engineers
    b. Licensed architects
    c. HVAC installers
    d. Mechanical contractors
    e. TAB certified technicians
    f. Controls installation and startup contractors
    g. Certified commissioning professionals (who have verifiable training, experience, and expertise in HVAC systems).

Chapter 3: Additional Concerns Raised

The mechanical ATTCPs have been working since the 2013 Energy Code to train the required number of ATTs and provide the required access to the certification training for qualified applicants. In that time, the CEC staff have held several workshops to ascertain additional concerns regarding the implementation of the certification requirement. These workshops were held in February 2017 and July 2019. From these workshops, four additional concerns were raised by stakeholders, staff, and CEC Commissioners.

1. Builders may not have reasonable access to a directory of certified ATTs across California.
2. The minimum number of 300 certified ATTs is not enough to meet the statewide demands of California's building industry for nonresidential buildings.
3. AHJs that are not ready to enforce the new requirement might delay implementation for those AHJs that are ready to implement.
4. There may be a lack of enforcement by some AHJs of the ATT certification requirement for technicians performing mechanical acceptance testing.

Remedy Evaluation Criteria

Staff used the following simple criteria to evaluate potential remedies for each of the concerns raised by stakeholders, staff, and CEC Commissioners.

The option cannot require a rulemaking. The timing involved in the evaluation of each option for consideration means that any additional rulemaking would require that the option be delayed for three years (or longer) waiting for the rulemaking to close and for the CEC to implement the new regulations. Any interim rulemaking (an option for the California Building Code) would require more staff time than is reasonably available. Additionally, an emergency rulemaking would also require staff resources that are not available and would also impact the regular Energy Code rulemaking schedule.

The option cannot add to the existing burdens of the AHJ while on the project site. The AHJ field inspectors have very little time to perform the required fire, life, and safety inspections that are of the highest concern on a nonresidential building project site. While the inspector's role is to enforce the California Building Code, they have few resources to enforce the Energy Code. Therefore, placing additional burdens on the AHJ field inspectors should be minimized.

The option must minimize the financial burden to the AHJ. Beyond the impact to the AHJ field inspectors, the option must not add a financial burden to the AHJs. For example, requiring additional substantial training (training that is more than one hour or complex in some way), or a program enforcement that requires additional staff to be hired is a significant burden on AHJs.

Remedies for Consideration

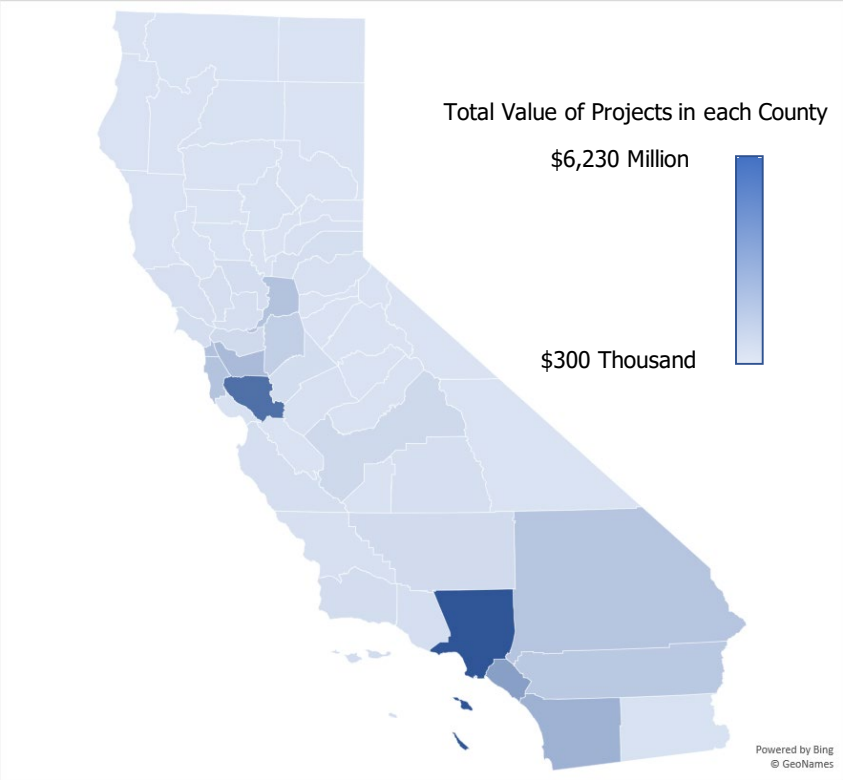
1. Builders Access to ATTs

Statewide implementation of the certification requirement may result in a lack of available ATTs in counties with very low nonresidential construction activity.

