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STAFF REPORT

Nonresidential Data Repository for the 2022 Energy Code

**Alternative to the Data Registry for Acceptance
Test Technician Certification Providers**

**Gavin Newsom, Governor
Month Year | CEC-400-2021-002**

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ABSTRACT

The California Energy Commission (CEC) updates the California Building Energy Efficiency Standards on a three-year cycle. The *2022 California Building Energy Efficiency Standards* will go into effect January 1, 2023 (for building permit applications submitted on or after the effective date). Staff prepared this report to seek public input on recommendations for the *2022 California Building Energy Efficiency Standards* related to the acceptance test technician certification provider program, the nonresidential data registry, and the CEC central nonresidential data repository.

Keywords: commission compliance document repository, nonresidential data registry, acceptance test technician certification provider, mechanical systems, lighting controls, Building Energy Efficiency Standards, Energy Code

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EXECUTIVE SUMMARY

As part of the pre-rulemaking process for the *2022 Building Energy Efficiency Standards* (Energy Code), the California Energy Commission (CEC) held a workshop March 10, 2020, to discuss and solicit public input on proposed changes to the CEC's acceptance test technician certification provider (provider) program and nonresidential data registry (registry) requirements. These proposed changes will address a redundant data reporting requirement that may cause confusion and increase costs to building owners and consumers who seek to comply with the Energy Code.

Providers are private organizations approved by the CEC and are responsible for training, certifying, and providing quality assurance for technicians certified as acceptance test technicians (technicians). Technicians perform acceptance tests as required by the Energy Code and complete nonresidential compliance documents for either lighting controls or mechanical systems. The CEC has approved two lighting controls and four mechanical systems providers. Each provider is required to have its own database for tracking nonresidential compliance documents that technicians complete.

As envisioned, a registry would be developed and owned by one or more third-party private organizations who would register and store each provider compliance document as it was created. A registry would be used only after a third-party organization applied to and was approved by the CEC as meeting all the registry requirements under the Energy Code. The registry would keep track of the documents electronically and make them available to local building departments (jurisdictions) for their building permit review process and to the CEC. In the absence of an approved registry, each provider has accepted and stored compliance documents in its own database. To date, the CEC has not received an application for, nor has it approved, a nonresidential data registry.

A provider database is not a registry and could not be approved as a registry since a provider database includes only lighting controls or mechanical systems compliance documents. A registry must be able to accept all compliance documents related to covered processes and envelope measures in addition to lighting controls and mechanical systems.

The Energy Code authorizes the CEC to develop a compliance document repository (repository) and collect and store compliance data for newly constructed buildings and alterations and additions to existing buildings. The CEC is developing the repository, which will ultimately be used to store nonresidential and residential building data. The repository will accept, and store compliance document data contained in all CEC-approved provider databases. The data will be available to the CEC for analyses to support buildings, appliances, and demand flexibility standards; inform program implementation and policy development; and evaluate standards compliance.

If left unaltered, the Energy Code would require that a provider record the acceptance tests performed by its technicians and submit those compliance documents to a private third-party registry. These actions would essentially duplicate the registration of each compliance document at an additional cost for industry (and the consumer) without additional benefits.

In response to the March 10, 2020, workshop, the California Energy Alliance submitted comments to the docket recommending that providers be allowed to report compliance data directly to the CEC and avoid registering compliance documents for a fee to one or more private registries and the CEC. The California Energy Alliance specifically recommends:

1. Authorizing providers to submit data directly to the CEC repository.
2. Expanding authority of providers to collect and store all nonresidential compliance documents relative to their area of expertise (currently limited to new installations of lighting controls and mechanical systems).

This staff report describes options that were proposed, criteria and process staff used to evaluate those options, and staff recommendations for the 2022 Energy Code.

Staff evaluated each option using the following criteria:

1. Avoid double charging consumers.
2. Promote market stability and transparency.
3. Promote a fair and level playing field for providers.
4. Promote data efficacy over document efficacy.
5. Avoid project site workflow impedance.
6. Avoid impacting the implementation of the repository.
7. Each option must include a cost-effectiveness/benefit assessment.

To inform the development of this report, staff met with the providers to discuss the following questions:

- Can providers develop a secure means of transferring data to the CEC repository?
- Can providers normalize data to ensure that data from one provider is consistent with data from another provider?
- Can providers add the additional compliance documents that are required by the registry to the provider's database?
- What is the size of data to be transferred in one year, and what is the frequency of data transference?
- What is the timing to develop the necessary functionality to deliver data to the CEC repository?

Staff evaluated the California Energy Alliance recommendations against the criteria listed above; all recommendations passed the criteria and beneficially impact the development of the CEC repository.

Staff recommends that the 2022 Energy Code be amended to allow for providers to submit data to the CEC repository directly rather than a third-party private registry. The registry will continue to be required for nonresidential covered processes and envelope projects.

CHAPTER 1:

Introduction

The California Energy Commission (CEC) updates the Building Energy Efficiency Standards (Energy Code) on a three-year cycle. The 2022 Energy Code will continue to improve upon the 2019 Energy Code for newly constructed building and alterations and additions to existing building. The 2022 Energy Code will go into effect January 1, 2023 (for building permit applications submitted on or after the effective date).

The 2019 Energy Code contains a redundancy and conflict between the acceptance test technician certification providers (ATTCPs) and the nonresidential data registry (NDR). Staff proposes to address this redundancy and conflict in the 2022 Energy Code.

The ATTCP Program

The ATTCP program was first introduced into the 2013 Energy Code. The intent was for ATTCPs to provide training, certification, and oversight, including quality assurance, to technicians performing the acceptance tests required by the Energy Code for new installations of lighting controls and mechanical systems in nonresidential buildings. The CEC reviewed and approved applications for both lighting controls and mechanical systems ATTCPs. The ATTCP certifies the acceptance test technicians (ATT) who performs the acceptance test. The ATTCP also certifies the technician's employer (ATE) so that the employer can ensure that the ATT performs the proper acceptance test. All acceptance tests are provided to the authority having jurisdiction (AHJ), most typically the local building inspector. Since July 2014, lighting controls acceptance tests are required to be performed only by certified ATTs (Section 10-103.1(b)). However, the CEC has recently opened a proceeding to consider a similar requirement for mechanical systems acceptance testing.

The ATTCP works directly with the ATT and ATE during construction. The ATT must perform the required acceptance test and submit completed compliance data to the ATTCP database that will be documented and submitted to the AHJ. Only the ATT has access to the compliance document for the purpose of completing it or making necessary changes. The ATE and AHJ access is limited to notes and review only for permitting purposes.

NDR vs. CEC Repository

An NDR was first introduced in the 2008 Energy Code and would be operated by one or more third-party private organizations approved by the CEC. The original intent was to provide a third-party data source to the CEC and furnish the nonresidential construction industry with a compliance document registry system like the registry systems for the residential construction industry.

The Energy Code currently authorizes the CEC to develop a commission compliance document repository (CCDR) and collect and store compliance data and documents. The CEC is currently developing a CCDR, which will store nonresidential and residential buildings data. An approved NDR is required to supply compliance documents (and data) to the CEC CCDR. Unlike an NDR, CEC staff has direct and complete access to the CCDR, which is developed and maintained by the CEC for analyses to support buildings, appliances, and demand flexibility standards, inform

program implementation and policy development, and evaluate standards compliance. The CCDR will accept and store compliance document data registered with one or more NDRs and can accept data directly from ATTCPs.

To date, the CEC has not completed enough of the control structure for an NDR to be approved. This structure is required prior to the CEC accepting an NDR application from one or more third parties. However, if the CEC were to approve one or more NDRs, all nonresidential compliance documents would be required to be registered to an NDR (which will likely charge a fee for service), including compliance documents submitted to ATTCPs.

2022 Energy Code Changes

An issue of conflict within the Energy Code is that if the CEC approved one or more NDRs, the compliance documents recorded by the ATTCP would need to be tracked by both an NDR and the ATTCPs, creating a redundancy, an additional level of complexity, and an additional cost to building owners.

Staff held a public workshop¹ on March 10, 2020, related to the ATTCP program and NDR. The workshop was attended primarily by representatives from the ATTCPs and those persons who have stated interest in applying to become an NDR. While several comments were received, one recommendation² from the California Energy Alliance (CEA), whose members include some ATTCPs, suggested the compliance documents that the ATTCPs already validate and track be excluded from the NDR requirements. It further suggested that the data collected by the ATTCPs could be submitted directly to the CCDR without first having to pass through an NDR.

Staff summarized the CEA option to two key elements:

1. Allow ATTCPs to submit data directly to the CEC CCDR.
2. Expand the authority of ATTCPs to collect and store all nonresidential compliance documents relative to its area of expertise (i.e., currently limited to new installations of lighting controls and mechanical systems).

This staff report evaluates the original proposals presented at the public workshop in addition to the CEA Proposal. Originally, staff proposed three possible options at the workshop, but encouraged participants to propose other solutions. These three staff options were:

Option 1: Define ATTCPs as authorized users of an NDR in Reference Joint Appendix JA7.4.2.

1 Docket 19-BTSD-03, TN#232021, 2/13/2020, [Staff Workshop Notice 2022 Energy Code - Acceptance Test Technician Certification Provider](#).

2 Docket 19-BSTD-03, TN#232808, 4/21/2020 [CEA Data Registry and Repository Comments and recommendations](#) regarding development of a data registry and repository, CEA submission on behalf of members including multiple ATTCPs.

Option 2: Include ATTCPs in an NDR as an External Digital Data Source (EDDS). An EDDS is an optional data entry system used by a data registry. An ATTCP could be included in an NDR as an EDDS.

Option 3: Add new requirements in Section JA7 to describe the authorized data exchanges between an ATTCP and an NDR.

Staff used the following criteria to evaluate the merits of each proposal:

1. Avoid double charging consumers.
2. Promote market stability and transparency.
3. Promote a fair and level playing field for ATTCPs.
4. Promote data efficacy over document efficacy.
5. Avoid project site workflow impedance.
6. Avoid impacting the implementation of the CCDR.
7. Each option must include a cost-effectiveness/benefit assessment.

Staff prepared this report to seek public input on the staff recommendations. This report does not include all changes being considered in the 2022 Energy Code that may affect the ATTCP program.

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Chapter 2: Background

Compliance Data Registry

The compliance data registry requirements were first developed in the 2008 Energy Code and include both NDRs and residential data registries (RDR). The requirements for a compliance data registry are found in Title 24, Part 6 Reference Joint Appendix JA7, with further nonregulatory explanations of the requirements and other implementation recommendations found in the Data Registry Requirements Manual (DRRM).³ The compliance data registries are referenced in several locations, starting with Part 1, Section 10-103(a). The CEC requires that RDRs are operated by Home Energy Rating System (HERS) providers, and that NDRs are separate from the ATTCPs.

