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**Cross-posting -- Systemic Underestimation of AHJ Impacts from
Title 24 Part 6**

Additional submitted attachment is included below.

November 10, 2025

Dear Chair Hochschild, Commissioner McAllister, and Commissioner Skinner,

The California Energy Commission (CEC) held a workshop on December 18, 2024 to discuss the State’s initiatives to improve compliance with Title 24, Part 6 (Title 24). Commissioner McAllister’s opening remarks included a suggestion that it is time for the CEC to start holding building departments accountable for shortcomings in Title 24 enforcement.

Commissioner McAllister explained:

*“And the AHJs that . . . we count on to enforce the code locally, and you know, and just work within some of the constraints that all of you have, but also, you know, **not shy away from the hard questions about enforcement**. You know, at the end of the day, **it is the law of the land** . . . I think, we need to really enhance the information that we have, or transparency, as a part of the path to creating accountability for compliance with the code”*

It is also a legal obligation of the CEC to assess impacts on local governments as the CEC evaluates the reasonableness of the regulations it might adopt.¹ For well over a decade, the CEC has failed to make such assessments in an objective manner, downplaying the legitimate enforcement concerns of Authorities Having Jurisdiction (AHJs). For the CEC to now blame AHJs for shortcomings in Title 24 implementation fundamentally misdiagnoses the problem.

Example: The following table is from the Title 24-2025 IOU² CASE Report for “*Multifamily Domestic Hot Water*” [excerpting two rows focused on AHJ impacts from a larger table].

Market Actor	Task(s) in current compliance process relating to the CASE measure	How will the proposed measure impact the current task(s) or workflow?	How will the proposed code change impact compliance and enforcement?	Opportunities to minimize negative impacts of compliance requirement
Plans Examiner	Would perform plan check reviews of gas water heater systems and verify construction drawings meet code	Would require verifying the design team has met code requirements for space, ventilation, structural capacity, condensate drainage, and adequate sizing of electrical systems upstream of the dwelling unit electric panel	No significant impact	The LMCC/NRCC documents could assist in understanding which projects need to meet proposal requirements
Inspector	- Would review the LMCI/NRCC documents and verified the central gas heater meets all applicable building codes, including the existing electric ready requirements - Would verify the electric ready provisions meet new code requirements including closet space, ventilation, structural, and building electrical system sizing	No significant impact	No significant impact	Compliance forms could be used to reduce the burden on the building official/inspector, while ensuring the proposal is properly enforced

¹ California Constitution article XIII B § 6

² The IOU Statewide C&S Team has not included SoCalGas in recent years.

This is not a cherry-picked example. Nearly every CASE report that CodeCycle has reviewed, going back at least four updates (2016, 2019, 2022, and 2025), asserts some version of the same “no significant impact” or “not a new cost” for AHJ operations.

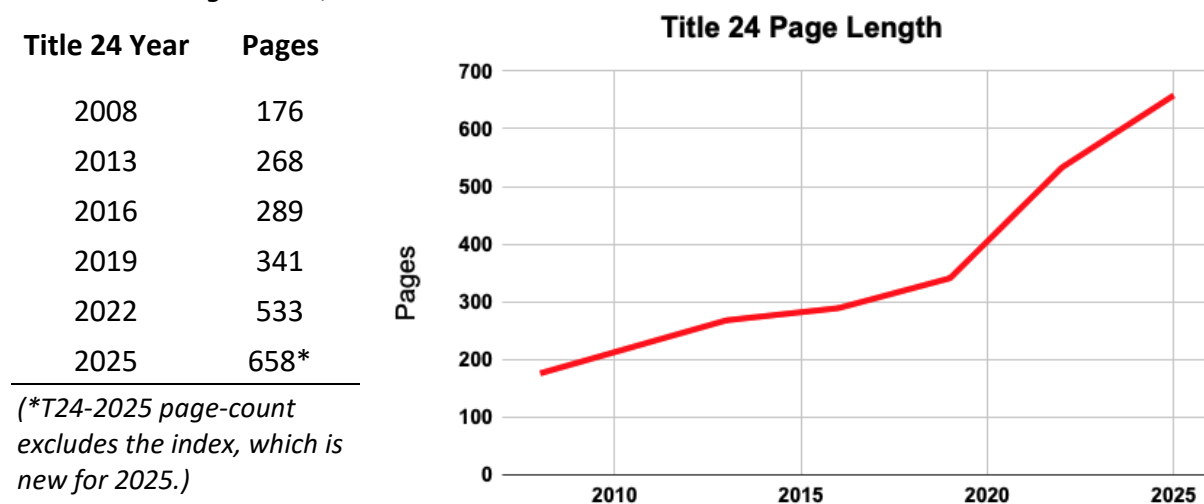
The conclusion is reiterated in CEC “Form STD 399” for each update. *Form STD 399* is the framework used by state agencies to assess and acknowledge added costs for local governments from new regulations. The last four versions of *Form STD 399* make no mention of AHJ enforcement costs. The CEC’s assertion – through regulatory omission – that there are no enforcement costs is demonstrably false, and not just with the clarity provided by hindsight. It was clearly false when the CEC and its consultants³ adopted each new piece of the Title 24 puzzle.

As shown in the above example (*yellow box, far right column*), the CEC and its consultants believe that adding additional Title 24 forms will “minimize negative impacts.” More CEC forms are quite likely the last thing that AHJ staff want to see.

1) The Scale of Increasing AHJ Expectations from Title 24-2008 to Title 24-2025

The CEC has added hundreds of new measures over the last 20 years, quadrupling the length of the Standards from 176 pages to 708 pages (658 pages without the new 2025 index).

Title 24 Page Count, 2008 to Present



The page count above does not include appendices, manuals, and forms for Title 24 Part 6, which in their totality run into the thousands of pages.

³ The “2025 Building Energy Efficiency Standards” published July 2025, sets forth: “**Energy Commission Consultants** – Key consultants include . . . *Statewide Codes and Standards Program* – which is . . . administered by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas and Electric Company (SDG&E) . . . and their consultants” (pg iii). Similarly, the “2025 Energy Code Accounting Methodology”, March 2024, sets forth: “**CEC Consultants** – Key consultants include . . . *the California Statewide Codes and Standards Program*” (pg i). There are other examples in the administrative record of IOUs working as *pro bono* consultants to the CEC – not mere stakeholders – executing the CEC’s Title 24 workload.

2) Widening the Lens of the 2025 Gap Analysis

In July, the CEC released the “*California Energy Code Compliance Gap Analysis*” (“Gap Analysis”).⁴ One of the purposes of the Gap Analysis is to determine “*the root causes of noncompliance.*” The disregard shown by the CEC towards AHJ implementation challenges during code adoption is almost certainly a primary “*root causes.*”

Looked at through a narrow lens, the CEC might characterize AHJ challenges in managing the complexity of Title 24 as a *root cause* for Title 24 compliance problems. But if the CEC can widen the lens, to look at its own history of ignoring AHJ concerns, the challenges faced by AHJs move from being a *root cause* of compliance problems to an inevitable *effect* of the CEC and its consultants downplaying impacts on AHJs.

One of the most useful things that the CEC can do with its ongoing compliance research is to consider how the CEC’s own biases have led to the challenges currently experienced by AHJs.

3) Treating Relentless Growth as Insignificant to Local Governments

A common theme in many of the Title 24 measure proposals adopted by the CEC is that, so long as Title 24 expands at a steady rate, it will not impact AHJs. An oft-repeated explanation from seven separate 2019 CASE Reports reads as follows:⁵

*“While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle.** The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated.”⁶*

Implied in this analysis is the idea that the only cost to local governments from new Standards is the training costs. What Commission leadership is now expecting AHJs to do is not just that they be trained on the new requirements, but that the AHJs consistently complete the far more challenging task of applying the byzantine Standards to each set of drawings, each stack of forms, and each completed building that moves through a city’s inspection process.

The idea that a steady rate of increase creates no additional burden misses two other important points:

- First, building departments do not solely need to enforce the newest round of regulations; they are asked by the CEC to enforce the whole of all accumulated standards.
- Second, the workforce in building departments is not fixed through time; new staff come into the industry; new staff likely have no basis from prior Title 24, Part 6 training to build

⁴ <https://efiling.energy.ca.gov/GetDocument.aspx?tn=265065&DocumentContentId=101838>

⁵ CodeCycle has tried to incorporate into this analysis only those measure proposals that resulted in measures moving into the Standards. Measure proposals that did not lead to a change in regulations are not included.

⁶ *Example: “Nonresidential Ventilation & Indoor Air Quality” 17-BSTD-02, TN# 222192.*

upon; so new inspectors and plan checkers must now be trained to understand the full 708 pages, not just the newest 125 pages.

These factors mean that a steady rate of increase creates an ever-increasing burden for building departments. This is sufficiently obvious that it should have been the CEC's starting assumption, necessitating robust mitigation to prove that there would be no impact. The CEC has instead held a seemingly irrefutable assumption that there will be no impact on AHJ operations no matter how complex the CEC makes the Standards and no matter how little mitigation is brought forth (see all recent *Form STD 399s* for Title 24, Part 6 filed by the CEC).