Context of the Raised Concern

In order to better understand this concern, staff performed an analysis using permit applications submitted to AHJs for nonresidential buildings.[8] Some of them may not have resulted in actual construction or completion of construction (or closed permits) and issuance of the certificate of occupancy. However, staff relies on this analysis as an indicator of the construction activity that might be present in a county. The results of the analysis are shown in Figure 2.

Figure 2: Permitted Nonresidential Project in California



Source: California Energy Commission[9]

8 The Construction Industry Research Board (CIRB) provides statistical resources for residential and commercial building permit data in California. The California Homebuilding Foundation (CHF) acquired the CIRB Report from the Building Industry Association of Southern California (BIASC).

9 CEC staff developed this figure based on data received from the Annual CIRB Report for 2019 regarding nonresidential construction. CEC staff include construction values for hotels/motels, industrial and manufacturing, offices, public works, schools, stores, mercantile, warehouses, other nonresidential buildings, and nonresidential alterations.

As illustrated in Figure 2, Los Angeles County is the build-center for California, with the Bay Area as a close second. These two build-centers (Los Angeles and Bay Area) have the highest construction activities in terms of project value ($6.2 billion each). Other counties, such as those in northern California, have very little to no nonresidential construction activities by comparison in terms of project value (the lowest being $300 thousand[10]). Figure 1 shows that the current California market is overwhelmingly centered around two build-centers and that is where most of the workload is located.

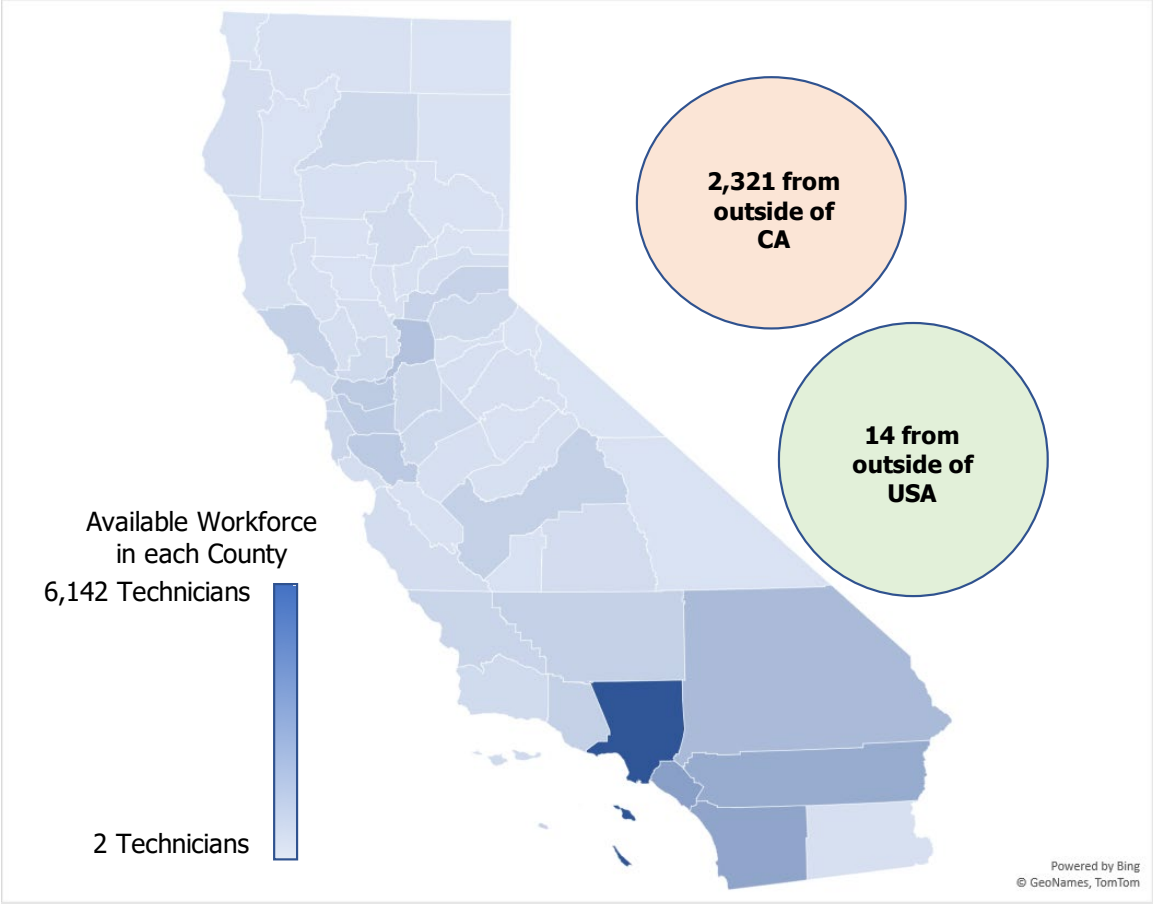
Staff requested an accounting of licensed HVAC contractors (and other related contractors that are permitted to install HVAC systems) and its location information from the Contractors State Licensing Board (CSLB). Using the information from CSLB, staff performed an analysis similar to the permit analysis shown in Figure 2 to make the correlation between the workload (Figure 2) and the workforce (Figure 3) more reasonable.