If approved by the CEC, all nonresidential compliance documents must be registered with an NDR. Note the specific difference between these requirements. The residential compliance documents are only registered with the data registry if a HERS rater is required. This eliminates many projects that do not require a HERS rater. While the nonresidential compliance documents must all be registered with an NDR. The RDR has other significant differences from an NDR. Primarily, an RDR must be operated by a HERS Provider, while an NDR may be operated by one or more approved third-party private organizations. This is a subtle difference but may create issues in terms of quality assurance. A HERS Provider is tasked with quality assurance responsibilities (Title 20, Section 1670 et seq.), an NDR is not required to provide any quality assurance. To date, the CEC has not approved an NDR.

External Digital Data System

An EDDS service is a data exchange service used by authorized users to upload data to a compliance data registry, first provided in the 2019 Energy Code (JA7.7). To use an EDDS service, a CEC-approved compliance data registry must apply to and receive approval from the CEC. The EDDS is a permitted means of avoiding transcribing data by hand into the compliance data registry. The intended use of an EDDS is for an automated digital tool reading for heating ventilation and air conditioning (HVAC) systems that can simplify the measurement and data gathering requirements for checking for things like appropriate refrigerant charge. However, there is no specific limit to what can be used as an EDDS, only that it has specific characteristics. These would be that the EDDS user have a secure user identification and password, it must be able to save data to its database system, and it must be able to upload to a compliance data registry under the direct control of an authorized user of that registry. With these definitions, it is possible that an ATTCP could qualify as an EDDS and work directly with a CEC-approved compliance data registry.

3 June 2020, California Energy Commission, [2019 Data Registry Requirements Manual](#), for the 2019 Building Energy Efficiency Standards, Title 24, Part 6, and Associated Administrative Regulations in Part 1. CEC-400-2018-022-CMF.

Nonresidential Data Registry

The original intent of the NDR was to provide a data source for the CEC CCDR and furnish the nonresidential construction industry with a compliance document registry system like the registry systems for the residential construction industry.

An NDR provides for the registration of nonresidential compliance documentation (Nonresidential Certificates of Compliance, Installation, and Acceptance) used for demonstrating compliance with the Energy Code. However, these regulations do not identify the actual purpose and goals of an NDR, only its function. The intended purpose of an NDR is to register and store the required compliance documentation in a data registry and convey these documents and associated data to the CCDR. The goals of an NDR are as follows:

- Reduce the complexity of navigating the compliance documentation requirements.
- Provide guidance to project proponents attempting to demonstrate compliance.
- Validate that the compliance documents were completed correctly and accurately.
- Authenticate that the source of the documents is from authorized users and certified technicians.
- Provide AHJs with a reliable means of determining compliance with the Energy Code.

Acceptance Test Technician Certification Provider Program

The ATTCP program was first introduced into the 2013 Energy Code. The intent was to provide training, certification, and oversight to technicians performing the acceptance tests for new installations of lighting controls and mechanical systems in nonresidential buildings. The CEC reviewed and approved applications for both lighting controls ATTCPs and mechanical systems ATTCPs. In July 2014, the lighting controls ATTCPs certified enough technicians for the CEC to require that only certified ATTs perform the required lighting controls acceptance tests (Section 10-103.1(b)). However, the mechanical systems ATTCPs have only just recently met these same requirements. The CEC opened a proceeding to consider a similar requirement for mechanical systems acceptance testing.⁴

As part of each application, the ATTCPs included a means of tracking the acceptance tests performed by each ATT to provide for a quality assurance program (Section 10-103.1(c)3F and 10-103.2(c)3F). The quality assurance program is operated by the ATTCP and requires that the ATT submit the project designs and nonresidential certificates of compliance (NRCC) that are required by the Energy Code (Section 10-103(a)1), and as approved by the AHJ. As an additional measure of quality assurance, ATTCPs restrict access to its database systems to only certified ATTs and ATEs that are also trained and certified by the ATTCP.

Access was limited for the following reasons:

- The ATTCP program includes only nonresidential compliance documents for lighting controls and mechanical systems, and not for envelope, covered processes, or other Energy Code requirements since those are not part of the ATTCP program. ATTCPs provide only access to its certified ATTs and ATEs.

⁴ Docket 20-ATTCP-01, TN#:234272, 8/7/2020, [Request to open a new docket regarding Mechanical Systems Acceptance Test Technician Certification](#).

- CEC distinguishes between internal databases maintained by ATTCPs, and formal data registries such as an NDR. Based on this distinction, compliance documents are “recorded” in an ATTCP database, and “registered” in an NDR. To date, no ATTCP database has been approved by the CEC as an NDR.

Commission Compliance Document Repository

The CCDR was added to the 2013 Energy Code and defines a CCDR as a formal system to capture, retain, store, and support analysis of compliance forms and associated data from data registry providers to support Energy Code enhancement, compliance, and enforcement.

Energy Code compliance is facilitated through compliant design, installation, acceptance testing, and verification documentation (as detailed in Section 10-103). The documentation includes the use of over 400 compliance documents for both residential and nonresidential buildings. As specified in the Energy Code starting with the 2013 code cycle, data registries are to transmit data and forms it collects and maintains to a data repository operated by the CEC. The CEC is currently building the CCDR.

As intended, the CCDR will offer in-house control, long-term availability, and unrestricted use by the CEC of Energy Code compliance documents, data, and information. The CEC has an interest and responsibility in tracking the volume, details, and accuracy of the data input into the compliance forms to perform necessary provider oversight, program evaluations, and standards development feedback. Currently, there is no practical method to evaluate provider performance, registry activity, or Energy Code compliance in the absence of this data and information.

Commission Compliance Document Repository Implementation

The CEC is currently building the CCDR for nonresidential and residential data from ATTCP and HERS Providers. Nonresidential data is currently stored in ATTCPs databases and is not based on a set schema. The residential CCDR, however, is based on a complicated data dictionary and XML Schema. These foundational elements allow the report generator and RDR to work together. These are also how the data and compliance documents will be submitted to the CCDR. This is a very complex structured approach that has been developed in the Energy Code and the DRRM.⁵ In theory, this approach was intended to allow the CEC to easily exchange data from one system to another. However, in practice this approach requires a level of expertise that the CEC does not have and must outsource to get.

The CEC is pursuing the implementation of the CCDR with in-house staff resources. Once the CCDR is implemented and tested, the ATTCP and HERS Providers will be required to regularly report data to the CCDR. Staff will also develop the necessary interfaces, analytical tools, and standard reports in support of the CCDR.

⁵ June 2020, California Energy Commission, [2019 Data Registry Requirements Manual](#), for the 2019 Building Energy Efficiency Standards, Title 24, Part 6, and Associated Administrative Regulations in Part 1. CEC-400-2018-022-CMF.

Implementation of Commission Compliance Document Repository for ATTCP Data

Since there is no NDR at this point, the CCDR will rely on the ATTCP database systems for data and compliance documents. To achieve the data/document transfer, the ATTCPs will each develop an application program interface (API) to convert the data and documents into a format acceptable to the CEC. This work will be performed in-house and does not require external contract support. The CEC will wait to implement the ATTCP-CCDR effort after the residential CCDR data transfer has been finalized.

The background for this staff report has described the components of the compliance data registry, EDDS, NDR, ATTCP program, and CEC CCDR; and how to integrate facilitate documentation of compliance with the Energy Code for nonresidential building projects. The next sections summarize the analysis of options by staff, proposed changes to the 2022 Energy Code, and recommendations by staff.

CHAPTER 3:

Analysis of Options

Issue Statement

The 2019 Energy Code contains a redundancy that may cause confusion between the approval of one or more NDRs and the ATTCPs approved by the CEC. Staff discussed the issues regarding the potential duplicate registration of nonresidential compliance documents between the ATTCP and NDR with impacted stakeholders.

The ATTCP databases are not approved as data registries so even though it can track and validate the compliance documents as it is created by the authorized ATT, the ATTCPs cannot register it pursuant to JA7 requirements. Additionally, an NDR (if one is approved) cannot register a lighting controls acceptance test⁶ unless it verifies that it was performed by an ATT. Therefore, if the CEC approved an NDR, the acceptance test compliance documents would have to be tracked in the ATTCP database and registered with an NDR at the same instance, creating an unnecessary, confusing, and potentially costly duplication of effort.

The development of the CEC CCDR does not depend on the CEC approval of an NDR. The CEC can use the existing ATTCP database system as a source of data and compliance documentation, although limited to lighting controls and mechanical systems at present. However, lighting controls and mechanical systems replacements constitute most permitted nonresidential construction projects in California. Additionally, the nonresidential construction industry is complex when compared to the residential industry, segmenting professionals into very specific trades. A slower development of providers for those trades (and the resulting data for the CCDR) may be more desirable than the awkward attempt to make nonresidential compliance look like residential compliance.

Evaluation Criteria

Staff evaluated the original proposals presented at the March 10, 2020, workshop in addition to the CEA Proposal. Staff proposed three possible options, but encouraged participants to propose other solutions including the possibility that the CEC should not regulate this interaction at all (the “do nothing” option):

Option 1: Define ATTCPs as authorized users of an NDR in Reference Joint Appendix JA7.4.2.

Option 2: Include ATTCPs in an NDR as an EDDS. An EDDS is an optional data entry system used by a data registry. An ATTCP could be included in an NDR as an EDDS.

Option 3: Add new requirements in Section JA7 to describe the authorized data exchanges between an ATTCP and an NDR.

⁶ When the CEC makes ATT certification mandatory for performing mechanical systems acceptance testing, an NDR would also need to verify that an ATT completed the mechanical systems acceptance tests as well.

Staff evaluated each option using the following criteria:

1. Avoid double charging consumers.
2. Promote market stability and transparency.
3. Promote a fair and level playing field for NDRs and ATTCPs.
4. Promote data efficacy over document efficacy.
5. Avoid project site workflow impedance.
6. Avoid impacting the implementation of the CCDR.
7. Each option must include a cost-effectiveness/benefit assessment.

Avoid Double Charging Consumers

The ATT is employed on the project site to perform the acceptance test and is also the installing technician. The additional charges that an ATT might have to pay for using the ATTCP system and an NDR might be absorbed by the ATT in terms of bidding to win the job. So, it is not a forgone conclusion that any charge incurred for either the ATTCP or an NDR would automatically be passed on to a specific project owner. However, it is likely these charges affect the industry, and eventually are passed on to the consumer. To simplify the problem, staff assumes that charges to file compliance documents with the ATTCP and an NDR are passed on to the project owner, the eventual tenants of the space, and finally the consumer.