4) Indications that the Impact on Building Departments have been Far from Negligible

While the Standards were expanding from 176 pages to 708 pages, building department staff have repeatedly conveyed to the CEC that the very nature of the Energy Standards makes them particularly challenging to understand and enforce.⁷ The following input was provided to the CEC when the Standards were a quarter of their current size:

"Building officials in the State of California . . . honestly believe that the Standards are too complicated to enforce currently at the inspection level. . . They're unbearably complex for the level of education and training for the individuals who have to do the job." – Building Official, testifying before the California Energy Commission, ~2010

Input from AHJ staff to the CEC seems to have dampened in recent years, likely due to prior rounds of input being consistently ignored. Why continue to engage if the input is viewed as an impediment to the **CEC's primary objective of new code development?**

There is occasional input to the docket. Recent comments by one AHJ staff member emphasized how Title 24 forms are as much a part of the problem as the Standards themselves:

"Sometimes it is still a mystery to me as to what energy forms are required for environment, mechanical, electrical, fenestration, etc., for any given project whether it be res or non-res. Most designers don't know what to submit and they want the City to [tell] them what to submit and I don't feel knowledgeable enough to provide a confident answer half the time. Once forms are submitted, it is difficult to determine if the form is correct."

That perspective is consistent with what we hear from professionals across the industry: design teams, AHJ staff, contractors, etc.. The systematic failure of the CEC to address Title 24 implementation concerns is costing Californians billions per year in excess energy costs. During the last decade, the excess cost to California consumers could be well over \$30 billion.⁸ As

⁷ Much of this complexity exists regardless of the organization of the Standards; it will persist even if the CEC restructures the document. Inaccuracies in the CEC's own software systems that are designed to validate Title 24 compliance reflect the inherent challenges of the regulatory logic, no matter the organizational strategy.

⁸ The CEC's estimate of the Cost of Noncompliance for the new measures added for Title 24-2022 alone is \$2.85 billion/yr. (<https://efiling.energy.ca.gov/GetDocument.aspx?tn=261312> , pg 14). The measures adopted in 2022 might be 25% or less of the overall code (on an energy

California's energy costs continue to surge,⁹ the penalty for Californians tied to the CEC downplaying Title 24 implementation challenges has only increased.

There is a renewed interest in compliance at the CEC, but the CEC's primary solutions seem to rely upon reminding AHJs of the enormous task laid upon them by the CEC, or digitization efforts that lead to the same challenging and inaccurate forms. Meanwhile, the CEC seems committed to years of studies before initiating any type of robust mitigation.

5) These Comments are not Assessing the Merits of the Standards; they are Assessing the Implications of Prolonged Policy-Making that Ignores Implementation Concerns

CodeCycle.org is not making a judgment through these comments as to whether the regulations are wise or foolish. CodeCycle.org would not be working to improve code enforcement processes if we did not agree with the CEC's mission. The Standards, as adopted, are likely prudent in an idealized world where CEC mandates somehow just happen. But that is not this world. We cannot go into the intricacies here, but a substantial portion of the intended savings from Title 24-2025's new code measures could be offset by increased noncompliance across the whole of the Standards. For every 10 kWh of additional savings the State and IOUs claim from new code measures, increased compliance and enforcement challenges with the whole range of the Standards could be costing Californians 8 kWh. The Standards are in many ways cannibalizing themselves as they compete for overwhelmed compliance and enforcement resources.

6) Impacts beyond California's Building Departments

There are many professionals in the construction industry – committed to the ideals of Title 24 – who are suffering significant economic harm as the CEC underestimates local government impacts while deprioritizing Title 24 implementation. With the CEC's enforcement paradigm proving too difficult for most AHJs to manage, the industry sees a race to the bottom by way of labor quality and third-party inspections. As a result, the reluctance of the CEC and its consultants to acknowledge the actual challenges of Title 24 enforcement undermines the clean-economy workforce that the State should be making every effort to reinforce.

basis). Once the CEC includes noncompliance with the wider set of Standards adopted in 2019, 2016, 2012, etc. (and soon 2025), the total impact could be well over \$10 billion/yr.

⁹ Earlier this year, the CEC released its analysis of Long-term System Costs (LSC) for Title 24-2028, and the LSC values are roughly 40% higher than for Title 24-2025, a significant increase. The CEC should update its Cost of Noncompliance analysis to reflect that 40% increase. <https://efiling.energy.ca.gov/GetDocument.aspx?tn=265860&DocumentContentId=102831> (starting pg. 47)

Focusing blame on AHJs for these impacts directs too much of the CEC's attention on a symptom of the problem rather than the cause. The cause seems to be a relentless increase in complexity while the CEC continues to slow-walk efforts to mitigate impacts on AHJs.

7) Going Back Ten Years, the CEC Relied Upon the Same Analysis

These comments opened with an example of the CEC's perspective on AHJ impacts in the most recent 2025 Standards. CASE reports written in 2014 (for the 2016 Standards) were less verbose, but the sentiment was the same.

From the Title 24-2016 CASE report on "*Residential High Performance Walls and QII [Quality Insulation Installation]*":

"Impact on building inspectors: As compared to the overall code enforcement effort, this measure has **negligible impact** on the effort required to enforce the building codes."

For the 2016 CASE Report "*HVAC Equipment Efficiency Based on ASHRAE 90.1-2013*", the CEC and IOUs concluded:

"Impact on building inspectors: As compared to the overall code enforcement effort, these measures have **negligible impact** on the effort required to enforce the building codes."

For the 2016 CASE Report "*Nonresidential Lighting Controls: Partial-ON Occupancy Sensors*", the CEC and IOUs concluded:

"Impact on building inspectors: As compared to the overall code enforcement effort, this measure has **negligible impact** on the effort required to enforce the building codes."

The pattern continues:

2016 Skylights: ***"Negligible impact."***

2016 Nonresidential Control Credits: ***"Negligible impact."***

2016 Residential Lighting: ***"Negligible impact."***

The same analysis can be found in nearly every CASE report for Title 24-2016. Parallel to these boiler-plate analyses of local government impacts, the CEC and its consultants have undertaken hundreds-of-millions of dollars of bespoke research justifying the cost-effectiveness of new measures. That research entails thousands and thousands of hours of data collection, building simulations, spreadsheet analysis, and report writing. The comparatively small effort that the CEC and its consultants have placed on understanding (or mitigating) AHJ impacts is stark.

The assertion in the CEC's recent Gap Analysis that code development and code implementation are coequal in the eyes of the CEC is not matched by the agency's conduct, past or present.

8) Ignoring Concurrent and Cumulative Impacts

It is a core principle of impact assessments that impacts should not be assessed singularly but should be assessed in the broader context. One fresh mile of road will not imperil endangered

wolves, but 500 one-mile projects could eliminate a species. The same is true of the CEC's 500 pages of new Standards. The CEC's avoidance of cumulative impacts in its assessments is all the worse because many of those one-mile "*no significant impact*" projects are being approved concurrently by the CEC through a single adoption of ~100 new pages of regulations.

In adopting Title 24-2025, the CEC completed *Form STD 399*. As previously discussed, *Form STD 399* requires an evaluation of the "*Fiscal Effect on Local Government*" of the full collection of newly adopted regulations.

In assessing the fiscal impacts of Title 24-2025, the CEC considered how the Standards might impact construction costs and energy costs for local governments, but the CEC did not acknowledge any **costs for local governments to enforce the expanded set of Standards**. The *Form STD 399* analysis would seem to assume that the only impact on local governments from Title 24, Part 6 flows through the physical buildings owned by local governments (*subsection A.2.f. below*), not building department enforcement obligations.

Title 24-2025 Form STD 399 (excerpts divided by dashed red line)

STATE OF CALIFORNIA — DEPARTMENT OF FINANCE

ECONOMIC AND FISCAL IMPACT STATEMENT

(REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

FISCAL IMPACT STATEMENT

A. FISCAL EFFECT ON LOCAL GOVERNMENT *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

☒ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ 959,000 annually

Check reason(s) this regulation is not reimbursable and provide the appropriate information:

☐ e. Will be fully financed from the fees, revenue, etc. from: _____

Authorized by Section: _____ of the _____ Code;

☒ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

Local governments bear significant administrative costs to manage and properly enforce the growing regulatory burden of Title 24, Part 6. Yes, local governments could recover those costs through increased permit and compliance fees, but neither the CASE reports nor CEC's *Form STD 399* mentions such costs or any related cost recovery mechanisms, as shown by the empty checkbox for Subsection A.2.e. (*highlighted with a red box*).

The \$959,000 in extra costs noted by the CEC on *Form STD 399* for Title 24-2025 (*shown above*) relate solely to building construction and renovations costs for city owned facilities, not Title 24 enforcement costs.

In Addendum A to *Form STD 399* for Title 24-2025, the CEC expands on the analysis of impacts to local governments, but once again, Addendum A looks only at the extra construction costs and projected energy savings for city owned buildings. As with *Form STD 399* itself, there is no mention of additional city staff costs to manage the **expanding responsibilities of Title 24 enforcement** that Commission leadership is now highlighting as a legal obligation of AHJs.

Form STD 399 for Title 24-2025 seems to aggregate the “*no significant impact*” finding of the CASE reports – and other new measure proposals – to determine that the whole of the Standards will pose “*no significant impact*” on AHJ enforcement operations.

The analysis is the same for **Title 24-2022** *Form STD 399*.

The analysis is the same for **Title 24-2019** *Form STD 399*.

The analysis is the same for **Title 24-2016** *Form STD 399*.