The location of contractors is based on its mailing address which may not represent its actual service territory. It is a common business practice for nonresidential HVAC contractors to travel throughout California. Since there is no reasonable way to evaluate the service territory of HVAC contractors (without conducting a survey) and to make the overall analysis more conservative, staff assumed that the HVAC contractors stay within the county that they are located.

Figure 3 only considers licensed contractors; unlicensed contractors are not represented in this analysis. While this potentially detracts from the analysis, there is no reasonable way for staff to account for unlicensed contractors.

10 Alpine County.

Figure 3: California Licensed HVAC (and other related) Contractors



Source: California Energy Commission[11]

As illustrated in Figure 3, Los Angeles County has the highest concentration of contractors (6,142), while several Northern California counties have virtually none. Additionally, there are a substantial number of contractors located outside of California (2,321 outside of the state and another 14 outside of the United States).

Staff assumes that the current workload (Figure 2) is met by the current work force (Figure 3). What these figures do not show is the assertion that many contractors travel away from the build-centers for an additional fee. While staff is confident that this does occur, there is no indication as to the amount of travel involved. Additionally, Table 2 shows the estimated pay range for technicians and contractors. As seen, this pay range is higher for areas that have a higher living expense and not necessarily farther from build-centers (the Bay Area has the highest range).

11 CEC staff developed this figure based on data received from the Contractors State Licensing Board, Class by County report. The report listed contractors licensed to work in California. CEC staff refined the contractor list to those that would be impacted by ATT certification requirements: General Engineering (A), Boiler Contractors (C-4), HVAC Contractors (C-20), and Air Balancing Contractors (D-62).

Table 2: Estimated Labor Costs by California Regions

California Regions	Estimated Labor Cost (Hourly Taxable Wage Range)
San Diego Region	20 to 41 dollars per hour
Los Angeles Region	19 to 49 dollars per hour
Bakersfield Region	16 to 37 dollars per hour
Central Coast Region	21 to 47 dollars per hour
Bay Area Region	27 to 65 dollars per hour
Central California Region	18 to 47 dollars per hour