Promote Market Stability and Transparency

Project owners must contend with a variety of issues during a construction project. These issues typically grow in number and variety with the size and complexity of the project scope. One most common complaint is inconsistent enforcement and turn-around time regarding interaction with AHJs. Similarly, AHJs' typically complain that the Energy Code is difficult to enforce. While both project owners and AHJs would like a simpler Energy Code, a clear path to compliance (and thus enforcement) is the next best thing. Promoting market stability for project owners can be accomplished by ensuring that the compliance process is simple and consistent. Transparency of the compliance process will be important to AHJs so that a system can be relied upon that provides a clear record of compliance.

Promote A Fair and Level Playing Field for NDRs And ATTCPs

It is important that California state government avoid "picking winners" in the free market system (this is precluded by state regulation). Any prescribed relationship between an NDR (if one were to exist) and the ATTCPs needs to avoid giving one ATTCP an advantage over the other. In order to evaluate each of the options, staff considered only the implications of either an NDR or ATTCP, and no other stakeholders such as the AHJs or consumers (whose concerns are addressed in other evaluation criteria) unless those stakeholders are adversely impacted by an option.

Promote Data Efficacy over Document Efficacy

An NDR is not required to provide training, certification, or oversight regarding registered documents and the real-world results. The ATTCP has a significant training and certification program that is restricted to experienced technicians. Additionally, the oversight program

implemented by the ATTCPs includes a quality assurance program to ensure that the technicians perform legitimate acceptance tests whose results represent real installations.

An NDR must comply with the regulations in JA7 that are focused exclusively on the completion and validation of compliance documents within the data registry system. There is no requirement that an NDR verify that the compliance document represent real design, construction, or installation. The CEC is intent on realizing the energy savings predicted by Energy Code compliance through data efficacy, not just the documentation efficacy.

Avoid Project Site Workflow Impedance

Project site workflow is a critical component for project costs. Work delays means trained crew remain idle on the job site while waiting for inspection or other compliance verification. Builders have traditionally complied with regulations when there is a clear path to compliance and even more so when that path eliminated work crew downtime. Each option must be evaluated to identify the impact it will have on project site workflow to improve compliance and lower overall project costs.

Avoid Impacting the Implementation of the CCDR

The CCDR is extremely important to the CEC for the management of CEC-implemented programs (such as the ATTCP, HERS, and NDR program), as well as for evaluating feedback to the Energy Code, appliance standards, and flexible demand standards policies. Each option must be evaluated as to its likely impact on the CCDR. To evaluate the potential impacts, staff will evaluate the cost to implement the CCDR for each option, the impact on data efficacy, and the impact on complexity of development.

Each Option Must Include a Cost-Effectiveness/Benefits

An NDR, ATTCP, and CCDR are not energy efficiency measures themselves, but related to the enforcement of energy efficiency measures in the Energy Code. Therefore, the approach used by the CEC to evaluate efficiency measures through building energy use modeling and time dependent valuation will not be effective for these options. Staff will evaluate the cost to consumers, AHJs, and California state agencies. The estimated costs for each option will be in comparison to current costs incurred under the 2019 Energy Code. Cost estimates will include initial costs and any expected on-going costs. The benefits of implementation of any of these options would be speculative because it is based on change in the actual Energy Code compliance rate. Since benefits cannot be accurately estimated, staff assume the same for all options.

Option Evaluation

Each option was evaluated by staff including careful study of the option proposals, potential updates to the Energy Code, and staff experience with the implementation and enforcement of the Energy Code.

Option 1: Define ATTCPs as authorized users of an NDR in Reference Joint Appendix JA7.4.2

Define the ATTCP as an authorized user of an NDR in Reference Joint Appendix JA7.4.2. Staff will determine a level of access to ensure that the ATTCP program is not hampered by lack of necessary data from an NDR.

This is a minor Energy Code modification that would allow each ATTCP to access the data registry of each NDR. The authorized user designation would be granted to all ATTCPs approved by the CEC for all NDRs approved by the CEC. An NDR would also be able to rely on the ATTCP to verify that only ATTs had access to the acceptance test compliance documents.

Table 1: Staff Evaluation of Option 1: ATTCP Defined as an Authorized User

Evaluation Criteria	Option Summary	Staff Evaluation
Avoid Double Charging	This option avoids double charging the consumer by allowing for the one-time registration of the acceptance test compliance documents in an NDR and will allow the ATTCP will access data via the NDR.	Pass
Market Stability and Transparency	The quality assurance is performed by the ATTCP and would need to be specifically added to an NDR registry requirement and made confidential. Otherwise the ATTCP would need to maintain a parallel database system to ensure that the quality assurance program was enforced, which would work against stability and transparency.	Pass, with conditions
Level Playing Field	This option would tend to give an NDR an advantage over the ATTCP, as much as the CEC would try to balance that advantage in the Energy Code. This option would require the ATTCP to work within an NDR system.	Does not pass
Supports data efficacy over document efficacy	This option may hinder the ATTCPs from implementing its quality assurance program. The ATTCP quality assurance program restricts access to the acceptance test forms to only certified ATTs, tracks scheduled implementation on each project, and performs all quality assurance checks as each acceptance test is entered into the system.	Does not pass
Construction Workflow	An NDR could make workflow both at planning phase and construction phase smoother and less likely to require change orders, with adequate training of users. However, this training is not required in the Energy Code.	Pass, with conditions

Evaluation Criteria	Option Summary	Staff Evaluation
Impacts on CCDR Implementation	The complexity of the CCDR would increase with the addition of acceptance test tracking needed for ATTCP quality assurance.	Pass

Source: California Energy Commission

Cost-Effectiveness/Benefits

This option presumes the implementation of the full NDR and includes collecting data for all compliance forms including covered processes and envelope, as well as lighting controls and mechanical systems. A common schema must be created for all documents, and a secure file transfer method will be developed with regular frequency from the NDR to the CEC CCDR. The cost to create a common schema and compliance document support for the NDR is substantial for the initial effort, continuous up-keep, and revisions for each code cycle.

There is no evidence to suggest that Energy Code compliance has improved with the implementation of a data registry (the residential data registry, for example). While this may be due a lack of enforcement by the AHJs, there is nothing in this option that would address this issue. So, while the compliance documents would be registered in an NDR, the benefits to the consumer are questionable.

This option will require the registration of all compliance documents with an NDR, which may indirectly impact consumers. Generally, the cost per form is under \$10 and while there may be an initial application fee, it is not expected to be significant (under \$100). These costs are based on the current HERS Registry costs. Per project, the costs can be significant due to the number of forms that may be needed. While the number of forms is clearly related to the complexity and size of the project, there are no estimates available for nonresidential projects, which tend to be much larger than residential projects. However, based on the cost per form, form registration should not be a significant source of cost increase for nonresidential projects.

This option offers little in the way of practical benefits for consumers or the State and comes with potentially a substantial cost to both.

Option 2: Include ATTCPs in an NDR as an External Digital Data Source

EDDS services are optional data entry systems used by an NDR.

- The ATTCP uses this designation to interact with an NDR. An NDR must apply to the CEC to use the ATTCP as an EDDS service.
- This allows an NDR and the ATTCP to coexist in a regulated framework that could enable both to proceed with its respective regulatory responsibilities.
- This option causes little impact to the ATTCP training, certification, or quality assurance programs by allowing both an NDR and ATTCP systems to coexist.

The ATTCP database system is not currently required to be compliant with JA7 and, as a result, compliance has never been determined.

Table 2: Staff Evaluation of Option 2: ATTCP as an EDDS

Evaluation Criteria	Option Summary	Staff Evaluation
Avoid Double Charging	This option may avoid double charging, but the fee collection would need to be determined in the contract agreement required between an NDR and an EDDS (the ATTCP in this case) or in the Energy Code.	Pass, with conditions
Market Stability and Transparency	Both the ATTCP database system and an NDR system could be viable in this option and could coexist in a regulated framework. This could tend to help with market stability and support the ATTCP quality assurance program. However, the lack of required training for authorized users of an NDR still presents an issue for market stability.	Pass, with conditions
Level Playing Field	This option skews the playing field towards an NDR. An NDR must submit the application to the CEC to make use of an EDDS (the ATTCP in this case). This puts the ATTCP at a significant disadvantage with an NDR, allowing for an NDR to choose a winner among the ATTCPs if only one ATTCP was selected as an EDDS.	Does not pass
Supports data efficacy over document efficacy	By allowing both the ATTCP database system and an NDR system to coexist, this option supports data efficacy.	Pass
Construction Workflow	An NDR could make workflow smoother with the development of user training. Additionally, with the ATTCP database left intact, the support to the ATTs through the ATTCPs is also left intact and would promote better construction workflow.	Pass, with conditions
Impacts on CCDR Implementation	The cost to the ATTCP would be significant. The ATTCP database would be required to comply with JA7, a significant undertaking.	Does not pass

Source: California Energy Commission

Cost-Effectiveness/Benefits

This option will require the registration of all compliance documents with an NDR, which may indirectly impact consumers. Generally, the cost per form is under \$10 and while there may be an initial application fee, it is not expected to be significant (under \$100). Per project, the costs can be significant due to the number of forms that may be needed. While the number of forms is clearly related to the complexity and size of the project, there are no estimates available for nonresidential projects, which tend to be much larger than residential projects. Based on the cost per form, form registration should not be a significant source of cost increase for nonresidential projects.

There is no evidence to suggest that Energy Code compliance has improved with the implementation of a data registry (the residential data registry, for example). While this may be due a lack of enforcement by the AHJs, there is nothing in this option that would address this issue. So, while the compliance documents would be registered in an NDR, the benefits to the consumer are questionable.

This option offers little in the way of practical benefits for consumers or the State and comes with potentially a substantial cost to both.

This option would require that the ATTCP forms tracking system be compliant with the EDDS requirements in JA7. This would represent a significant undertaking by the ATTCPs, like the original development of the forms tracking system (between \$1-\$2 million).⁷

Option 3: Add New Requirements in Section JA7 to Describe the Authorized Data Exchanges between an ATTCP and an NDR

Requirements can be added in a new section of JA7 to describe the authorized data exchanges between an ATTCP and an NDR:

- Staff collaborates with approved ATTCPs and other stakeholders to develop this new section to JA7.
- This better address the concerns raised by staff than the other options discussed.
- This enables the ATTCPs and other stakeholders to discuss issues in an open forum to reach resolutions.
- This process may be difficult to conduct within the constraints of the 2022 Energy Code rulemaking process.

Table 3: Staff Evaluation of Option 3: New JA7 Section

Evaluation Criteria	Option Summary	Staff Evaluation
Avoid Double Charging	This option would be designed to require cost-sharing between the ATTCP and an NDR.	Pass
Market Stability and Transparency	This option would be designed to ensure market stability by requiring both the ATTCP database system and an NDR system to coexist.	Pass
Level Playing Field	This option would be designed to recognize that both the ATTCP and an NDR have separate CEC approval processes and would not require one to apply for the other. Further, this option would require that any NDR be able to work in concert with any ATTCP.	Pass

⁷ Staff has had several conversations over a period of years with the ATTCPs regarding its original invest in the training, certificate, and oversight programs. The training portion is the largest investment, with the oversight being second. The ATTCPs estimate that the investment on the oversight (including quality assurance) was over \$1 million.