9) It is not the Job of Building Departments to Monitor the CEC’s Assessment of Local Government Impacts

We fear that, in reviewing these comments, the CEC might argue that it is the responsibility of local governments to step forward and inform the CEC of missing elements in the CEC’s regulatory process. Continuing that premise: absent such engagement from local governments, it is not the CEC’s fault that impacts to local governments have been overlooked. This is not how the CEC’s obligations towards local governments should work. The CEC and its consultants should discern the impacts of the CEC’s own accord. The impacts are not hard to see.

Looked at from the other side, it is the job of local governments to address the needs of their constituents. Local governments generally do not have the time or resources to supervise the CEC’s Title 24 development efforts.

10) Acknowledging Economic Activity for “California Building Inspectors”, but Somehow without Costs to Local Governments

It is an important secondary objective of the CEC’s code development efforts that Title 24 is also a jobs creation program for the California clean economy. The IOUs used IMPLAN in the 2019, 2022, and 2025 CASE reports to estimate job creation. “*Conceptually, IMPLAN estimates jobs created as a function of incoming cash flow in different sectors of the economy, due to implementing a code or a standard.*”

A number of the IOU IMPLAN estimates of increased economic activity reach the conclusion that a given measure proposal would drive additional employment for building inspectors. For example, the 2025 CASE Report for “*Multifamily Indoor Air Quality*” sets forth: “*Table 22: Estimated Annual Impact that Adoption of the Proposed Measure would have on California*

Building Inspectors.” Table 22 suggests that the proposed measure would generate six additional building inspector jobs.¹⁰

Yet, in the CASE Report where the IOUs assess the “*Cost to Local Governments*”, there is no mention of additional labor tied to enforcement. Similarly, on Form STD 399 for Title 24-2025, the new staff members needed to enforce the “*Multifamily Indoor Air Quality*” requirements have disappeared (no such costs are acknowledged).

One gets the sense that the CEC is selectively putting forward positive data – related to job creation – while suppressing negative data – related to increased enforcement costs – even though the two costs are exactly the same thing, involving the same AHJ staff to enforce the same new regulations. This pattern is repeated by the CEC across a range of analytical issues related to Title 24 compliance.

11) Evidence from the CEC and the CPUC that Title 24 is not Easy to Understand or Implement

It is worth reinforcing that the CEC’s own compliance software systems, developed in partnership with the IOUs, do not properly interpret the CEC’s own Standards because the Standards are too complicated for the CEC / IOU team to translate into software. CodeCycle has made the CEC aware of at least some of those errors, and the CEC has so far characterized the errors as somehow inevitable or un-addressable given the complexity of Title 24. If the CEC cannot accurately convert its own regulatory rules into software, how does the CEC expect AHJs to “*quickly and easily*”¹¹ enforce the Standards, using analog means?

The CEC is not alone in failing to surmount the complexity of the Standards that the CEC created. PG&E made a presentation to the CPUC’s CAEECC process in 2016 arguing that Title 24 compliance was generally quite good. PG&E argued that more robust programs were not needed to help building departments with most aspects of energy code compliance or enforcement.¹² The primary citation provided by the PG&E was the CPUC’s “*Statewide Codes and Standards Program Impact Evaluation Report For Program Years 2010-2012.*”¹³

The CPUC published an Addendum to that study acknowledging that the compliance portion of the 2010-2012 IOU C&S Impact Evaluation did not, itself, adhere to the rules of Title 24.¹⁴ Therefore, per the Addendum, “*the CPUC thinks it prudent to note the methodological*

¹⁰ The IMPLAN estimate might be accurate, but it could be underestimating the actual time required for proper enforcement. The IMPLAN models likely do not consider the actual complexity of the new measures, the impact of that new complexity layered on top of existing complexity, or the thoroughness that the CEC now expects of Title 24 enforcement.

¹¹ See Appendix A to these comments for repeated “*quickly and easily*” characterizations.

¹² https://www.caecc.org/_files/ugd/0c9650_73302886f7574c9ea84a89725b0a7068.pdf

¹³ https://www.calmac.org/publications/CS_Evaluation_Report_FINAL_10052014-2.pdf

¹⁴ https://www.calmac.org/publications/CodesandStandards10-12Impact_Addendum.pdf

differences so that the results of the 2010-2012 Impact Evaluation will not be misinterpreted as a barrier to further improvements in compliance."

Subsequent CPUC compliance research, including the most recent evaluation completed in 2023, has also been unable to compare actual regulations to the evaluated buildings due, in part, to the overwhelming complexity of Title 24. There are reasons to believe that the CEC has relied upon that same CPUC research when the CEC has argued for deprioritizing compliance improvement efforts.¹⁵ The CPUC research is cited as a legitimate bookmark of high compliance rates in the CEC's recent Gap Analysis¹⁶ and in CEC presentations related to the Gap Analysis.

California's energy agencies have found, repeatedly, that it is not remotely a trivial effort to apply the Title 24 Standards to a given set of design drawings or a given project in the field. There are no easy, analog "*cheat sheets*" given the myriad, interwoven *options, exceptions, precursors, compliance paths, building types, system types, and space types* that the CEC has added to the Standards, creating an ever-changing tapestry of requirements in a single edition of Title 24.

12) Before Asking more of Building Department Staff, the CEC should Conduct a Secondary Review of Impacts to Local Governments Driven by Title 24 Adoption from 2016 to 2025

If Commission leadership concurs with CodeCycle's assessment that impacts on local governments have not been properly evaluated, would it be useful for the CEC to conduct a review of actual impacts on local governments that are tied to the CEC's desired level of enforcement? The CEC might also assess why those impacts were not identified in the initial round of reviews, thereby preventing a recurrence of the problem.

If a review were to occur, it is probably best that the review be conducted with some level of independence from those who produced the last few rounds of evaluations that found "*no significant impact*", or in the case of *Form STD 399*, no enforcement impact at all.

Important initial issues to review:

1. Undertake a cumulative impact assessment for the last four Title 24 updates: Title 24-2016, Title 24-2019, Title 24-2022, and Title 24-2025.
 - a. For measure proposals that led to adopted standards, catalog the following information:

¹⁵ Commissioner McAllister: "*On the new construction I would actually say that compliance is pretty darn good and certainly in the nonresidential it's very good. I don't think we have a whole lot of evidence that the new construction code, certainly in developments that the major builders are doing -- like production builds -- I think we're quite confident that compliance is high in those.*" December 2022 business meeting (at 2:26:00):

[https://energy.zoom.us/rec/play/PF2Hq-VGFQW5iBDXewGzZvJir-](https://energy.zoom.us/rec/play/PF2Hq-VGFQW5iBDXewGzZvJir-7Vtp35X7p4NhyjinKfQvkO0xkpizg9Y6J_0E9ibqS5apxZ8aldqisT.OWx43GzmVxRNNHyb)

[7Vtp35X7p4NhyjinKfQvkO0xkpizg9Y6J_0E9ibqS5apxZ8aldqisT.OWx43GzmVxRNNHyb](https://energy.zoom.us/rec/play/PF2Hq-VGFQW5iBDXewGzZvJir-7Vtp35X7p4NhyjinKfQvkO0xkpizg9Y6J_0E9ibqS5apxZ8aldqisT.OWx43GzmVxRNNHyb)

¹⁶ <https://efiling.energy.ca.gov/GetDocument.aspx?tn=265065&DocumentContentId=101838>

- i. Document the projected impact on plan checkers and building inspectors set forth in the measure proposal.¹⁷
 - ii. Document any proposed mitigation measures.
 - iii. Document the entity that proposed the measure.
- b. Assess whether, when looked at in the aggregate (i.e. cumulatively), the projected impacts on building departments matched the actual impacts.
 - i. The CEC will need to find ways to seek candid input from building department staff, including an objective input on how much time would be required if the Standards were fully enforced.
 - ii. The CEC should conduct its own Title 24 review process applying the Title 24 Standards to borrowed design drawings to assess the required time for enforcement at plan check.¹⁸
 - iii. Elements of this analysis should probably be done independently for each of the last four code updates, as well as across all four updates combined. (AHJs must manage all four updates on top of the continuing elements of Title 24, Part 6 that predate Title 24-2016.)
- c. If the actual impacts exceeded the projected impacts, could the impacts have been foreseen, in advance?
 - i. If yes, is there an explanation why likely impacts were ignored?
- d. More broadly, is it appropriate for the CEC and its code development partners to assess impacts on AHJs piecemeal, as has been done in measure proposals?
 - i. If not, should that change in the future, such that impacts for each code update are evaluated collectively?
- e. Consistent with the requirements of the CEC's New Measure Template (discussed more below), if the CEC "*assume[s] state and local government staffing is unavailable,*" what would be the cost for the State itself to enforce the requirements that have been adopted from Title 24-2016 to present, to the letter of the law?
 - i. Perhaps break down this assessment by measure proposal, as required by the New Measure Template, and then sum those estimates per code adoption cycle?

¹⁷ There are frequently multiple assessments per measure proposal, some labeled as "*Cost to Local Government*" and some labeled as "*Roles of Market Actors in the Proposed Compliance Process.*" Other labels are sometimes used. All such descriptions should be documented, as they frequently differ.