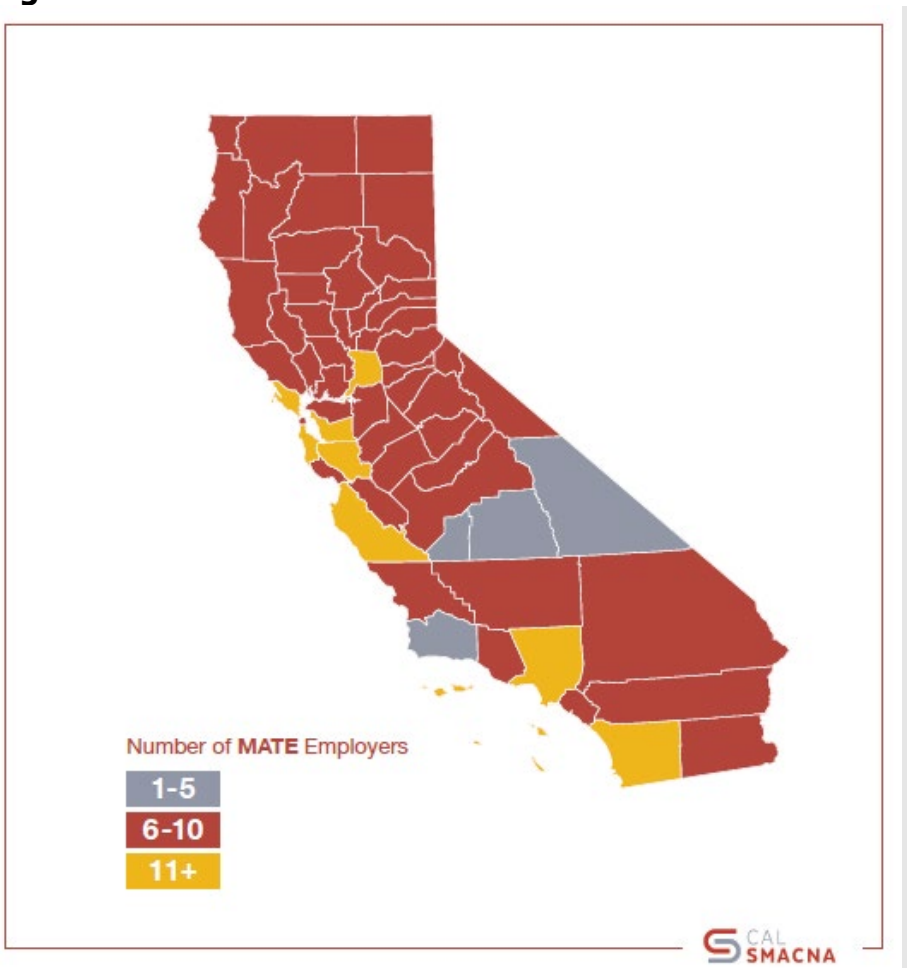
Source: NEMIC Report Confirming Industry Certification Thresholds[12]

Figures 2 and 3 show that most contractors are located at the build-centers and will be encouraged by AHJ enforcement to seek out ATT certification. This is consistent with the lighting controls ATT certification implementation in July 2014. Staff's experience with the implementation of the lighting controls ATT certification requirement suggests that the counties where enforcement may be an issue are willing to enforce the requirement, but not to the detriment of the community that they serve. However, most contractors will bid on jobs throughout California as evidenced by the large contingent of contractors located outside of California (see Figure 3), and the common business practice of HVAC contractors. Figure 4 shows the service territory of contractors currently certified by NEMIC (as ATEs) and demonstrates statewide coverage from one ATTCP. The primary cost to builders for a technician is between $31 and $128 per hour depending on location, crew components, economy of scale, equipment, and site-specific requirements.[13] To be competitive in the build-centers as well as other areas in California, HVAC contractors will be motivated to seek ATT certification if it is enforced by the AHJs.

12 20-ATTCP-01, Mechanical Acceptance Test Technician Implementation Proceedings. TN #: 235060, National Energy Management Institute Committee (NEMIC) Comments - NEMI Industry Threshold Report 200930. October 6, 2020.

13 Ibid.

Figure 4: NEMIC ATE Service Territories within California



Source: NEMIC Report Confirming Industry Certification Thresholds, Exhibit B NEMIC Map of Service Area Coverage

The issue of builder access to ATTs may not be as significant as initially thought given the above considerations. However, it is likely that there will be some difficulty early in the rollout of the enforcement process. The challenge will be to effectively communicate to the contractor community the scope of the new certification requirements in concert with the AHJ. Partnering with the AHJ and communicating to the contractors (designers and builders) will encourage contractors to seek ATT certification.

Options Considered

Amend the Threshold Requirements

Incorporate implementation by geographic area into the threshold requirements that would allow for build-centers to enforce immediately and allow less active AHJs to enforce later. This alternative implementation plan would set the criteria for each AHJ to be required to enforce the ATT certification requirement once those criteria were satisfied.

Staff determined that such a staggered implementation would likely require a rulemaking. Therefore, this option is rejected.

Targeted Education and Outreach

Provide targeted education and outreach to AHJs, local builders, and contractors regarding the ATT certification requirement. This would require the CEC to enact the ATT certification requirement at a business meeting (as prescribed in the Energy Code). Staff would then engage in an education and outreach effort targeting the ATT certification requirement for AHJs, local builders, and contractors. The training provided by staff would be between 15 and 60 minutes and include counter-cards, fact sheets, and brochures. Additionally, the ATTCPs would provide free training that is more in-depth (approximately four hours in length) for AHJs and builders to give them a better understanding of the program.