Evaluation Criteria	Option Summary	Staff Evaluation
Supports data efficacy over document efficacy	By allowing both the ATTCP database system and an NDR system to coexist, this option supports data efficacy.	Pass
Construction Workflow	An NDR could make workflow smoother with the development of user training. Additionally, with the ATTCP database left intact, the support to the ATTs through the ATTCPs is also left intact and would promote better construction workflow.	Pass, with conditions
Impacts on CCDR Implementation	This option would not require the ATTCP database to be compliant with JA7.	Pass

Source: California Energy Commission

Cost-Effectiveness/Benefits

This option will require the registration of all compliance documents with an NDR, which may indirectly impact consumers. Generally, the cost per form is under \$10 and while there may be an initial application fee, it is not expected to be significant (under \$100). Per project, the costs can be significant due to the number of forms that may be needed. While the number of forms is clearly related to the complexity and size of the project, there are no estimates available for nonresidential projects, which tend to be much larger than residential projects. Based on the cost per form, form registration should not be a significant source of cost increase for nonresidential projects.

There is no evidence to suggest that Energy Code compliance has improved with the implementation of a data registry (the residential data registry, for example). While this may be due a lack of enforcement by the AHJs, there is nothing in this option that would address this issue. So, while the compliance documents would be registered in an NDR, the benefits to the consumer are questionable.

This option offers little in the way of practical benefits for consumers or the State and comes with potentially a substantial cost to both.

Option 4: The California Energy Alliance Proposal

The March 10, 2020, workshop was attended primarily by representatives from the ATTCPs and those persons who are interested in applying to become an NDR. Comments received as a result of the workshop include comments from CEA and are supported by all ATTCPs (including the two lighting controls ATTCPs and four mechanical systems ATTCPs).

The CEA comments suggested the compliance documents that the ATTCPs already validate and track be excluded from an NDR. It further suggested that the data collected by the ATTCPs could be submitted directly to the CEC CCDR without first having to pass through the NDR.

While the compliance documents that are currently recorded by the ATTCP represent only a portion of the total number of possible compliance documents (not all are used on any one

project), these are most common for nonresidential projects permitted in California. Most commercial tenant improvements are lighting and HVAC changes or repairs, with the remainder being minor elements, such as finishing work (carpets, painting, etc.).

Additionally, while the lighting controls and mechanical systems ATTCPs are limited to those trades now, staff plans to recommend in future code cycle updates that the ATTCP program be expanded to include other closely related trades. Table 4 identifies the possible expansion of the ATTCP into the trades represented by the Energy Code requirements.

Table 4: Potential Expansion of ATTCP Trades

Lighting Controls ATTCP	Mechanical Systems ATTCP
Indoor and outdoor lighting design	Building ventilation
Electrical power distribution	Domestic hot water
Sign lighting (indoor and outdoor)	Pools and spas
Indoor agricultural lighting design	Commercial kitchens
	Laboratories and fume hoods
	Refrigerated warehouses
	Data centers

Source: California Energy Commission

Staff also plans to recommend that a future Energy Code update include a third ATTCP group exclusively for commissioning agents. Commissioning agents will be responsible for acceptance tests not performed by an ATT. These responsibilities may include envelope, solar requirements, escalators, elevators, and ensuring compliance with local energy efficiency requirements (as approved by the CEC). While this is early staff thinking for future code updates, it is a reasonable consideration when evaluating the CEA Proposal.

If an NDR application process were to be pursued by the CEC, staff estimates that it would require the same level of CEC staff and external contractor resources as for the RDR, and would provide a similar benefit in terms of the data submitted to the CCDR. The main elements of the compliance data registry system that the CEC is responsible to create are the data dictionary, XML Schema, and Report Generator. The CEC has developed these elements for the residential data registry. The cost for CEC staff and contractors is substantial and on-going. There have been several instances where the CEC could not implement simple changes due to the down-stream costs of the contractors and a lack of staff availability. These elements would require continual testing, updating, and corrective actions needed to maintain any complex system of registry. While this option will not eliminate these costs, it may reduce them as a result of fewer compliance documents being required to be registered with the NDR.

Staff summarized the CEA option to two key elements:

1. Allow the ATTCPs to submit directly to the CCDR.

2. Expand the authority of the ATTCPs to collect and store all nonresidential compliance documents relative to its area of expertise (i.e., limited to new installations of lighting controls and mechanical systems).

Table 5: Staff Evaluation of CEA Proposal

Evaluation Criteria	Option Summary	Staff Evaluation
Avoid Double Charging	This option would avoid double charging by limiting the compliance documents to either the ATTCP or an NDR, but not both.	Pass
Market Stability and Transparency	This option would allow both systems to exist separately but would require the project owner and AHJs to use both systems for a newly constructed building. However, alterations and additions projects would typically only need the ATTCP program.	Pass
Level Playing Field	This option would allow both systems to exist and rarely (if ever) interact.	Pass
Supports data efficacy over document efficacy	For alterations and additions to existing buildings, the most common projects are for lighting controls and mechanical systems. By relying on the ATTCP program for these projects, helps to ensure the efficacy of the data collected.	Pass
Construction Workflow	This option would tend to encourage builders, engineers, and architects to consider acceptance testing earlier in the process and use the expertise of the ATT in the planning process.	Pass
Impacts on CCDR Implementation	If the NDR were developed, the CCDR would be required to use the XML schema. The main costs of the CCDR are associated with the development of the XML Schema and the Report Generator (as well as many other support efforts). This option would generally avoid further expenditures in these areas as the ATTCP database system does not require either the XML Schema or Report Generator.	Pass

Source: California Energy Commission

Cost-Effectiveness/Benefits

This is a lower-cost option in that the ATTCPs currently collect and store compliance data from ATTs conducting field verification of installation of lighting controls and mechanical systems. ATTCPs are currently working with CEC staff to identify a low-cost and cost-effective means to transmit that data to the CEC CCDR.

The CEC is currently accepting residential compliance data from HERS Providers into the CCDR. The CEC is concurrently working with ATTCPs to develop data transfer rules for nonresidential compliance data for lighting controls and mechanical systems.

While it is still unclear if the ATTCP program is improving Energy Code compliance, the cost to consumers and the State are substantially lower than any other option considered. Additionally, there does seem to be enforcement of the acceptance test requirements in the major building markets (Southern California and the Bay Area).

Analysis Results

Based on the evaluation criteria, the CEA Proposal is most likely to produce a favorable result. Defining the ATTCP as an authorized user of an NDR or an EDDS results in giving too much leverage to an NDR over the ATTCP. Developing a new JA7 section to address these issues is a viable option but cannot be implemented in the time available to be included in the 2022 Energy Code update. The CEA option has the advantage of avoiding significant developmental costs, can be included in the 2022 Energy Code update, and be implemented now.

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CHAPTER 4: Findings, Results, Additional Issues

Option Evaluation Results

Each option was evaluated to determine if it could be expected to comply with the criteria developed by staff. From the evaluation, staff determined that only two of the options would comply with all criteria. Table 6 shows the results of the staff evaluation for each option considered. The CEA Proposal passes all criteria and beneficially impacts the development of the CCDR.

Table 6: Summary of Staff Evaluation of all Options

	ATTCP as Authorized User	ATTCP as EDDS	New Section (JA7)	CEA Proposal
Avoid Double Charging	Pass	Pass, with conditions	Pass	Pass
Market Stability and Transparency	Pass, with conditions	Pass, with conditions	Pass	Pass
Level Playing Field	Does not pass	Does not pass	Pass	Pass
Supports data efficacy over document efficacy	Does not pass	Pass	Pass	Pass
Construction Workflow	Pass, with conditions	Pass, with conditions	Pass, with conditions	Pass
Impacts on CCDR Implementation	Pass	Does not pass	Pass	Pass

Source: California Energy Commission

Next, staff considered other issues regarding the implementation of the CEA Proposal. In meetings with the ATTCPs, staff discussed the following issues with proposed solutions:

- Developing a secure means of transferring data to the CEC CCDR secure data storage systems.
- Developing methods for data normalization to ensure that data from one ATTCP is consistent with data from another ATTCP.
- Identifying additional compliance documents that the ATTCP will need to add to its database system.
- Estimating the size of data to be transferred, and the frequency of transfer.
- Determining a timeline to implement 2022 Energy Code provisions.

Secure Data Transfer

The CEC provided a secure file transfer protocol (FTP) site to accept data from the ATTCPs. This was tested using real data (limited to 100 acceptance tests) to verify that the data could be sent securely, moved into the secure data storage, and accessed by specific staff (restricted to three CEC staff). This test was completely successful and gave staff a unique insight into the actual database design of the ATTCPs databases.

Data Normalization

The CEC agreed on an API that ATTCPs will develop and securely send compliance data through to the CCDR in an agreed upon format based on the CCDR requirements. The API will be developed by the ATTCPs in cooperation with and approved by the CEC. The functionality of the API will be as shown in Figure 1.