¹⁸ If the CEC can secure an array of permit drawings, the CEC could review energy code compliance and evaluate the time required of CEC staff to complete a thorough plan check process for all applicable Title 24 requirements. The time should include the drafting of comments as well as the projected time required for secondary review following any plan revisions. The results should be reported in person-hours, with some characterization of the scale of the projects that were reviewed (size, rooms, building type, new or alteration, etc)

2. For each mitigation measure listed, particularly with respect to AHJ responsibilities:
 - a. Did the mitigation measure come to pass, and in what manner?
 - b. If a mitigation measure was implemented, is there evidence that it effectively mitigated impacts on AHJs or achieved desired compliance outcomes?
 - c. Were there alternate mitigation measures that may have worked better but were not listed and/or were not tried?
 - d. Must contemplated mitigation measures consider systems or solutions that could or should be developed, not just solutions already in existence?
 - e. In evaluating mitigation strategies, is there an obligation to consider all possible mitigation measures, or may the CEC and IOUs constrain the evaluation of mitigation measures to those strategies offered by the CEC and IOUs?
 - f. For each measure proposal that set forth implementation “objectives” to “quickly and easily” achieve a given outcome, was that “quickly and easily” outcome achieved? A number of examples are provided in Appendix A.
3. There are likely other questions that should be included in this retrospective analysis.

13) Revisiting the CEC’s Declaration that it is Time to Hold Local Governments Accountable

Having set forth examples of the CEC’s underestimation of local government impacts, it seems worth revisiting the emphasis that Commission leadership wishes to convey to local building departments in asking them to take Title 24 enforcement more seriously. In the December 2024 workshop on Compliance Initiatives, Commissioner McAllister stated:

*“And the AHJs that . . . we count on to enforce the code locally, and you know, and just work within some of the constraints that all of you have, but also, you know, **not shy away from the hard questions about enforcement**. You know, at the end of the day, **it is the law of the land** . . . I think, we need to really enhance the information that we have, or transparency, as a part of the path to **creating accountability for compliance** with the code, and setting really over time a much greater expectation of compliance.”¹⁹*

The CEC has been inclined to “shy away from the hard questions” about its own role in Title 24 compliance challenges. In numerous instances the CEC has distorted analyses and resisted transparency on the topic of Title 24 implementation, whether impacts on AHJs, the cost to Californians from noncompliance, or the reliability of State of California’s compliance assessments.

“Accountability”, “transparency” and a “greater expectation of compliance” are all noble ideals, but they are ideals that might best be directed at the Commission itself at this stage. Perhaps helping AHJs in a far more robust manner, over a meaningful period of years (a decade?), should precede any effort by the CEC to hold AHJs accountable?

¹⁹ https://energy.zoom.us/rec/share/lrsZ0Xrjyk0HXMOPdPz_UZ928zt3c3-F4GK-NzUszNnHBynmk4QPVsgSyQXtx0Ch.H5hqug14hgV2ilp8 (at 00:04:40)

14) The CEC Set Guardrails to Ensure that Enforcement Impacts were Properly Evaluated, but the Guardrails were Ignored

The CEC has a template for new measure proposals. For the 2025 Standards, the document title was: “2025 California Energy Code: Measure Proposal to the California Energy Commission”. In accordance with the CEC’s obligations to assess economic impacts on local governments, the Template requires those entities proposing new measures to assess the “*Cost of Compliance and Enforcement*” for the proposed measures.

Central to the CEC’s framework is a directive that the analysis “***assume state and local government staffing is unavailable.***” This assumption appears structured to keep the assessment candid, or objective, so that additional work cannot be piled upon existing building department staff with the assumption that the existing, fixed number of staff can absorb any amount of additional work.

The recently released New Measure Template for the 2028 Standards²⁰ sets forth the same guardrails:

“3.6 Cost of Compliance and Enforcement

Assume state and local government staffing is unavailable. Discuss the likely cost to the state to ensure compliance with the measures and enforce the proposed measures in the field, including any additional person years or new programs that must be developed.” (emphasis added)

Nonetheless, the analysis used in almost all measure proposals approved by the CEC, including those for Title 24-2025, state something similar to:

“Impact on Building Inspectors

Building inspectors participate in continuing education and training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.”²¹

This analysis by the IOUs – approved by the CEC – explicitly ignores the analytical guardrails set forth by the CEC. It assumes that local government staffing is available and that the existing staffing can complete any required enforcement process. The IOUs and CEC assume the additional enforcement work can be done with “*no impact on . . . the scope of their role conducting energy efficiency inspections*”.

²⁰ https://www.energy.ca.gov/sites/default/files/2025-07/2028_Energy_Code_Measure_Proposal_Template_ADA.docx

²¹ 2025 CASE Report “*Process Load Pipe Insulation*” (24-BSTD-01, TN# 255320-4)

15) Additional Examples of CEC Failures to Account for Local Government Impacts

Appendix A to these comments sets forth additional material related to the assessment of impacts on building departments from measure proposals for Title 24-2019, Title 24-2022, and Title 24-2025.

16) Conclusion

CodeCycle submits these comments primarily in response to the suggestion from Commission leadership that it is time for the CEC to start holding AHJ's accountable. Helping California's Building Energy Efficiency Standards fulfill their potential is a matter of significant importance. This is particularly true given rising energy costs, a stressed energy grid, increasing demand for electricity, decarbonization goals, and the relentless pace of climate change.

Having underestimated impacts to local government for well over a decade, the current disparities between Title 24's complexity and AHJ enforcement capacities will not be quickly or easily remedied. The Standards are overwhelming complex, as is the construction industry. The CEC needs to have its eyes wide open, *bringing accuracy and transparency to the fore*, if the State is going to make the type of progress that it wants to see in improving Title 24 compliance and enforcement outcomes.

Sincerely,



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APPENDIX A

Further Examples of CEC Underestimating Local Government Enforcement Challenges

Having provided one example from Title 24-2025 above, and six examples from Title 24-2016, further examples of the CEC's systematic underestimation of local government impacts are provided below from Title 24-2025, Title 24-2022, and Title 24-2019. CodeCycle has tried to include all measure proposals that resulted in additional requirements being added to Title 24, but it is possible that we have either over-included or under-included references due to challenges in tracking the connection from measure proposals to adopted regulations.

1. Title 24-2025 Measure Proposals

2025 CASE Report "Refrigeration" (24-BSTD-01, TN# 255320-1)

The following analysis of building inspector impacts is repeated five times for five sub-measures in the CASE Report "Refrigeration System Proposal" sponsored by the IOUs²² and developed in coordination with the CEC:

*"Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. **The Statewide CASE Team, therefore, anticipates the proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections other than learning how to plan check this new requirement on submitted plans.**"*

This analysis suggests that, in the eyes of the CEC and IOUs, so long as building department staff can be trained in the new measures, there will be no change in responsibilities or work "scope" for the plan check or field inspection process. Missing in the analysis is the inherent challenge in memorizing, let alone understanding, the whole of a more complicated set of Standards. More importantly, the CEC has concluded that so long as the Standards can be fully memorized and understood, there is no additional work to enforce additional measures. Of course, doing more things requires more time.

Further analysis of the enforcement process in the CASE report repeatedly emphasizes that the enforcement process is similar to other processes, and therefore likely to be easy:

"The compliance process described above is very similar to the process that currently exists for measures related to refrigerated warehouses and commercial refrigeration."

²² All CASE Reports – "Codes and Standards Enhancement" – are sponsored by the IOUs; such sponsorship will not be universally noted. CASE reports are the most common type of measure proposal; consequently, IOU measure proposals have acquired a unique acronym: "CASE".

“The compliance process described above does not significantly differ from the normal compliance process in place for existing code language on infiltration barriers. Small updates to the compliance documents are expected to be needed to clarify the mandatory requirement, but overall verification and compliance would be conducted in a similar manner.”

A small sample follows of the new code language that the CEC and its IOU consultants think can be easily incorporated into the enforcement capacities of AHJs based on routine training:

“Transcritical CO₂ gas coolers. New fan-powered gas coolers on all new transcritical CO₂ refrigeration systems shall conform to the following:

- A. Air-cooled gas coolers are prohibited in Climate Zones 9 through 15.**
- B. Design leaving gas temperature for air-cooled gas coolers shall be less than or equal to the design dry-bulb temperature plus 6°F.**
 - Exception to Section 120.6(a)8B: Design leaving gas temperature for air-cooled gas coolers in Climate Zones 2, 4 and 8 shall be less than or equal to the design dry-bulb temperature plus 8°F.**
- C. Design leaving gas temperature for adiabatic gas coolers necessary to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be less than or equal to the design dry-bulb temperature plus 15°F.**
- D. All gas cooler fans shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.**
- E. While operating below the critical point, the gas cooler pressure shall be controlled in accordance with Section 120.6(a)4F.**
- F. While operating above the critical point, the gas cooler pressure setpoint shall be reset based on ambient conditions such that the system efficiency is maximized.**
- G. The minimum condensing temperature setpoint shall be less than or equal to 60°F for systems utilizing air-cooled gas coolers, evaporative-cooled gas coolers, adiabatic gas coolers, air or water-cooled fluid coolers or cooling towers for heat rejection.**
 - Exception to Section 120.6(a)8G: Transcritical CO₂ refrigeration systems with a design intermediate saturated suction temperature greater than or equal to 30°F shall have a minimum condensing temperature setpoint of 70°F or less.**
- H. Fan-powered gas coolers shall meet the gas cooler efficiency requirements listed in Table 120.6-C. Gas cooler efficiency is defined as the Total Heat of Rejection (THR) capacity divided by all electrical input power (fan power at 100 percent fan speed).**