This option would not require a rulemaking. Since the training provided is minor and includes the AHJ, local builders, and contractors it is does not represent an additional burden to the AHJ inspector or the AHJ itself.

2. 300 Certified ATTs is Insufficient

The threshold requirement includes a minimum of 300 certified ATTs, but this is not enough to meet the statewide demands of California's building industry for nonresidential buildings.

Context of the Raised Concern

Based on the information staff received from the CSLB, there are approximately 35,000 licensed HVAC contractors in California; 300 of them are certified ATTs, that is less than 1 percent. However, the intent of the threshold requirement was not to ensure that there were enough ATTs to address the workload, but to demonstrate that the ATTCP program is viable and enough ATTCPs are operational and capable of training qualified technician applicants as ATTs.

There are four CEC-approved mechanical ATTCPs that can provide training for both union and nonunion technicians across California. NEMIC uses 11 training centers and CSPTC has six training centers for classroom and laboratory training for ATT certification. Figure 1 shows the counties where these training centers are located. Two of the ATTCPs employ a mobile training facility that can be setup anywhere there is a suitable space (for example, most California community colleges have ample space for this training facility). Additionally, the ATTCPs provide classroom training materials on-line in learning management systems (LMS) that can be accessed anywhere.

Since the training is available across California, the issue is not one of training accessibility, but technician motivation. The HVAC contractors and technicians surveyed by NEMIC stated that they were not convinced that the CEC would ever make the certification mandatory.[14] As a result, they are choosing to wait until there is a hard date for enforcement.

Options Considered

Education and Outreach prior to Enforcement

Staff proposes to provide education and outreach training to AHJs, builders, and contractors as part of the rollout of the mandate. This training would include an advisory of the possible future date of enforcement. The enforcement date is the date that the CEC is expected to

14 Statement provided by NEMIC (data submitted under confidentiality) during the July 2019 staff workshop.

determine that the threshold requirements have been met and approve the implementation of the mandate. However, because the CEC must make this determination at a public business meeting, staff would only be able to advise AHJs, builders, and contractors of a possible date of enforcement, not a hard date.

Staff have, over the past four years, engaged in education and outreach training events for contractors, AHJs, and builders. In staff's opinion, these efforts alone have not been effective in encouraging contractors to seek ATT certification. The conventional wisdom and consistent advice from the audience attending these training events is that most contractors will only seek certification once a hard date of enforcement is announced.

Using education and outreach training alone (without an enforcement date) will not contribute to any impact on industry or the enforcement community. However, staff does not believe that it will effectively encourage technicians to seek ATT certification. Therefore, staff only considers the education and outreach option viable if it is paired with a disclosure of a hard date for implementation.

Delayed Initial Implementation Date as the Hard Date

As soon as the CEC makes the two findings required by Section 10-103.2, the requirement that ATTs complete acceptance testing immediately triggers. However, CEC could exercise its discretion to not enforce the requirement to allow a reasonable time for training and implementation, not to exceed six months.

This option would not require a rulemaking. This option would tend to ease the burden of enforcement for the AHJs, and compliance for the builders and contractors by allowing them enough time to engage with the CEC targeted education and outreach training.

Business Meeting Date as the Hard Date

The date that the CEC would approve the threshold requirements and make ATT certification mandatory for performing mechanical acceptance tests could also be the date it is enforced. Given enough warning that the business meeting is the hard date could be achieved by holding a staff workshop six months prior. This would give parties the opportunity to comment on the approval process and give staff enough time to educate a large portion of industry and the enforcement community. With enough lead time, contractors, and technicians (as well as other professions) would be able to be informed of the pending enforcement of the requirement and seek out the necessary certification.

This option would not require a rulemaking. This option would initially have an impact on the enforcement efforts for the AHJs as not all AHJs would be reached (even with a six-month lead time). This option would also have an initial impact on the industry as the builders and contractors become aware of the new requirement. This option does not allow a significant amount of time to educate the AHJs or builders prior to the implementation date. Additionally, this option risks undermining marketplace confidence in the intent of the CEC to implement the requirement.

3. Implementation Delay for Smaller Counties

Stakeholders are concerned that the CEC may delay the implementation of the certification requirement to allow small counties that do not have a significant amount of nonresidential construction to prepare, when larger build-centers in California may be ready to proceed.