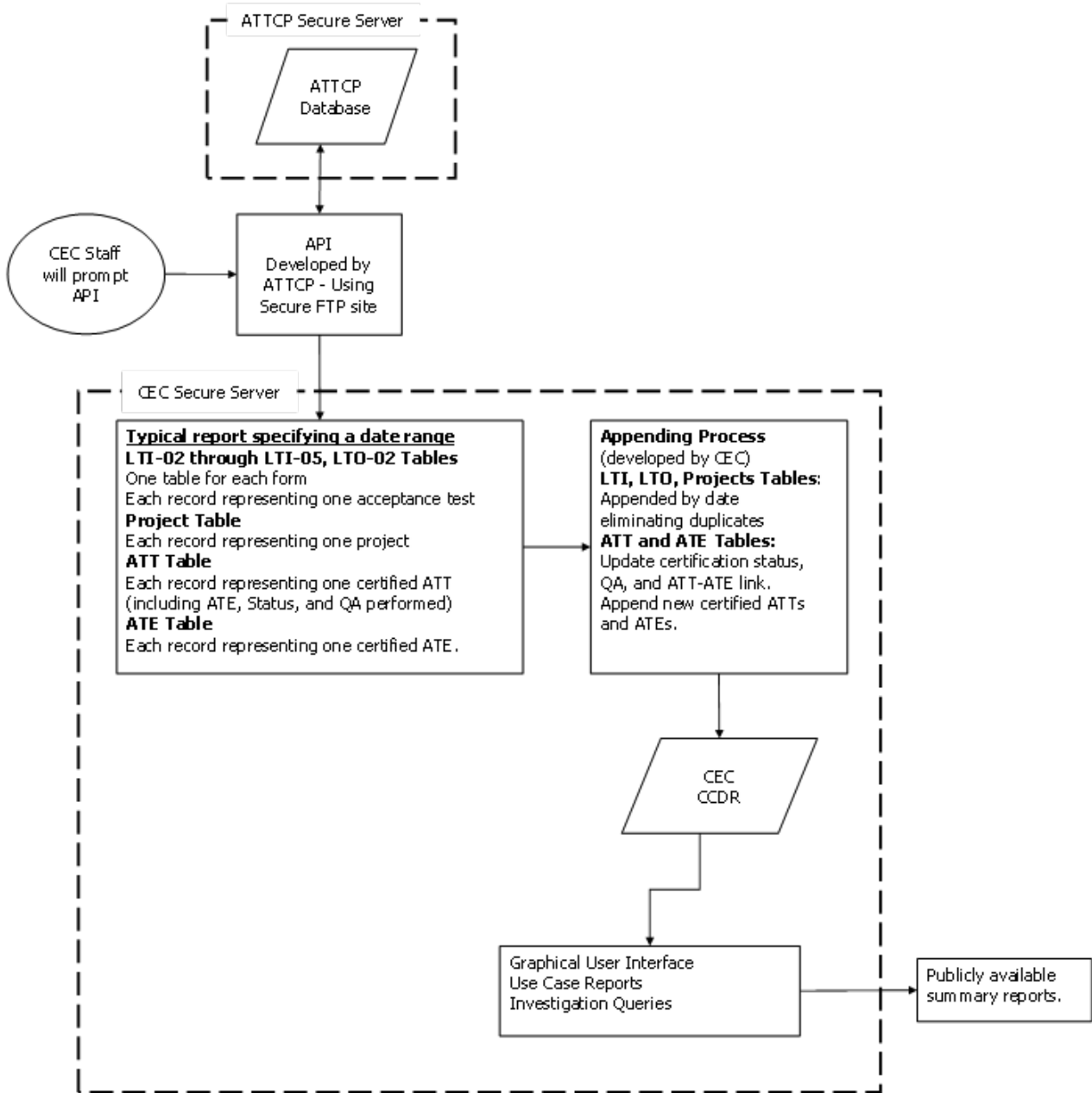
The API will be prompted by the CEC with a specific date range; initially this will be for historic records, and subsequently it will include only new records on an agreed upon frequency. Staff estimates that this will be necessary once each month for each ATTCP.

The API will securely access the ATTCP data servers, retrieve the data, and deliver it to the CEC data servers using the secure FTP site. The API upon retrieval of the data will configure the data as determined by the CEC.

Internally to the CEC secure servers, the CEC would append the new data to the existing data in the CCDR system. This append process will be automated and will be separate from the API.

The CEC will develop a graphical user interface, standardized use case reports, and investigative tools for staff. From these tools, staff can produce publicly available reports clear of personally identifiable information.

Figure 1: Functionality of the ATTCP API



Source: California Energy Commission

Additional Compliance Documents

The CEC approved smart forms for the 2019 Energy Code, limited to the nonresidential certificates of compliance or NRCC documents. The ATTCPs currently require that these NRCCs be submitted by the ATTs for purposes of quality assurance. The ATTCPs consider them critical to conducting the desk audits for its quality assurance programs. In addition to the NRCCs, the ATTCPs require the actual approved planning documents that the project submitted to the AHJ (including change orders) for the same purpose. The only remaining

compliance documents that would need to be included into the ATTCP databases are the nonresidential certificates of installation (NRCI). These documents are very small and pose no significant issues for the ATTCPs to include.

The Energy Code does not require the ATTCP to produce a project status report like an NDR (JA7.5.6.1). However, the ATTCPs provide access to their database system for verified AHJs and are developing a project status report that makes sense for the acceptance test compliance documents that they are currently required to track.

Additional Issues for Consideration

Staff has also considered other issues that would need to be addressed for the implementation of the CEA Proposal in Table 7. It is staff's opinion that all these issues can be addressed.

Table 7: CEA Proposal - Additional Issues for Consideration

NDR Issues (Objectives, Goals, and Specific Functions)	How the NDR would address these Issues	How the ATTCP databases address these issues	What is gained/lost by using the CEA Proposal
Reduce the complexity of navigating the compliance documentation requirements.	An NDR provides the user with the compliance documents needed to complete the project in one location for a fee.	The CEC would provide the user with the NRCCs (at no cost) and the ATTCPs would track all compliance documents related to its profession (limited to lighting controls and mechanical systems).	<p>Gained: Lower costs, more reliance on professionals, simpler to implement and maintain.</p> <p>Lost: Only the compliance documents related to the lighting controls (5) or mechanical systems (19) would be included, while an NDR would include all compliance documents (over 100).</p>
Provide guidance to project proponents attempting to demonstrate compliance.	An NDR would provide a system for the user to navigate the compliance document requirements.	The ATTCPs would provide training for ATTs to complete the documents, and to perform the acceptance testing if required.	<p>Gained: Training and oversight to help ensure compliance with the Energy Code.</p> <p>Lost: Nothing.</p>

NDR Issues (Objectives, Goals, and Specific Functions)	How the NDR would address these Issues	How the ATTCP databases address these issues	What is gained/lost by using the CEA Proposal
Verify that the compliance documents were completed correctly and accurately.	An NDR has no requirement to ensure that the compliance documents reflect the actual construction. However, it would require that the documents be completed (even if not accurately).	The ATTCPs would require that the NRCCs be signed by an ATT relevant to the lighting controls or mechanical systems industry. The ATTCP already provides the necessary quality assurance to validate the accuracy of the compliance documents.	Gained: A low-cost validation of the compliance documents. Lost: Nothing.
Provide AHJs with a reliable means of determining compliance with the Energy Code.	An NDR would provide a Project Status Report document for AHJs, which AHJs could verify through an NDR.	One of the lighting controls ATTCPs currently provides a QR Code on all its documents allowing an AHJ to scan any one document to have access to them all. Other ATTCPs are considering a similar approach.	Gained: Nothing. Both an NDR and ATTCPs would provide the AHJs with suitable means to verify code compliance. Lost: Nothing.
NDR is to register and store the required compliance documentation in a data registry resulting in a more robust means of compliance and enforcement of the Energy Code.	This is the main function of an NDR, but there is no current structure of how an NDR must work with an ATTCP. This relationship would have to be provided in JA7.	These same functions are currently performed by the lighting controls ATTCPs, albeit on fewer compliance documents.	Gained: Lower costs to the CEC and simpler implementation. Lost: Only a portion of the forms will be tracked.

NDR Issues (Objectives, Goals, and Specific Functions)	How the NDR would address these Issues	How the ATTCP databases address these issues	What is gained/lost by using the CEA Proposal
Signature Validation – ensuring that the form is signed and that the signature on the form is of the person identified.	<p>An NDR requires that a user (any person that signs the forms) complete an application and use its user identification/password to log onto an NDR system. However, once logged-in there is no further validation (borrowed user information is an issue).</p> <p>An NDR would require that all certificates use the same encryption and signer validation approach.</p>	The ATTCPs use a live-sign process. The signatory uses the ATT account to sign the form electronically (typically with a finger-trace). Since the ATT must sign-in, the ATT is responsible to ensure that the signatory is as identified. In the case of one lighting controls ATTCP, 'Responsible Person' is limited to an ATE.	<p>Gained: Nothing.</p> <p>Lost: Nothing.</p> <p>Both systems have pros and cons; however, the ATTCP process includes quality assurance, whereas an NDR does not.</p>

Source: California Energy Commission

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CHAPTER 5:

Recommendations

Staff recommends implementing the CEA Proposal to allow ATTCPs to submit data directly to the CEC CCDR and expand the authority of ATTCPs to collect and store nonresidential compliance documents relative to its area of expertise (i.e., currently limited to new installations of lighting controls and mechanical systems).

Staff recommends that the ATTCPs be required to submit monthly data transfer packets to the CEC CCDR as will be specified by the CEC. The data transfer packets should include unique data collected on each acceptance test document, the project location, the permit number (as issued by the AHJ), and the certificate number for the ATT and ATE.

This will require modification to several sections of the Energy Code including the following:

1. Modification to exclude specific NRCCs, NRCIs, and acceptance test from requirements to be registered with an NDR, if one is approved by the CEC:
 - a. Title 24, Part 1, Sections:
 - i. Modifications to Existing Requirements
 1. 10-102 Definitions
 2. 10-103(a)1 Certificate of Compliance
 3. 10-103(a)3 Certificate of Installation
 4. 10-103(a)4 Certificate of Acceptance
 - ii. New Requirements
 1. 10-103.1(c)3I Repository Reporting Requirement
 2. 10-103.2(c)3I Repository Reporting Requirement
 - b. Joint Reference Appendix Sections:
 - i. JA1 Definitions
 - ii. JA7.5 Definitions

Specific language recommendations are provided in Appendix C.

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 public schools.
API Application Programming Interface	This is a general concept in software technology that refers to how multiple applications can interact with and obtain data from one another.
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 it is 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."
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 a certification is held. 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
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 it is 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."
CALCTP California Advanced Lighting Controls Training Program	A lighting controls ATTCP approved by the CEC.
CCDR Commission Compliance Document Repository	A formal software system to capture, retain, store, and support analysis of compliance forms and associated data from data registry providers for Energy Code enhancement, compliance and enforcement. The CCDR includes both a central nonresidential data repository and a central residential data repository.
CEA California Energy Alliance	An advocacy organization for California's energy stakeholders. It was founded in 2016 as a nonprofit, non-partisan alliance of business, government, environmental, and nongovernmental organization leaders advocating for energy productivity to achieve economic growth, environmental justice, energy security, affordability, and resilience.
CEC California Energy Commission	The California State Energy Resources Conservation and Development Commission.
CSPTC California State Pipe Trades Council	A mechanical systems ATTCP approved by the CEC.
DRRM Data Registry Requirements Manual	A compliance manual published by the CEC for data registry providers to clarify the detailed data structures and activities that are required in Reference Appendix JA7.

Term	Definition
EDDS External Digital Data Source	A data transfer service approved by the CEC to operate in conjunction with an approved data registry that allows authorized users of a data registry to transfer data from a digital data source external to the data registry as an alternative to the key-in data entry described in JA7.7.1.1 for registering compliance documents as required by the Energy Code.
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.
FTP File Transfer Protocol	The language that computers on a network (such as the internet) use to transfer files to and from each other.
HERS Home Energy Rating System	The residential field verification and diagnostic testing program as described in Title 20, Chapter 4, Article 8, Section 1670.
HVAC Heating, Ventilation, and Air Conditioning	A general reference to systems and devices that provide different types of heating, ventilation, and cooling services to residential and commercial buildings.
NEBB National Environmental Balancing Bureau	A mechanical systems ATTCP approved by the CEC.
NEMIC National Energy Management Institute Committee	A mechanical systems ATTCP approved by the CEC.
NDR Nonresidential Data Registry	A data registry that is maintained by a private third-party organization approved by the CEC, that provides for registration, when required by Title 24, Part 6, of all nonresidential compliance documentation.
NLCAA National Lighting Contractors Association of America	A lighting controls ATTCP approved by the CEC.
NRCA Nonresidential Certificate of Acceptance	A compliance document used to record the results of an acceptance test that must be completed on certain controls and equipment before the installation is deemed to comply with the Energy Code.