Table 120.6-C

CONDENSER TYPE	REFRIGERANT TYPE	MINIMUM EFFICIENCY	RATING CONDITION
Outdoor Air-Cooled	Transcritical CO ₂	160 Btuh/watt	1400 psig, 100°F Outlet Gas Temperature, 90°F Outdoor Dry bulb Temperature
Adiabatic Dry Mode	Transcritical CO ₂	90 Btuh/watt	1100 psig, 100°F Outlet Gas Temperature, 90°F Outdoor Dry bulb Temperature

CEC Form STD 399 for Title 24-2025 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2025 CASE Report “Laboratories” (24-BSTD-01, TN# 255320-2)

The following analysis is repeated four times in the assessment of impacts on building inspectors in the CASE report for new laboratory measures:

“3.2.3.6 Impact on Building Inspectors

*... Building inspectors participate in continuing education and training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the **proposed change would have no impact on employment of building inspectors or the scope of their role** conducting energy efficiency inspections . . .”*

Table 73 of the “Laboratories” CASE Report provided further assessment of the impact on “Enforcement Agency Plans Examiner.” The conclusion: “*Impact is expected to be minimal relative to current processes.*” The proposed mitigation strategy involves adding more fields to the forms, which are already not working for AHJs:

Table 73: Roles of Market Actors in the Proposed Compliance Process

Market Actor	Task(s) in current compliance process relating to the CASE measure	How will the proposed measure impact the current task(s) or workflow?	How will the proposed code change impact compliance and enforcement?	Opportunities to minimize negative impacts of compliance requirement
Enforcement Agency Plans Examiner	Validate the labs HVAC system meets current Title 24, Part 6 requirements based on submitted plans.	Validate the labs HVAC system meets additional proposed Title 24, Part 6 requirements based on submitted plans	Impact is expected to be minimal relative to current processes.	Consolidation of all new tasks (i.e., new fields in existing form) with existing inspection and approval practices.

A subset of the language added through this measure follows:

“5. Reheat limitation. Air handlers in buildings with greater than 20,000 cfm of laboratory exhaust that serve multiple space-conditioning zones in laboratory spaces shall not mechanically cool air handler supply air below 80 °F and shall not heat air handler supply air above 50°F, and each zone shall include heating and cooling capacity to prevent cooling at the air handler and reheating at the zones.

Exception 1 to Section 140.9(c)5: Additions or alterations to existing air-handling systems serving existing zones without heating and cooling capacity.

Exception 2 to Section 140.9(c)5: Systems in Climate Zones 7 or 15.

Exception 3 to Section 140.9(c)5: Systems dedicated to vivarium spaces or to spaces classified as biosafety level 3 or higher.

Exception 4 to Section 140.9(c)5: Systems that:

1. Are located where the outdoor dew point temperature is greater than or equal to 64°F at the ASHRAE 2 percent annual dehumidification design condition, and
2. Include heating and cooling capacity at each zone, and
3. Do not mechanically cool air handler supply air below 80°F when the outdoor dew point temperature is below 60°F.

6. Exhaust air heat recovery. Buildings with greater than 10,000 cfm of laboratory exhaust shall include an exhaust air heat recovery system that meets the following:
- A. A sensible energy recovery ratio of at least 45 percent at heating design conditions and 25 percent at cooling design conditions.
 - B. Heat is recovered from at least 75 percent of all lab exhaust air volume.
 - C. The system includes a run-around coil pump or other means to disable heat recovery.
 - D. The system includes a bypass damper or other means so that the exhaust air pressure drop through the heat exchanger does not exceed 0.4 inch w.g. when heat recovery is disabled.

Exception 1 to Section 140.9(c)6: Additions or alterations to existing laboratory exhaust systems that do not include exhaust air heat recovery.

Exception 2 to Section 140.9(c)6: Buildings where the total laboratory exhaust rate exceeds 20 cfm/ft² of roof area.

Exception 3 to Section 140.9(c)6: Locations that meet both of the following:

1. In Climate Zone 6 or 7; and
2. In a jurisdiction where gas heating is allowed.

Exception 4 to Section 140.9(c)6: Buildings with an exhaust air heat recovery system and heat recovery chillers designed to provide at least 40 percent of the peak heating load from exhaust heat recovery.

Exception 5 to Section 140.9(c)6: Exhaust systems requiring wash down systems such as exhaust systems dedicated to perchloric acid fume hoods.

Exception to Section 140.9(c): Healthcare facilities.”

CEC Form STD 399 for Title 24-2025 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2025 CASE Report “Process Load Pipe Insulation” (24-BSTD-01, TN# 255320-4)

This code proposal added new requirements for the insulation of process load piping. The CASE team and CEC concluded that “the proposed change would have no impact on . . . the scope of [building inspectors] role conducting energy efficiency inspections”:

“4.3.5 Impact on Building Inspectors

*Building inspectors participate in continuing education and training to stay current on all aspects of building regulations, including energy efficiency. When industrial facilities are inspected for safety, inspection includes other requirements for steam and refrigerant piping, such the provision of maximum spacing of pipe hangers and observing whether piping is suitably insulated requires marginal additional inspection effort. Therefore, the Statewide CASE Team anticipates the **proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

Table 27 is excerpted with a single row that focuses on AHJ roles. It is helpful that the table acknowledges the “Increase in observing and following requirement change **initially**”, but the use of the word “**initially**” suggests that somehow, once AHJ staff become familiar with the new process load pipe insulation requirements, the process will no longer require any effort to check compliance and provide feedback to engineers and contractors. How will the impact be limited to an “initial” period if the CEC is now insisting that the legal requirement for AHJs to enforce the provisions is permanent and ongoing?

Table 27: Roles of Market Actors in the Proposed Compliance Process

Market Actor	Task(s) in current compliance process relating to the CASE measure	How would the proposed measure impact the current task(s) or workflow?	How would the proposed code change impact compliance and enforcement?	Opportunities to minimize negative impacts of compliance requirement
AHJ	Perform verification for pipe insulation quality	Increase in observing and following requirement change initially .	NRCC-PRC would need to be updated with new insulation requirements	N/A

Under the “Opportunities to minimize negative impacts of compliance requirement”, the answer was “N/A”, meaning “not applicable.” This answer is erroneous since the AHJs need to enforce the new “Process Load Piping Insulation” requirement. There would certainly be benefits to mitigating or minimizing the impacts, and there are surely opportunities to do so.

CEC Form STD 399 for Title 24-2025 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2025 CASE Report “Buried Ducts and Roofs with Cathedral Ceilings” (24-BSTD-01, TN# 255321-3)

For this new set of residential insulation requirements, the CEC and the IOUs once again found:

“3.2.3.6 Impact on Building Inspectors

*Building inspectors participate in continuing education and training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the **proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

For the reasons noted above, this analysis does not properly consider the expanded scope of work that inevitably comes with an expanded set of Standards.

CEC Form STD 399 for Title 24-2025 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2025 CASE Report “Single-Family High-Performance Windows and Walls” (24-BSTD-01, TN# 255321-7)

Once again, the CEC and its consultants believe that ongoing training will address any increase in complexity. Additional exceptions and nuances can be memorized and applied without any cost to local governments in terms of staff time:

*“Building inspectors participate in continuing education and training to **stay current on all aspects of building regulations**, including energy efficiency. The Statewide CASE Team anticipates the proposed change **would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

CEC Form STD 399 for Title 24-2025 also does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2025 CASE Report “Multifamily Indoor Air Quality” (24-BSTD-01, TN# 255321-6)

For this new measure, with important health implications, the initial analysis is the same, “no impact”:

“4.3.7 Impact on Building Inspectors

*. . . The Statewide CASE Team, therefore, anticipates the proposed change **would have no impact on . . . the scope of their role conducting energy efficiency inspections.**”*

The breakdown of employment impacts suggests that six new FTEs will be needed statewide at AHJs to enforce the air quality requirements (*Table 22*).

Table 57, evaluating the roles of market actors, similarly acknowledges additional steps for AHJs in some elements of the enforcement process, but the analysis also concludes “*no significant impact*” for AHJ operations at many of the plan check or field inspection stages. While the analysis is more objective than most by acknowledging an increase in building inspector jobs, it still suggests that the new code measures can be seamlessly incorporated into an AHJ’s overtaxed workflow without additional costs to the AHJ or any change to an inspector’s “*scope*” of work. This discrepancy – there is more work but there is not more expense – is discussed in the above section “9) *The Scale of Increasing AHJ Expectations from Title 24-2008 to Title 24-2025*”.

CEC Form STD 399 for Title 24-2025 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2. Title 24-2022 Measure Proposals

2022 CASE Report “Residential Additions and Alterations” (21-BSTD-01, TN# 237713)

This measure proposal has four separate sections, and each of the four sections has the same analysis regarding the “*Impact on Building Inspectors*”, concluding that there is “*minimal impact*”:

“Impact on Building Inspectors

*Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the **proposed change would have minimal impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

The shortcomings of this 2022 analysis are the same as the shortcomings discussed above, as much of the analysis language was copied forward into the 2025 CASE Reports.

In “*Appendix E: Impacts of Compliance Process on Market Actors*”, a series of tables set forth a slightly more in-depth analysis. For some measures, there is an acknowledgment of additional responsibilities for AHJs, with hope that the impact can be minimized by fact sheets or automated forms. It is not clear how much fact sheets will reduce the scope of work for AHJs, and the vision of automated forms remains a work-in-progress.