Context of the Raised Concern

When the threshold requirements were developed in the 2013 Energy Code, there was no consideration of flexibility for AHJs that might not be prepared for the implementation of the ATT certification requirement. The CEC can consider holding off implementation if the CEC determines that there would be substantial disruption to the nonresidential building industry.

The CEC did not raise this concern when it implemented the lighting controls ATT certification requirements in July 2014. The CEC made ATT certification mandatory for lighting control acceptance testing on the date of the business meeting. However, there was an extended period until the first AHJ began enforcing the requirement (approximately six months). Staff received a steady stream of complaints from certified ATTs and the lighting controls ATTCPs regarding AHJs that were not enforcing the testing requirements. Staff would contact each AHJ, inform them of the deficiency, offer training (accepted about 50 percent of the time), and follow up with the AHJ within three months. From this effort, it has taken more than two years to on-board the AHJs currently enforcing the lighting controls ATT certification requirements and enforcement continues to be inconsistent across AHJs in California.

Options Considered

Targeted Education and Outreach

This option proposes to provide the local AHJs with the educational material to enable them to enforce the new requirement. Staff proposes to provide this education by area (Los Angeles County, Southern California, Bay Area, Central Valley, and Northern California) to build the necessary support within a given area. This educational material would be provided after the CEC business meeting approving the threshold.

It will not require a rulemaking. It will not burden the AHJs as the educational materials will be slight (presentations will be 15 minutes to 1-hour in length) and the resulting on-site enforcement would be simplified for the AHJ inspector.

4. Lack of AHJ Enforcement

There may be a lack of enforcement by some AHJs of the ATT certification requirement for technicians performing mechanical acceptance testing.

Context of the Raised Concern

Traditionally, some AHJs have had difficulty enforcing the Energy Code requirements. The Energy Code is flexible providing developers and builders with many paths to compliance, but with that flexibility comes a significant amount of complexity, especially for AHJ enforcement.

Lack of enforcement of the ATT certification requirement would put a certified ATT at a disadvantage compared to a contractor without a certified ATT when bidding on nonresidential projects. However, the disadvantage might not be as significant as was initially believed. There is very little evidence to support this concern, other than the idea that a technician would spend time and money becoming certified in addition to the money needed to perform the acceptance test at each job. Most technicians work for a contractor and only one technician needs to be a certified ATT in that situation, which would minimize the exposure to down time for the contractor (who supplies the bids for nonresidential projects). Moreover, the union-

based ATTCPs, which represent most certified ATTs, do not charge an additional fee for the ATT certification training or subsequent use of its compliance documentation systems. Even so, the consistent enforcement of the ATT requirement across California is a fair and desirable goal for most stakeholders, including the CEC. Options Considered

Options Considered

Targeted Education and Outreach

As previously discussed, staff would provide targeted education and outreach to AHJs, local builders, and contractors regarding the ATT certification requirements. This would require the CEC to enact the ATT certification requirement at a business meeting (as currently prescribed in the Energy Code). Staff would then engage in an education and outreach effort targeting the ATT certification requirement for AHJs, local builders, and contractors. The targeted training provided by staff would be limited to approximately 15 minutes and include counter-cards, fact sheets, brochures, and information to access voluntary additional training.

This option would not require a rulemaking. Since the training provided is minor and includes the AHJ, local builders, and contractors it does not represent an additional burden to the AHJ inspector or the AHJ itself.

Staff Recommendation

Based on the evaluation criteria, staff recommends the following implementation strategy:

1. Make the requisite finding pursuant to Title 24, Part 1, Section 10-103.2, but, as necessary, exercise the CEC's discretion to not enforce the requirement to allow a reasonable time for training and implementation, not to exceed six months.
2. Actively engage the AHJs, builders, contractors, engineers, and architects to advise them of the program and the enforcement date and offer training.

Chapter 4: Conclusions and Recommendations

Threshold Compliance

Staff believes that the evidence submitted to the docket (20-ATTCP-01 and 13-ATTCP-01) by the ATTCPs demonstrates compliance with the threshold requirements:

1. (Section 10-103.2(b)1A): The evidence submitted by the ATTCPs shows that there are more than 300 ATTs certified to perform the complete set of mechanical acceptance tests as required in the Energy Code, Section 120.5.
2. (Section 10-103.2(b)2): The evidence submitted by the ATTCPs shows that all qualified technicians listed below have reasonable access to the ATT (and ATE) certification program:
    a. Professional engineers
    b. Licensed architects
    c. HVAC installers
    d. Mechanical contractors
    e. TAB certified technicians
    f. Controls installation and startup contractors
    g. Certified commissioning professionals (who have verifiable training, experience, and expertise in HVAC systems).