Term	Definition
NRCC Nonresidential Certificate of Compliance	A compliance document used to record the design decisions made to demonstrate compliance with the Energy Code.
NRCI Nonresidential Certificate of Installation	A compliance document used to record the installation of energy efficiency measures prescribed by the NRCCs or change orders approved by the AHJ, in compliance with the Energy Code.
QR Code Quick Response Code	A type of matrix barcode. A barcode is a machine-readable optical label that contains information about the item to which it is attached.
RDR Residential Data Registry	A data registry that is maintained by a registration provider approved by the CEC, that provides for registration, when required by Title 24, Part 6, of residential compliance documentation when the residential project requires the use of a HERS rater.
Reference Appendices Joint Appendix (JA)	<p>A series of appendices used to convey the requirements for compliance of Title 24, Part 6 of the Energy Code pertaining to both residential and nonresidential construction:</p> <ul style="list-style-type: none"> JA1 – Glossary JA2 – Reference Weather/Climate Data JA3 – Time Dependent Valuation (TDV) JA4 – U-factor, C-factor, and Thermal Mass Data JA5 – Technical Specifications for Occupant Controlled Smart Thermostats JA6 – HVAC System Fault Detection and Diagnostic Technology JA7 – Data Registry Requirements JA8 – Qualification Requirements for High Efficacy Light Sources JA9 – Qualification Requirements for Low Leakage Air-Handling Units JA10 – Test Method for Measuring Flicker of Lighting Systems JA11 – Qualification Requirements for Photovoltaic Systems JA12 – Qualification Requirements for Battery Storage Systems JA13 – Water Pump Water Heater Demand Management Systems

Term	Definition
RSES Refrigeration Service Engineers Society	A mechanical systems ATTCP approved by the CEC.
XML Extensible Markup Language	A set of rules for encoding documents in machine readable form to facilitate the electronic transmission of documents. XML standard was developed by the W3C.
XML Schema	Refers to XML Schema Definition Language, commonly referred to as XSD, which is another standard defined by the W3C. An XML Schema uses XSD to define a set of rules to which an XML document must conform to be considered valid according to that schema. The rules can include definitions of major organizational units, definitions of data elements and attributes, data types, constraints on valid values such as upper and lower bounds, and whether data is required or optional.

APPENDIX B:

How the NDR, ATTCP, and CCDR Work Together

Nonresidential Building Development

While there is a wide variety of development techniques and approaches in the building industry in California for nonresidential projects (including newly constructed buildings and additions or alterations to existing buildings), most follow some general milestones. It is important to understand the general process when comparing the impacts on that process from the NDR, the ATTCP program, and the CCDR.

What is the NDR

An NDR is a digital system for the tracking and verification of the nonresidential compliance certificates required by the Energy Code. These certificates are designed to demonstrate compliance and aid in enforcement of the Energy Code for the AHJs. Most commonly, the AHJ is the local building department for the county or city in which the project resides but may include other entities such as the Division of the State Architect for construction activities at California public schools. The nonresidential compliance certificates number over 100 but fall into three general categories:

- Planning certificates labeled nonresidential certificate of compliance (NRCC)
- Installation certificates labeled nonresidential certificate of installation (NRCI)
- Acceptance test certificates labeled nonresidential certificate of acceptance (NRCA)

What is the ATTCP Program

The CEC adopted the ATTCP program in the 2013 Energy Code, Title 24, Part 1, Section 10-103.1 and 10-103.2. The ATTCP program consists of CEC-approved providers that train, certify, and oversee technicians that perform acceptance tests and complete the NRCA as required by the Energy Code for lighting controls and mechanical systems installations (generally HVAC systems). There are two lighting controls ATTCPs and four mechanical systems ATTCPs approved by the CEC:

- Lighting Controls ATTCPs:
 - National Lighting Contractors Association of America (NLCAA)
 - California Advanced Lighting Controls Training Program (CALCTP)
- Mechanical Systems ATTCPs
 - National Energy Management Institute Committee (NEMIC)
 - California State Pipe Trades Council (CSPTC)
 - National Environmental Balancing Bureau (NEBB)
 - Refrigeration Service Engineers Society (RSES)

What is the CCDR

The CCDR is being developed and managed by the CEC to track the nonresidential compliance certificates recorded by the NDR. However, the CCDR may also accept nonresidential compliance certificates from the ATTCP. The purpose of an CCDR is to provide a more robust

means of compliance and enforcement of the Energy Code, a means to manage the NDR and ATTCP programs, and provide a resource for the development and refinement of regulatory requirements in the Energy Code or possibly other research efforts within the CEC. The CCDR will also include residential compliance documents from HERS Providers.

General Milestones for Nonresidential Construction

Staff developed a flowchart to better illustrate the general milestones for nonresidential construction. However, these milestones are a simplification of what can be a complex process. The intent of the flowchart in Figure B-1 is to simplify that process for purposes of discussion of the interaction of the NDR, ATTCP, and CCDR only.

Initial Project Concept

The flowchart starts with the initial project concept and then on to the first basic step of site control and evaluation. These are the first basic steps to any construction project.

Concept Design and Scoping

From there the project moves on to concept design and scoping. These are not finished designs but are more akin to architectural renderings and documentation of the overall goals of the project.

It is from this point that the preliminary designs are developed and when the AHJ planning department might be contacted if land use planning is an issue.

Once the AHJ planning permit is issued (if needed), the detailed designs are started. It is at this stage that the main teams are brought on to the project including the architects, designers, project management team, engineering teams, and commissioning agents. Up to this point any of these stages can push the project back to a previous stage without much harm to the overall project schedule or costs. However, from this point on, changes to the project start to take on higher costs. It is very possible that issues may arise from the detailed design phase that force reconsideration of prior plans and objectives to the point of reconsidering the project site or even abandoning the project.

Detailed Designs

The detailed designs will include the compliance plan for the Energy Code and ultimately the NRCCs – there are 10 dynamic NRCCs that the project may require.

Once the NRCCs are completed, it can be submitted to the AHJ building department, along with the rest of the application for a building permit. Any changes required by the building department that affect the NRCCs may require further design changes, moving the project backwards along the flowchart.

Permit to Construct and Construction Phase

The project then moves into the construction phase, which may result in change orders. If these change orders affect the NRCCs, it may have to be approved by the building department. Additionally, even in the instance that the construction or installation does not cause a change order, it will require completion of the NRCIs. The NRCIs must be made available to the AHJ site inspectors, who may approve them, typically while performing onsite inspections.

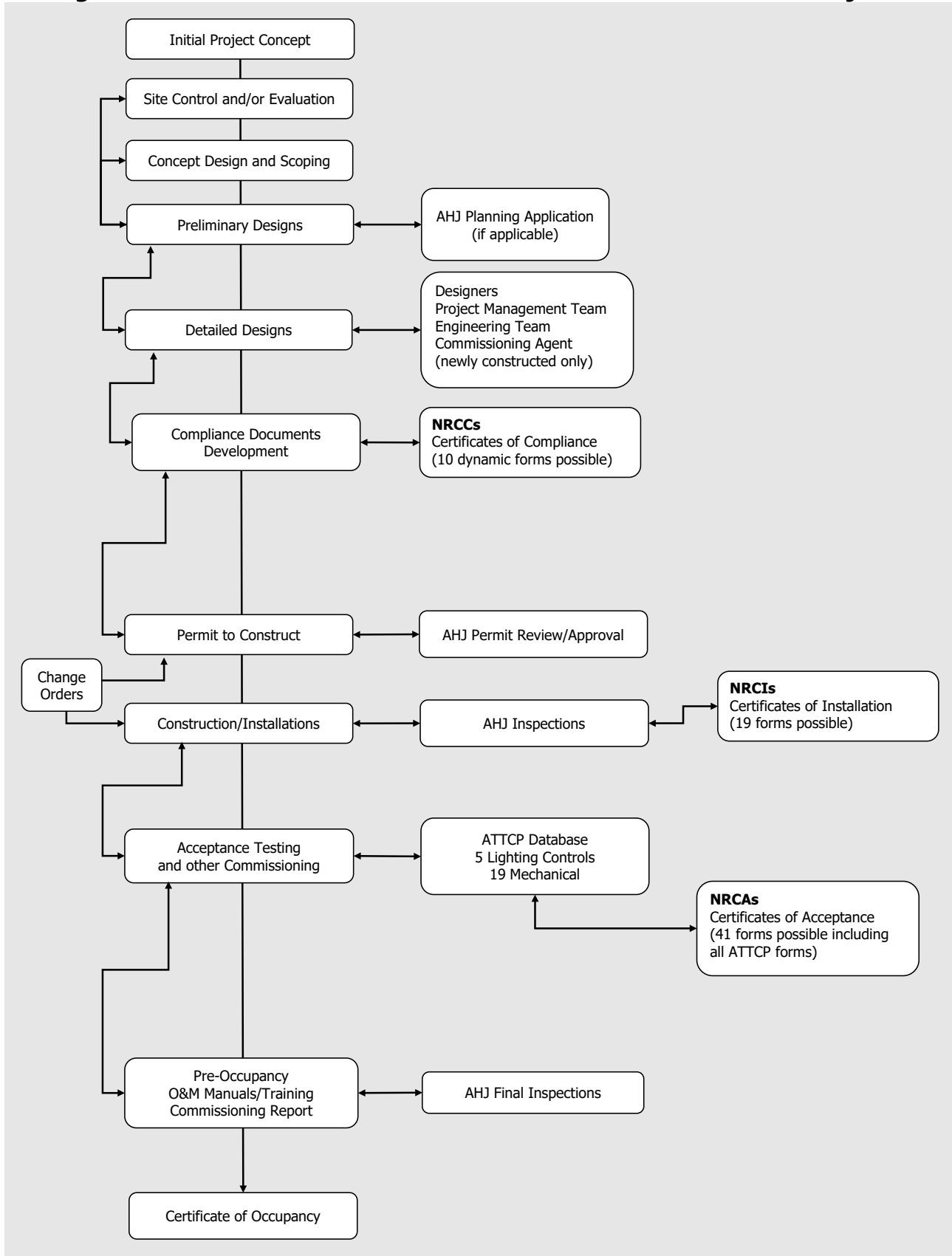
Acceptance Testing

After construction and installation, any required acceptance tests must be performed and the NRCAs completed. If these NRCAs are for lighting controls (and mechanical systems if mechanical systems ATTs become mandatory), then the acceptance test must be performed by an ATT and submitted to the ATTCP, which may require a fee to be paid.