Table 179, Table 180, Table 181, and Table 182 (below) analyze four separate sets of “*Residential Additions and Alterations*” measures. In setting forth the “*Objective in Completing Compliance Tasks*” the IOUs use the phrase “*quickly and easily*” 21 times (see red boxes). If that is the “*objective*”, has it been achieved?

The excerpts below illustrate, once again, the discrepancy between elements of the analyses acknowledging that new measures will create additional work for AHJs while other parts of the same analyses and CEC Form STD 399 assert that there will essentially be no additional labor required of AHJs, once training is completed.

Excerpts from Table 179, Table 180, Table 181, and Table 182 Related to the Role of Building Departments:

Market Actor	Task(s) In Compliance Process	Objective(s) in Completing Compliance Tasks	How Proposed Code Change Could Impact Work Flow	Opportunities to Minimize Negative Impacts of Compliance Requirement
Building Inspector/Plans Examiners	- Understand code requirement and confirm data on documents is compliant. - Confirm plans / specifications match data on compliance documents. - Provide correction comments if necessary.	- Quickly and easily determine requirements based on scope and climate zone. - Quickly and easily determine if data in documents meets requirements. - Quickly and easily determine if plans/specs match compliance documents. - Quickly and easily provide correction comments that would resolve issue.	- Would need to verify new proposed projects are compliant. - If project is applying for an exception would need to verify if this is acceptable.	- Compliance documents could auto-verify data is compliant with standards. - Provide fact sheets available for distribution at local building department offices and websites to distribute to all projects applying for residential re-roof permit.
Building Inspector/Plans Examiners	- Understand code requirement and confirm data on documents is compliant. - Confirm plans/specifications match data on documents. - Provide correction comments if necessary.	- Quickly and easily determine requirements based on scope. - Quickly and easily determine if data in documents meets requirements. - Quickly and easily determine if plans/specs match documents. - Quickly and easily provide correction comments that would resolve issue.	- Would need to verify new proposed projects are compliant. - If project is applying for an exception would need to verify if this is acceptable.	Compliance document could auto-verify data is compliant with standards.
Building Inspector/Plans Examiners	- Understand code requirement and confirm data on documents is compliant. - Confirm HERS testing documents confirm compliance. - Provide correction comments if necessary.	- Quickly and easily determine requirements based on scope. - Quickly and easily determine if data in documents meets requirements. - Quickly and easily determine if plans/specs match documents. - Quickly and easily provide correction comments that would resolve issue.	Impact is minimal	N/A
Building Inspector/Plans Examiners	- Understand code requirement and confirm data on documents is compliant. - Confirm plans / specifications match data on documents. - Ensure contractor / building owner are aware of additional requirements associated with this measure. - Provide correction comments if necessary.	- Quickly and easily determine requirements based on scope and climate zone. - Quickly and easily determine if data in documents meets requirements. - Quickly and easily determine that project team is aware of additional tasks and inspections required. - Quickly and easily determine if plans/specs match documents. - Quickly and easily provide correction comments that would resolve issue.	- Would need to verify new proposed projects are compliant. - Would need to ensure additional CF2R and CF3R forms are provided. - If project is applying for an exception would need to verify if this is acceptable. - Would need to verify new insulation levels meet code requirements.	- Compliance documents could auto-verify data is compliant with standards. - Compliance documents could easily identify which requirements apply to the specific project.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “All-Electric Multifamily Compliance Pathway” (21-BSTD-01, TN# 237692)

For this compliance pathway, the IOUs concluded:

*“Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the **proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “Nonresidential Indoor Lighting” (21-BSTD-01, TN# 237704)

For this measure proposal, the IOUs concluded:

*“Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the proposed change would have no impact on employment of building inspectors. The scope of the building inspectors’ role conducting energy efficiency inspections would be revised to include a new space type, large offices, in which to verify the presence of occupancy sensing controls. This scope change is standard procedure in line with typical code updates and is therefore **not expected to have a significant impact.**”*

This analysis of AHJ impacts is more candid than most CASE Reports, acknowledging that new Title 24 requirements would create new responsibilities for AHJ staff. But at the end of the analysis, the CEC and IOUs conclude that the new measures are “*not expected to have a significant impact.*”

In Table 68 of the same CASE Report, the IOUs set forth their thinking on “*Opportunities to Minimize Negative Impacts of Compliance Requirement*”: for plan checkers and field inspectors a single opportunity is listed: “*update training to include all new control requirements.*” Training for the new code requirements does not really minimize negative impacts because the enforcement burden is not reduced. Training is table stakes for updated code requirements, not substantive minimization.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “Controlled Environment Horticulture” (21-BSTD-01, TN# 237699)

This proposal added new energy regulations for greenhouse lighting. The CASE Report does acknowledge an expanded scope of work for AHJs: *“The proposed code changes would have significant impact on all phases of the project since Title 24, Part 6 does not currently regulate CEH facilities as a covered process.”* And Table 23 of the CASE Report suggests that an additional five staff (FTEs) will be added to AHJs across the state to manage the additional inspection work.

Given the acknowledgement of extra inspection responsibilities, this is one of the better assessments of AHJ impacts from the last four code updates. Section 3.3.6, assessing the *“Impact on Building Inspectors”* nonetheless concludes:

*“. . . the proposed change would have **no impact on . . . the scope of their role conducting energy efficiency inspections.**”*

There will be more tasks, but there will be no impact on a building inspector’s scope.

CEC Form STD 399 for Title 24-2022 also does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “Steam Trap Monitoring” (21-BSTD-01, TN# 237700)

This CASE report includes a reasonably accurate assessment of likely AHJ impacts. The economic analysis suggests that five additional FTEs statewide could perform the required enforcement. As to the specifics, the report is direct in describing the additional AHJ responsibilities:

*“**Permit Application Phase:** The proposed code change would impact the permit application phase for all steam traps serving new industrial facilities and steam traps serving new industrial process equipment in existing industrial facilities. Local building department jurisdictions are currently not, or minimally, accustomed to plan reviews of steam system design.”*

*“Currently the energy code does not cover steam related systems. Therefore, the Statewide CASE Team, anticipates the proposed code adoption would impact the scope of building inspector roles when conducting energy efficiency inspections. **Additional training would be necessary** for building department inspectors.”*

“Opportunities to Minimize Negative Impacts of Compliance Requirement” falls back to the training approach that seems to have proven insufficient: *“Provide education and training to local building department plans examiners to familiarize with the new code language of 120.6(j).”* (Table 36).

As with other CASE reports, the phrase *“quickly and easily”* and variants thereof appears 8 times as an objective in *“Table 36: Roles of Market Actors in the Proposed Compliance Process”*.

It does not seem that the CEC has taken the necessary actions to make the enforcement of “Steam Trap Monitoring” requirements “quick and easy.”

When the IOUs and CEC analyzed costs to local governments for enforcing the new measures, once again it is believed that training costs will be no different than for any other code update:

*“Local governments would need to train building department staff. . . **While this re-training is an expense to local governments, it is not a new cost associated with the 2022 code change cycle.** . . . There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU Codes and Standards program (such as Energy Code Ace).”*

Enforcement costs are not evaluated.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “Pipe Sizing, Monitoring, and Leak Testing for Compressed Air Systems” (21-BSTD-01, TN# 237701)

This CASE report added a new set of requirements to ensure better compressed air system design, installation, and testing.

*“The addition to the Nonresidential Certificate of Acceptance document **may require additional inspection time for the plans examiner and building inspector to verify compliance.** . .*

*Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the proposed change **would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

Per the CASE report, the new regulations “may require” additional plan check and inspection resources. That seems to underestimate the challenge, as additional resources are a certainty if the provisions are to be enforced, as the CEC expects.

By the next paragraph, the analysis has returned to the default conclusion of “no impact” on a building department’s scope of work:

*“Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the proposed change would have **no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

Per Table 53, the opportunities to minimize impacts on building departments is limited to more training.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “Multifamily Restructuring” (21-BSTD-01, TN# 237697)

The IOUs and CEC concluded that these new measures and regulatory restructuring would have “no impact” on a building department’s “scope” of work. Training would solve the problem, turning time-consuming tasks into tasks that require no time.

“the proposed change would have no impact on . . . the scope of their role conducting energy efficiency inspections.”

In Table 174 and Table 175, the role of various market actors in the compliance and enforcement process are evaluated. The phrase “quickly and easily” appears eleven times, nine of which apply to plan examiners and building inspectors. The list of “opportunities to minimize negative impacts” focuses on training for AHJ staff.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 Measure Proposal “Nonresidential PV and Battery Storage Measure Proposal” (21-BSTD-01, TN# 237776)

This measure proposal is notable because it was funded by the CEC rather than the IOUs. The report acknowledges that there may be additional costs to local governments for enforcing a broad new range of Title 24 requirements, but as with most measures, the CEC concludes that it will not pose a significant additional cost:

“While additional requirements are not new, for effective enforcement, the new requirements could provide justification for a modest increase to department budgets for code enforcement. Even so, this does not pose a significant additional cost . . .”

The report leans on training as the preferred method to minimize impacts:

“. . . local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support code compliance.”

In assessing the cost to local governments, the analysis states that there is not a need for field verification, only plan check. Why the CEC thinks there is no need to confirm the proper scale and attributes of PV and batteries that are installed in the field is not clear:

“Local building code officials have a large number of requirements to check and are often constrained by time and department budgets. The new requirement for

*commercial PV system requires an additional plan check, **but no field verification testing** ...”*

All code required elements likely need some type of field inspection.