Staff will recommend CEC approval to make ATT certification mandatory to perform a mechanical acceptance test.

Staff Recommended Implementation Strategy

Staff proposes that the CEC approve the following implementation plan to help enforce the mandatory requirement that certified ATTs perform mechanical acceptance tests. The intent is to allow sufficient time for CEC staff to engage the AHJs, builders, contractor, engineers, and architects and advise them of the ATTCP program and the enforcement date. The strategy will be to focus both on a statewide outreach effort augmented with a local outreach effort. Staff will make the following recommendations to the CEC approval of the certification requirement:

3. Make the requisite finding pursuant to Title 24, Part 1, Section 10-103.2, but, as necessary, exercise the CEC's discretion to not enforce the requirement to allow a reasonable time for training and implementation, not to exceed six months.
4. Actively engage the AHJs, builders, contractors, engineers, and architects to advise them of the program and the enforcement date and offer training.

Outreach Materials

Staff will develop the following outreach materials:

- Getting Started Training (PowerPoint)
- Counter Cards
- Inspector Field Sheets
- Fact Sheets and CEC Blueprint articles

Additionally, staff will promote the ATTCPs' in-depth training (approximately 4-hours) for inspectors.

Statewide

Staff will conduct a public workshop in January 2021 to announce the CEC intention and collect comments and questions. Staff will use email and training sessions as a means of persistent reminder of the targeted implementation date and the ATTCP program. Staff will proactively conduct education and outreach using partnerships such as the Energy Code Ace, PG&E training, CALBO, BayREN, 3C-REN, and SoCalREN. Additionally, staff will seek out large venue opportunities such as conferences and symposiums to present information to contractors, engineers, architects, and builders.

Local

Staff will work with local partners to refine necessary enforcement tools, provide special assistance for difficult issue resolution at the local level, and seek out promotional opportunities aimed at smaller building departments.

Approval Process

The CEC must formally make the findings specified by Section 10-103.2 to trigger the requirement for certified ATTs to perform the mechanical acceptance tests required by the Energy Code (Title 24. Part 1, Section 10-103.2(b)). Given the complexity of the minimum requirements themselves and the additional concerns raised, staff will submit this report for the CEC to consider as evidence for this approval. Staff will recommend at a business meeting that the CEC accept the staff report as compelling evidence and find by resolution that the regulatory threshold conditions have been met. Thus, making ATT certification required for performing the mechanical acceptance tests required by the Energy Code.

1. Publish staff report.
2. Conduct a public workshop with a 30-day comment period.
3. Revise the initial staff report as necessary and address comments for the final staff report.
4. Produce documents necessary for a business meeting approval.

APPENDIX A: Glossary

Term	Definition
AHJ Authority Having Jurisdiction	An authority having jurisdiction refers to the entity that would issue a building permit for a construction project. Generally, this is the local (city or county) building department but can also include state or federal agencies that would have jurisdiction. For example, the Division of the State Architect is the AHJ for construction projects in California K-12 schools.
APA Administrative Procedures Act	California Government Code, Title 2; Government of the State of California, Division 3, Part 1, Chapter 3.5; Administrative Regulations and Rulemaking. Describes the requirements and process for a state agency to develop, approve, and implement regulations.
ATTCP Acceptance test technician certification provider	An agency, organization, or entity approved by the CEC to train, certify, and oversee acceptance test technicians and acceptance test employers relating to either lighting controls or mechanical systems. ATTCPs are authorized to certify only those technicians and employers for which they are approved. ATTCPs approved to certify technicians and employers relating to lighting controls acceptance testing are sometimes referred to as "lighting controls ATTCPs," and ATTCPs approved to certify technicians and employers relating to mechanical systems acceptance testing are sometimes referred to as "mechanical ATTCPs."
ATT Acceptance test technician	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. ATTs are authorized to perform only those acceptance tests for which they are certified. ATTs certified to perform lighting controls acceptance testing are sometimes referred to as "lighting controls ATTs," and ATTs certified to perform mechanical systems acceptance testing are sometimes referred to as "mechanical ATTs."