Certificate of Occupancy

The final stage of the project is the development of the operation and maintenance manuals, training manuals, commissioning report, and the AHJ final inspections. From this point the AHJ would typically issue a Certificate of Occupancy, although in many instances this may be left until the tenant completes its first alterations.

Figure B-1: General Milestones for Nonresidential Construction Projects



Source: California Energy Commission

How the NDR Works

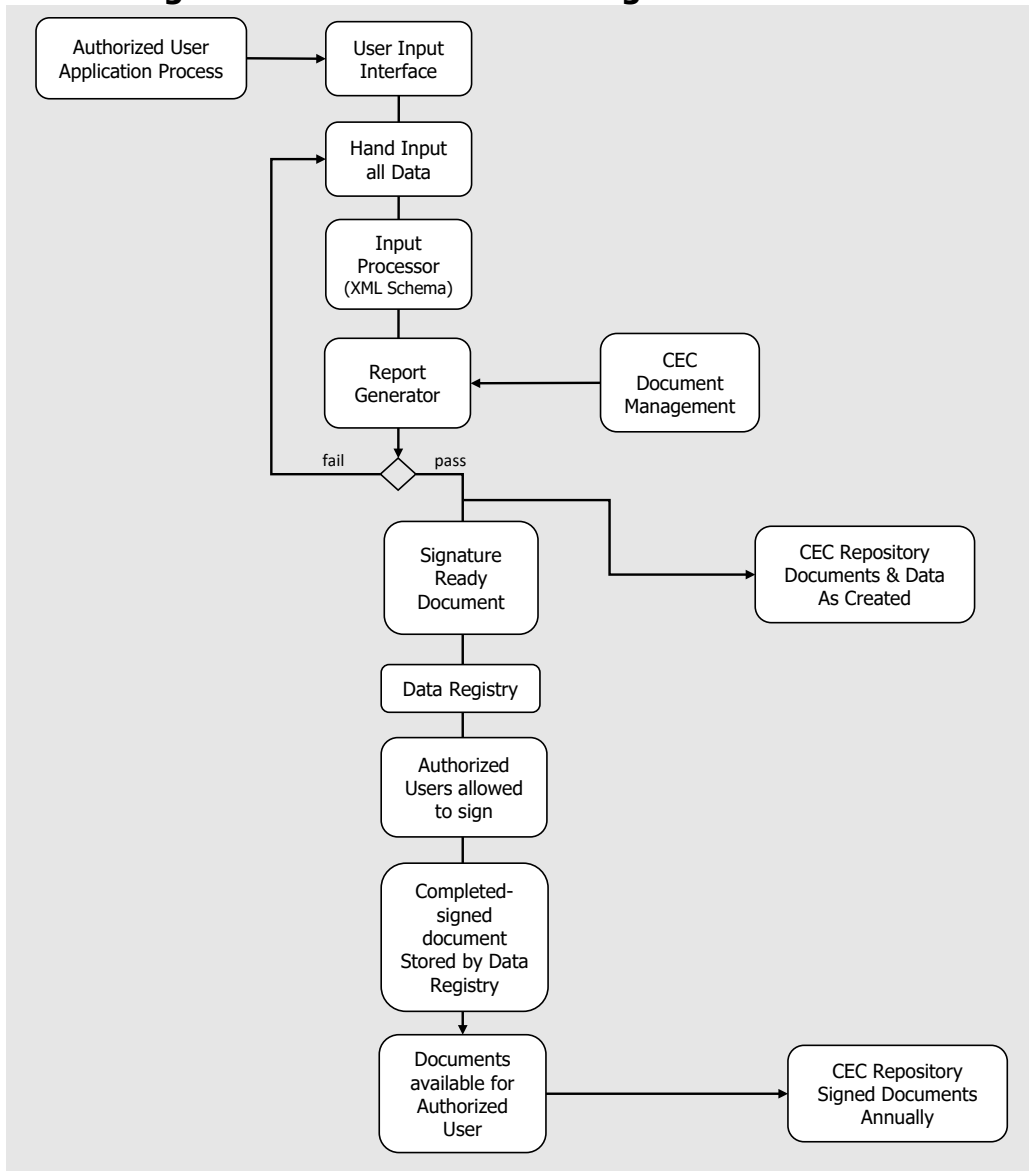
The NDR is similar to the HERS Provider data registry (also referred to in the Energy Code as the residential data registry) in that both are regulated by Title 24, California Code of Regulations, Part 6, Joint Reference Appendix JA7. Figure B-2 shows the general process that the NDR would use to allow an authorized user to register a compliance document (NRCC, NRCI, or NRCA). The authorized user is a defined term and includes builders, architects, or project proponents. The project proponent must apply to the NDR to receive a user-identification and password to access the NDR, which may require an initial fee. This application fee would be in addition to the fee required for the registration of each compliance document (NRCC, NRCI, and NRCA). The NDR is not required by the Energy Code to provide any training for the authorized user, although as a practical matter, some minimal training will likely be needed to enable use of the NDR system.

Once an authorized user has access to the NDR, an NDR user-interface is used to create the project and stock it with the required blank forms. In other words, the authorized user must have a full understanding of what compliance documents are required prior to creating the project in the NDR system. These required compliance documents are identified by the project design. Thus, the authorized user has little opportunity to test design ideas prior to completing the compliance documents.

Once the authorized user has hand-entered the required data for a compliance document, the document is tested for compliance with the XML Schema requirements. This generally happens as the data is being entered, but in many cases is only tested after data is entered. If the compliance document passes the XML Schema requirements, the NDR system passes it to the CEC Report Generator. The Report Generator either validates the document making it ready for e-signature or fails the document. This is the first point at which a design might be rejected. If the design forces the entered values to be outside of the compliance requirements, then the design must be changed. Referring to Figure 1, this would occur at the latest stages of the project design ("Compliance Document Development"). The cost of redesign at this stage is far less than a change order later but can still be costly depending on the scope of the changes required.

Once the compliance document is validated by the Report Generator and made signature ready, it is passed back to the NDR and the authorized users are permitted to sign. Once signed, the compliance document is locked (from further changes), stored by the NDR, and made available to the authorized user for submission to the AHJ.

Figure B-2: NDR Document Registration Process



Source: California Energy Commission

Each of the types of compliance documents (NRCC, NRCI, and NRCA) would be required to be registered with the NDR and would individually go through the process shown in Figure B-2. Referring to Figure B-1, the NDR would be used at least three different times in the construction process:

1. The NRCCs would be registered at the "Compliance Document Development" stage.
2. The NRCIs would be registered at the "Construction and Installation" stage.
3. The NRCAs would be registered at the "Acceptance Testing and other Commissioning" stage.

As previously stated, costs are not known at this time but are likely to be like the costs incurred from the HERS Provider data registry. However, the NDR is not required to perform any quality assurance or training so these costs may be lower than what is charged for the

HERS Provider. Generally, the cost per form is under \$10 and while there may be an initial application fee, it is not expected to be significant (under \$100).

However, to approve an NDR the CEC must first develop the structural elements for the NDR to use. The primary structural elements of the NDR that the CEC must create are modifications to the CBECC-Com software, development of the XML Schema, and development of the Report Generator. Some of this effort has been started, but most of it is far from completion.

How the ATTCP Works

Acceptance testing ensures that technicians install and make operational the equipment, controls, and systems in nonresidential buildings as required by the Energy Code. The CEC developed the ATTCP program to improve compliance with lighting controls and mechanical systems acceptance test requirements.

The ATTCP program provides training, certification, and oversight of technicians and employers who perform acceptance tests required by the Energy Code. Providers are private organizations approved to provide training curricula, as well as certification procedures, complaint resolution services (including disciplinary procedures), quality assurance, and accountability measures to technicians and employers.

Technicians must apply to the ATTCP to be approved for training and certification. The main qualification is that the technician has three years of installation experience to be accepted. Some ATTCPs also require that the technician be a member of a specific labor union, but the ATTCP program (as a whole) offers training and certification for both union and nonunion technicians. Applications are reviewed and approved by the ATTCP for admission.

The training itself focuses on the triggers, procedures, and documentation of acceptance testing for either lighting controls or mechanical systems installations. The training involves both classroom and hands-on (or laboratory) education. The training modules are broken down to individual acceptance tests (five for the lighting controls and 19 for mechanical systems). The mechanical systems ATTCPs offer a cafeteria style option, allowing the technician to choose which acceptance tests to be trained on; aligned to HVAC systems that are either the more common air-based systems (using traditional fluid compression and air movement) or systems that are more complex water-based, which use water retention systems, ice-block systems, or other unusual systems. The lighting controls ATTCPs train its technicians for five acceptance tests because five lighting controls acceptance tests are generally required on most projects.

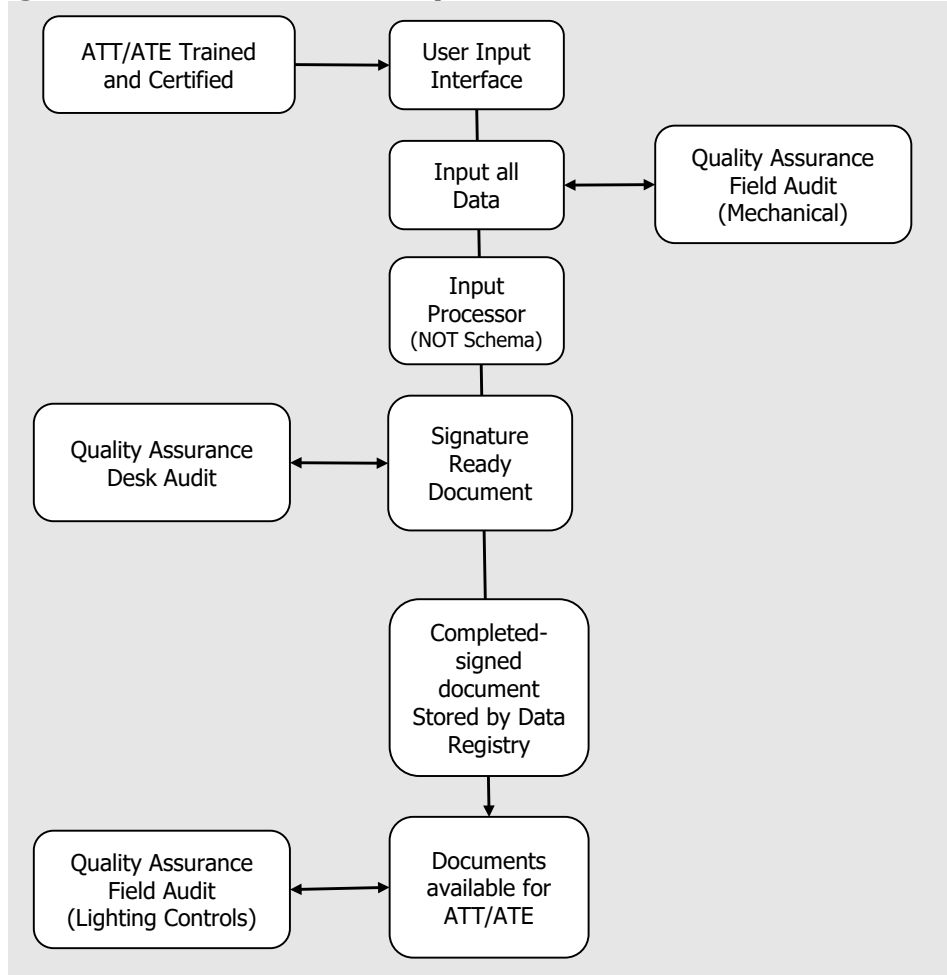
After a technician has passed each training module (or group of training modules), a written and laboratory proctored test is required to be passed. Once the technician passes the test, a certification as an acceptance test technician (ATT) is issued, and acceptance tests for which certified may be performed. The ATTCPs control the documentation that the ATTs must use for each acceptance test on each project. The ATT is given a login access and must complete the documentation after the acceptance test is successfully completed.