Later, in describing the “Compliance and Enforcement” process, the actual extent of the field verification is clearly documented:

*“The **building inspector will verify** the NRCI [Certificate of Installation] is valid by confirming the NRCI **matches what has been physically installed and that it meets operational requirements, including controls**. The main aspects of inspection and verification are as follows:*

- 3. Check that the designed and installed PV size complies with the code. Check if any roof area reduction has been applied by the project and if the reduction is appropriate.*
- 4. Check that the battery size complies with the code.*
- 5. Check that the installed PV, battery, and inverter efficiency match the specifications used for compliance.*
- 6. Check that interconnection requirements have been met.*

Additional requirements in JA11 and JA12 must also be verified.”

In outlining enforcement responsibilities, the new PV and battery measures adopted by the CEC necessitate that “*additional requirements in JA11 and JA12 must also be verified.*” Those requirements include shading analysis across the roof (JA11) and battery capacity and control rules (JA12). None of those provisions are simple or intuitive.

CEC *Form STD 399* for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 Measure Proposal “Demand Management - Controlled Receptacles Code Change Proposal” (21-BSTD-01, TN# 237775)

This measure proposal was sponsored by the California Energy Alliance (CEA). Like other proposal, it concludes that there will be no significant new costs to local governments:

“3.3.6.2 Cost to Local Governments

Existing compliance forms and processes can be modified to include checks for the proposed measure devices and functionality. **CEA does not anticipate any significant new costs to local governments and building departments.** The proposed updates can be included in ongoing education and training programs already available to code professionals.”

As with other measure proposals, the analysis suggests that expanded training and expanded forms can mitigate any impacts on a building department’s scope of work.

CEC *Form STD 399* for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “High Efficiency Boilers and Service Water Heating” (21-BSTD-01, TN# 237777)

This CASE report contains the standard assessment of local government impacts:

*“Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the **proposed change would have no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

Providing a clear description of the new requirements in the Title 24 compliance manual is seen as a reasonable means to minimize negative impacts on plans examiners: *“The Statewide CASE Team recommends providing clear language in the compliance manual to show when these proposed requirements are triggered.”* It is hard to see how this minimizes negative impacts, as it is really no different than just expecting the AHJ staff to bear the brunt of the additional enforcement work.

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2022 CASE Report “All-Electric Multifamily Compliance Pathway” (21-BSTD-01, TN# 237692)

This CASE report uses the IOUs’ default analysis for AHJ impacts:

*“Building inspectors participate in continuing training to stay current on all aspects of building regulations, including energy efficiency. The Statewide CASE Team, therefore, anticipates the proposed change would have **no impact on employment of building inspectors or the scope of their role conducting energy efficiency inspections.**”*

CEC Form STD 399 for Title 24-2022 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

3. Title 24-2019 Measure Proposals

2019 CASE Report “Nonresidential Ventilation & Indoor Air Quality” (17-BSTD-02, TN# 222192)

This 2019 CASE Report on nonresidential ventilation focuses on training as the default mitigation measure for impacts to local governments. The CASE Report argues that free training from the IOUs will eliminate labor costs to local governments to enforce the new regulations:

“Cost to Local Governments

*All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle.** The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, **including tools, training and resources provided by the IOU codes and standards program (such as Energy Code Ace).** . . .”*

The CASE report acknowledges that there will be additional work to complete the enforcement process:

*“Permit Application Phase: **Since the calculations are more complicated, it may take plans examiners more time to confirm the calculations were performed correctly.** The compliance documents will also change, and the plans examiner will need to be familiar with these new documents.”*

There is the common mismatch between the description of the “Permit Application Phase”, where “it may take plans examiners more time” and the overall conclusion that “it is not a new cost.” The economic analysis seems to assume the only additional cost is training, which will be *de minimis*.

Table 23 sets forth the “Roles of Market Actors in the Proposed Compliance Process.” Looking at “Opportunities to minimize negative impacts” for Plans Examiners, the IOU solution is to draft:

*“**Clear and easy to understand** code language so that plans examiner can quickly and easily show that drawings are in compliance and match compliance documents.”*

The solution for Building Inspectors is similar:

*“**Clear and easy to understand** code language so that building inspector can easily show that building is in compliance with code as is verified by the certificate of acceptance forms.”*

While clear language is always helpful, the analysis ignores the broader challenge that no matter how clear the language, how organized the subsections, or how robust is the training, the sheer volume of requirements and inherent complexity make the enforcement process enormously difficult. There seems to be an illusion with the CEC and the IOUs that if clear language is applied to something that is inherently complex, that the complex thing will become easy. There is no evidence this is true.

CEC Form STD 399 for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “High Efficiency Fume Hoods in Laboratory Spaces” (17-BSTD-02, TN# 222188)

The assessment of the “Cost to Local Governments” for this measure matches other measures. The assessment suggests that the primary cost to local government are the training costs for new measures, the cost of which is already included in city budgets. The assessment does not consider that additional code measures will require additional time for AHJs to enforce. The additional enforcement time will create additional labor costs for AHJs for as long as the measure remains in effect: 5, 10, 20 years into the future.

“Cost to Local Governments

*All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. **This is not a new cost associated with the 2019 code change cycle.** The building code is updated on a triennial basis and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training, and resources provided by the IOU codes and standards program (such as Energy Code Ace). . .”*

The assessment of “Impact on Building Inspectors”, below, does acknowledge that additional enforcement actions will be required, but those extra actions somehow do not accrue as a “Cost to Local Governments” in the IOU analysis quoted above.

“3.3.6 Impact on Building Inspectors

*While the proposed measure will involve the addition of one Certificate of Acceptance document, **it will add to the list of compliance checks and forms for building inspectors and plans examiners.** The inclusion of the new acceptance test will require a field technician to perform functional testing and complete and sign the corresponding compliance documents to ensure the measure meets the acceptance requirements specified in NA7.16. The addition of the Certificate of Acceptance document may require additional inspection time to verify compliance. . .”*

In the assessment of “Roles of Market Actors” in Table 27, the CASE report cites ten separate “objectives” that use the phrase “quickly and easily,” four of which apply to AHJ operations.

CEC Form STD 399 for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 Measure Proposal “Rooftop Solar PV Systems” (17-BSTD-02, TN# 222201)

This measure proposal was sponsored by Energy and Environmental Economics, Inc. (E3), a contractor to the CEC that develops energy metrics such as the Long-term System Cost (LSC, formerly TDV). The proposal adds renewable energy requirements to Title 24 for the first time.

The analysis of “Cost to Local Governments” mirrors that of the IOU CASE reports, focusing the analysis on training costs rather than the much more substantial enforcement costs. The new rooftop PV requirements opens a whole new area of regulatory review that will apply to almost all new residential construction in the state, undeniably creating new enforcement costs for every AHJ.

“Cost to Local Governments

*All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. While this re-training is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle.** The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the Investor Owned Utility codes and standards program.”*

A description of the tasks required for code enforcement is provided in the measure proposal:

***“Permit Application Phase:** Generally, the changes to the existing permit application phase process are minimal. During this phase, the plans examiner reviews the permit application document package and verifies that the specifications called out in the Title-24, Part 6 report match the building plans. The plans examiner will now have to verify that the proposed solar PV systems meets the required capacity per the report. The project applicant will need to provide the PV design drawings at the time of permit submittal in order for the plans examiner to verify that the proposed PV systems meet code requirements.”*

***“Inspection Phase:** A HERS rater will verify the PV system installation meets the design criteria following a protocol similar to what is currently required for the New Solar Homes Partnership (Energy Commission 2017b) program and the 2016 PV compliance credit. The building inspector will conduct final field inspections and verify that the solar PV installation meets all code requirements before issuing a certificate of occupancy.”*

This description is accurate, but all of the different comparisons that are denoted for enforcement – between reports and specifications, between specifications and design drawings, and between reports and the regulations themselves – can require an enormous amount of work for AHJs to do consistently and reliably. Most challenging for AHJs could be the task that is not described: determining when one of the many exceptions is permitted.

Nonetheless, the assessment of “Cost to Local Governments” suggests there will be no additional costs.

The language, as added to the code, follows:

***“14. Photovoltaic requirements.** All single-family residential buildings shall have a newly installed photovoltaic (PV) system or newly installed PV modules meeting the minimum qualification requirements specified in Joint Appendix JA11. The annual electrical output of the PV system shall be no less than the smaller of a PV system size determined using*

Equation 150.1-C, or the maximum PV system size that can be installed on the building's Solar Access Roof Area (SARA).

A. SARA includes the area of the building's roof space capable of structurally supporting a PV system, and the area of all roof space on covered parking areas, carports, and all other newly constructed structures on the site that are compatible with supporting a PV system per Title 24, Part 2, Section 1511.2.

B. SARA does NOT include:

i. Any roof area that has less than 70 percent annual solar access. Annual solar access is determined by dividing the total annual solar insolation, accounting for shading obstructions, by the total annual solar insolation if the same areas were unshaded by obstructions. For steep slope roofs only shading from existing permanent natural or manmade obstructions that are external to the dwelling, including but not limited to trees, hills, and adjacent structures, shall be considered for annual solar access calculations. For low slope roofs, all obstructions including those that are external to the dwelling unit, and obstructions that are part of the building design and elevation features shall be considered for the annual solar access calculations.

ii. Occupied roof areas as specified by CBC Section 503.1.4.

iii. Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.