Term	Definition
ATE Acceptance test employer	A person or entity who employs an acceptance test technician and is certified by an authorized acceptance test technician certification provider. ATEs are authorized to employ only those technicians for which they are certified. ATEs certified to employ technicians that perform lighting controls acceptance testing are sometimes referred to as "lighting controls ATEs," and ATEs certified to employ technicians that perform mechanical systems acceptance testing are sometimes referred to as "mechanical ATEs."
BIASC Building Industry Association of Southern California	BIASC is a public policy advocacy group representing home builders, developers, contractors, suppliers, and skilled labor.
CALBO California Building Officials	California Building Officials is a non-profit corporation dedicated to promoting public health and safety in building construction through responsible legislation, education, and building code development.
CEC California Energy Commission	The California State Energy Resources Conservation and Development Commission.
CHF California Homebuilding Foundation	The California Building Industry Foundation (CBIF) was founded in 1978 by the California Building Industry Association (CBIA) and renamed as the California Homebuilding Foundation (CHF) in 2007. The Foundation was created to house a widespread college scholarship program for students majoring in homebuilding and construction-related fields, dedicated to pursuing long-term careers in the industry.
CIRB Construction Industry Research Board	CIRB is a statistical resource for residential and commercial building permit data since 1954. They are owned and operated by BIASC and CHF for the building developer industry.
CSLB Contractors State Licensing Board	CSLB is a California state agency that protects consumers by regulating the construction industry through policies that promote the health, safety, and general welfare of the public in matters relating to construction.
CSPTC California State Pipe Trades Council	CSPTC is a mechanical ATTCP approved by the CEC.

Term	Definition
Energy Code Building Energy Efficiency Standards	The regulations contained in Title 24, Part 6 and Title 24, Part 1, Chapter 10 of the California Code of Regulations.
HVAC Heating, Ventilation, and Air Conditioning	HVAC is a general reference to systems and devices that provide different types of heating, ventilation, and cooling services to residential and commercial buildings.
HVACR Heating, Ventilation, Air Conditioning, and refrigeration	HVACR is a general reference to systems and devices that provide different types of heating, ventilation, cooling, and refrigeration services to commercial buildings (residential buildings do not typically use HVACR).
LMS Learning Management System	An LMS is an online software system used to deploy and track online training programs.
NEBB National Environmental Balancing Bureau	NEBB is a mechanical ATTCP approved by the CEC.
NEMIC National Energy Management Institute Committee	NEMIC is a mechanical ATTCP approved by the CEC.
Regional Energy Networks: 3C-REN Tri-County Regional Energy Network BayREN Bay Area Regional Energy Network SoCalREN Southern California Regional Energy Network	The California Public Utilities Commission developed the REN program for organizations to manage energy efficiency programs where there is potential for scalability to a broader geographic area or hard to reach markets, whether there is a current utility program that may overlap. 3C-REN is a partnership between the Counties of San Luis Obispo, Santa Barbara, and Ventura. BayREN is a collaboration of the nine counties that make up the San Francisco Bay Area. SoCalREN is managed by the County of Los Angeles for Southern California.
RSES Refrigeration Service Engineers Society	RSES is a mechanical ATTCP approved by the CEC.

Term	Definition
SMACNA Sheet Metal and Air Conditioning Contractors' National Association	SMACNA is an international trade association with more than 4,500 contributing contractor members in 103 chapters throughout the United States, Canada, Australia, and Brazil. Its headquarters is in Chantilly, Virginia.
SMART International Association of Sheet Metal, Air, Rail and Transportation Workers	SMART is a North American labor union headquartered in Washington, DC, was chartered by the AFL-CIO in 2013.
TAB Testing, Adjusting, and Balancing	TAB is a set of procedures used to ensure that an installed HVAC system is operating properly and in accordance with design and code. TAB professionals are trained and certified by specialized institutions.
Threshold In reference to Title 24, Part 1, Section 10-103.2(b). Industry Certification Threshold.	This is the coded section within the Energy Code that allows the CEC to make ATT certification mandatory to perform a mechanical acceptance test required by the Energy Code, Section 120.5.
UA United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States, Canada	The United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States, Canada (UA), affiliated with the national building trades, represents approximately 355,000 plumbers, pipefitters, sprinkler fitters, service technicians, and welders in local unions across North America.