The ATTCP system records the documentation in a dedicated database system. This database system tracks the acceptance tests performed by each ATT and verifies the data as the ATT enters it into the system. The ATTCP also uses the database system to perform desk audits (also referred to as paper audits) of one to five percent of the acceptance tests performed by

each ATT (new ATTs start out at five percent and upon successful audits slowly go down to a minimum of one percent). The ATTCP also uses the database system to perform on-site (also referred to as field audits), where the ATTCP will send an auditor to the project site unannounced, to observe and verify that the ATT is performing the acceptance test as required. Additionally, the ATTCP uses the database system in its complaint resolution process. Depending on the complaint, the ATTCP will verify what acceptance tests were performed and may audit the acceptance tests (either desk or field audit, or possibly both) to help resolve the complaint. Complaint resolutions can result in the ATT being required to retrain, or even be decertified.

Figure B-3 outlines the basic process that the ATT uses to complete the NRCA after a successful acceptance test. The process outlined in Figure B-3 begins from Figure B-1 at the point of "Acceptance Testing and other Commissioning." Once the ATT has successfully completed the acceptance test, the ATTCP user interface is accessed, where the ATT inputs the required data and results, and electronically signs the document. Behind the scenes, the ATTCP database system checks the data as it is entered into the system and verifies that the values entered are close to what would be expected. The desk audit would be performed when the NRCA is signed and saved to the database. The on-site audit is performed based on the day-ahead schedule that the ATT must submit to the database system. Each ATT must indicate in the database system at least one day in advance, when the acceptance test will be performed. If an on-site audit is selected for a planned acceptance test and the ATT fails to perform that, it is counted as a failed audit. Once completed, the NRCA is sent to the ATT to be made available to the AHJ.

Figure B-3: The ATTCP Acceptance Test NRCA Documentation



Source: California Energy Commission

The costs associated with the use of the ATTCP program vary by ATTCP. In general, the union affiliated ATTCPs restrict its systems to union members only and do not charge for the training or use of NRCA forms. The independent ATTCPs charge for both training-certification and the use of NRCA forms. Training costs are currently under \$1,000 and the fee for NRCA forms is currently under \$10 (typically sold in 10-pack increments).

How the CCDR Works

The CCDR is created and maintained by the CEC to retain the compliance documents registered by the NDR. The intent of the CCDR is to give CEC staff the resources necessary to manage the NDR and ATTCP programs. Additionally, the CCDR can be used to provide a more robust means of compliance and enforcement of the Energy Code, provide a means to refine the Energy Code during a rulemaking, and assist the CEC in other areas of analysis regarding nonresidential buildings and projects. The CEC is currently implementing the CCDR for residential compliance documents and will implement the CCDR for lighting controls and mechanical systems next. Therefore, much of what CEC staff knows about the CCDR is in early implementation for residential buildings and the small ATTCP pilot project to collect ATTCP through an API.

The NDR is required to submit registered compliance documents to the CCDR. This is a data transference through secure means. While the CCDR is linked to the NDR in the DRRM, it is not restricted to the NDR. Meaning that the CCDR can use sources of data other than the NDR, such as data from the ATTCPs. The CCDR could functionally accept NRCA data from the ATTCPs, bypassing the NDR altogether.

Direct costs associated with the CCDR are unknown, but are likely to be absorbable with existing staff, given the estimated size of the data from the ATTCPs. These costs are primarily the cost of data storage, as the interface and user access will be developed by CEC staff.

APPENDIX C:

Draft Proposed Language

Staff recommends the following changes to specific language changes for the 2022 Energy Code rulemaking. Note, deleted language is in ~~strikethrough~~ and new language is in underline.

Title 24, Part 1 Administrative Regulations

Section 10-102 Definitions

DATA REGISTRY is a web service with a user interface and database maintained by a Registration Provider that complies with the applicable requirements in Reference Joint Appendix JA7, with guidance from the Data Registry Requirements Manual, and provides for registration of residential or nonresidential compliance documentation used for demonstrating compliance with Part 6.

RESIDENTIAL DATA REGISTRY is a data registry that is maintained by a HERS Provider that provides for registration, when required by Part 6 of all residential compliance documentation and the nonresidential Certificate of Verification.

NONRESIDENTIAL DATA REGISTRY is a data registry that is maintained by a Registration Provider approved by the Commission that provides for registration, when required by Part 6 of all nonresidential compliance documentation, excluding all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). However, nonresidential data registries may not provide for registration of nonresidential Certificates of Verification.

Section 10-103(a)1 Certificate of Compliance

- D. Contingent upon approval of data registry(s) by the Commission, all nonresidential buildings, high-rise residential buildings, and hotels and motels, when designated to allow use of an occupancy group or type regulated by Part 6 the person(s) responsible for the Certificate(s) of Compliance shall submit the Certificate(s) for registration and retention to a data registry approved by the Commission, excluding all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). The submittals to the approved data registry shall be made electronically in accordance with the specifications in Reference Joint Appendix JA7.

Contingent upon availability and approval of an electronic document repository by the Executive Director, Certificate of Compliance documents that are registered and retained by an approved data registry shall also be automatically transmitted by the data registry to an electronic document repository for retention in accordance with the specifications in Reference Joint Appendix JA7.

Section 10-103(a)3 Certificate of Installation

- E. Contingent upon approval of data registry(s) by the Commission, all nonresidential buildings, high-rise residential buildings, and hotels and motels, when designated

to allow use of an occupancy group or type regulated by Part 6 the person(s) responsible for the Certificate(s) of Installation, ~~except those documents exempted by the Energy Commission,~~ shall submit the Certificate(s) for registration and retention to a data registry approved by the Commission, excluding those documents exempted by the Energy Commission and all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). The submittals to the approved data registry shall be made electronically in accordance with the specifications in Reference Joint Appendix JA7.

Contingent upon availability and approval of an electronic document repository by the Executive Director, Certificate of Installation documents that are registered and retained by an approved data registry shall also be automatically transmitted by the data registry to an electronic document repository for retention in accordance with the specifications in Reference Joint Appendix JA7.

Section 10-103(a)4 Certificate of Acceptance

- B. Contingent upon approval of data registry(s) by the Commission, for all nonresidential buildings, high-rise residential buildings, and hotels and motels, when designated to allow use of an occupancy group or type regulated by Part 6 the person(s) responsible for the Certificate(s) of Acceptance shall submit the Certificate(s) for registration and retention to a data registry approved by the Commission, excluding all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). The submittals to the approved data registry shall be made electronically in accordance with the specifications in Reference Joint Appendix JA7.

Contingent upon availability and approval of an electronic document repository by the Executive Director, Certificate of Acceptance documents that are registered and retained by an approved data registry shall also be automatically transmitted by the data registry, to an electronic document repository for retention in accordance with the specifications in Reference Joint Appendix JA7

Sections 10-103.1(c)3I and 10-103.2(c)3I: Repository Reporting Requirement

The ATTCP application requirements are separated into two separate sections, 10-103.1 for lighting controls ATTCPs and 10-103.2 for mechanical systems ATTCPs. The following is a new section (section (c)3I) that will be identical for both lighting controls and mechanical systems ATTCPs.

- I Compliance Document Recording and Repository Reporting Requirement:
- i. The ATTCP shall record all certificates of compliance (Section 10-103(a)1), certificates of installation (Section 10-103(a)3), and certificates of acceptance (Section 10-103(a)4) associated with any acceptance test specified in Part 6, Section 130.4 or 120.5.

- ii. Contingent upon Energy Commission approval of the threshold (Section 10-103.1(b) or 10-103.2(b)) and upon availability and approval of an electronic document repository by the Executive Director, the ATTCP shall submit monthly data transfer packets to the Energy Commission to an electronic document repository for retention consistent with Energy Commission instructions.

Joint Reference Appendix

JA1 Definitions

DATA REGISTRY is a web service with a user interface and database maintained by a Registration Provider that complies with the applicable requirements in Reference Joint Appendix JA7, with guidance from the Data Registry Requirements Manual, and provides for registration of residential or nonresidential compliance documentation used for demonstrating compliance with Part 6.

RESIDENTIAL DATA REGISTRY is a data registry that is maintained by a HERS Provider that provides for registration when required by Part 6 of all residential compliance documentation and the nonresidential Certification of Verification.

NONRESIDENTIAL DATA REGISTRY is a data registry that is maintained by the Registration Provider approved by the Commission that provides for registration, when required by Part 6, of all nonresidential documentation, excluding all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). However, nonresidential data registries may not provide for registration of nonresidential Certificate of Verification.

JA7.5 Definitions

DATA REGISTRY is a web service with a user interface and database maintained by a Registration Provider that complies with the applicable requirements in Reference Joint Appendix JA7, with guidance from the Data Registry Requirements Manual, and provides for registration of residential or nonresidential compliance documentation used for demonstrating compliance with Part 6.

RESIDENTIAL DATA REGISTRY is a data registry that is maintained by a HERS Provider that provides for registration when required by Part 6 of all residential compliance documentation and the nonresidential Certification of Verification.

NONRESIDENTIAL DATA REGISTRY is a data registry that is maintained by the Registration Provider approved by the Commission that provides for registration, when required by Part 6, of all nonresidential documentation, excluding all compliance documents recorded by an acceptance test technician certification provider (10-103.1 and 10-103.2). However, nonresidential data registries may not provide for registration of nonresidential Certificate of Verification.