EQUATION 150.1-C ANNUAL PHOTOVOLTAIC ELECTRICAL OUTPUT

$$kW_{PV} = (CFA \times A) / 1000 + (NDU \times B)$$

WHERE:

kW_{PV} = kW_{dc} size of the PV system

CFA = Conditioned floor area

NDU = Number of dwelling units

A = CFA adjustment factor from Table 150.1-C

B = Dwelling unit adjustment factor from Table 150.1-C

Exception 1 to Section 150.1(c)14: For steep slope roofs, SARA shall not consider roof areas with a northerly azimuth that lies between 300 degrees and 90 degrees from true north. No PV system is required if the SARA is less than 80 contiguous square feet.

Exception 2 to Section 150.1(c)14: No PV system is required when the minimum PV system size specified by section 150.1(c)14 is less than 1.8 kW_{dc}.

Exception 3 to Section 150.1(c)14: Buildings with enforcement-authority-approved roof designs, where the enforcement authority determines it is not possible for the PV system, including panels, modules and components and supports and attachments to the roof structure, to meet the requirements of the American Society of Civil Engineers (ASCE), Standard 7-16, Chapter 7, Snow Loads.

Exception 4 to Section 150.1(c)14: For buildings that are approved by the local planning department prior to January 1, 2020 with mandatory conditions for approval:

a. Shading from roof designs and configurations for steep-sloped roofs, which are required by the mandatory conditions for approval, shall be considered for the annual solar access calculations; and

b. Roof areas that are not allowed by the mandatory conditions for approval to have PVs, shall not be considered in determining the SARA.

EXCEPTION 5 to Section 150.1(c)14: PV system sizes determined using Equation 150.1-C may be reduced by 25 percent if installed in conjunction with a battery storage system. The battery storage system shall meet the qualification requirements specified in Joint Appendix JA12 and have a minimum usable capacity of 7.5 kWh

There are exception interpretation challenges throughout the Standards, which, if they are to be properly enforced, can consume an enormous amount of time for AHJ staff. The “Solar Access Roof Area (SARA)” mentioned in “Exception 1” is defined in Section 150.1(c)14.A.. But there are areas of a roof not included in “SARA”, as set forth in Section 150.1(c)14.B.i to 150.1(c)14.B.iii.. Those three subsections create something of an Exception to the very definition of “SARA”, and then “SARA” is itself used in Exception 1. Deciphering the overall meaning of what is effectively an exception to an exception can be challenging.

CEC Form STD 399 for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “Nonresidential Indoor Controls (Alignment with ASHRAE 90.1)” (17-BSTD-02, TN# 222193)

This measure proposal, sponsored by the IOUs, made a number of changes to the prescriptive and mandatory lighting control requirements. In assessing the impact on building inspectors, the IOUs and CEC concluded there would be “*minimal impact*” at both the permit phase and inspection phase:

*“Permit Application Phase: The proposed code changes would have **minimal impact** to the existing permit application phase process. **Additional time will be required** to make sure design documents include these requirements properly*

*Inspection Phase: The proposed code changes would have **minimal impact to the existing inspection application phase process**. . . . Building inspectors and acceptance testers will need to be trained on the new control requirements as well as the field-verified process through acceptance testing.”*

When the IOUs and CEC expressly assess additional costs associated with the new measures, they find that the training cost “*is not a new cost*” and make no mention of enforcement costs:

“Cost to Local Governments

*All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle**. The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support*

*compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU Codes and Standards Program (such as Energy Code Ace). As noted in Section 2.5 and **Appendix B**, the Statewide CASE Team considered how the proposed code change might impact various market actors involved in the compliance and enforcement process, and aimed to minimize negative impacts on local governments.”*

The referenced Appendix B that lists “opportunities to minimize negative impacts” does not mention plan checkers or building inspectors at all. Table 62 only discusses mitigation strategies for lighting designers, contractors, and electricians.

CEC Form STD 399 for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “Indoor Lighting Power Densities” (17-BSTD-02, TN# 222186)

This CASE Report was notable for proposing the deletion of a significant amount of regulatory language. Considerable language was added as well, including an additional 25 new space types tied to lighting power allowances (roughly 2 full pages are needed to define the new space types in the CASE proposal).

In the analysis of the “Compliance and Enforcement” process, the IOUs and CEC note that inspections will be easier due to the removal of current limiters.

“Inspection Phase: The proposed code change will result in a simplified compliance and enforcement process as current limiters will no longer need to be inspected.”

But that analysis ignores the significant expansion of space types as well as the new compliance credits for tunable lighting:

“4. Small aperture tunable white and dim-to-warm luminaire Lighting Power adjustment. For qualifying small aperture tunable white or dim-to-warm luminaires, the Adjusted Indoor Lighting Power of these luminaires shall be reduced by multiplying the installed watts by 0.75 to calculate their Adjusted Indoor Lighting Power. Qualifying luminaires shall comply with Items A through C:

A. Small aperture. Qualifying luminaires longer than 18 inches shall be no wider than four inches. Qualifying luminaires with a length of 18 inches or less shall be no wider than eight inches.

B. Color changing. Qualifying tunable white luminaires shall be capable of a color change greater than or equal to 2,000 Kelvin correlated color temperature (CCT). Qualifying dim-to-warm luminaires shall be capable of color change greater than or equal to 500 Kelvin CCT.

C. Controls. Qualifying luminaires shall be connected to controls that enable color changing.”

This bias is repeated across the Title 24 development process, where any small improvement in complexity is lauded as a significant step forward for reducing regulatory burden while the overall, relentless increase is downplayed or ignored.

The analysis of “Cost to Local Governments” matches other CASE reports, focusing on training costs rather than the far greater enforcement costs:

*“All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle**. The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU Codes and Standards Program (such as Energy Code Ace). . .”*

In Table 28, listing the roles for market actors, the “objectives” for plan checkers reiterates the idea that the enforcement tasks can be “quickly and easily” completed:

- “• **Quickly and easily** determine requirements based on scope.*
- **Quickly and easily** determine if data in documents meets requirements.*
- **Quickly and easily** determine if plans/specs match documents.*
- **Quickly and easily** provide correction comments that will resolve issues.*
- Coordinate with building owners/designers/inspectors.”*

There is no evidence that the CEC and IOUs have achieved those objectives. Similarly, the “opportunities to minimize negative impacts” describe a level of clarity that is seldom achieved with CEC compliance forms.

- “• **Clear code language** that’s easily understandable. Clear instructions on where to find everything in the plans.*
- **Clear documentation** of what paperwork they need to receive and/or other tasks they need to perform.*
- **Clear documentation** of how the new code differs from the old.*
- Compliance documents could **auto-verify data** is compliant with standards.*
- Existing conditions documented via as-builts or photos or ATT. Do not require additional field visit by Authority Having Jurisdiction.*
- Provide documentation of compliance in a way **easily compared to plans**.*
- Examples of plans that are in compliance.*
- Examples of plans that aren’t in compliance and reasons why they aren’t.”*

CEC Form STD 399 for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “Advanced Daylighting Design” (17-BSTD-02, TN# 222189)

This measure proposal primarily creates new PAFs for daylighting enhancements. PAFs are a commonly misapplied part of the Standards, so the enforcement responsibilities that come with such measures are real. The analysis of the “cost to local governments” matches those of almost all other code proposals, suggesting that the only additional AHJ costs will be tied to training, not enforcement.

*“All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 2, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code cycle**. The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU codes and standards program (such as Energy Code Ace)”*

The evaluation of roles for market actors in *Table 13* has sixteen instances of “quickly and easily” or some variation on “quickly”, six of which are tied to “objectives” for AHJ staff. There is no evidence that the CEC and IOUs have achieved that objective.

CEC *Form STD 399* for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “Economizer Fault Detection and Diagnostics (FDD) for Built-Up Air Handlers” (17-BSTD-02, TN# 222187)

The IOUs evaluated impacts from the new code measure on AHJs and once again found no impact on the cost to local governments:

“The Statewide CASE Team does not expect this code change will impact costs to local governments.

*All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 2, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle**. The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU codes and standards program (such as Energy Code Ace). . . .”*

The measure proposal detailed the opportunities to minimize negative impacts (*Table 18*). That minimization is important because FDD systems can be quite complicated. Two mitigation opportunities were proposed for AHJs:

- “Become acquainted with when economizer FDD is required”
- “Check plans for specification of economizer FDD”

Those are not mitigation measures. The two recommended solutions are restatements of the additional tasks that the new regulations have required of building departments *absent* any mitigation.

If a person is burdened with a water supply that is 20 miles from home, and they have no vehicles, mitigation might be a bike or a car, or maybe drilling an additional well that is only 2 miles away. Mitigation would not be “have the person walk 20 miles and back to get the water.” The CEC can do far more to minimize the impact on building departments, but the CEC has too-often opted for inaction instead.

CEC *Form STD 399* for Title 24-2019 does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.

2019 CASE Report “Adiabatic Condensers for Refrigerated Warehouses and Commercial Refrigeration” (17-BSTD-02, TN# 222182)

As with other measures, the CEC and IOUs did not foresee any additional costs to local governments for enforcing the new regulations related to Adiabatic Condensers:

*“All revisions to Title 24, Part 6 will result in changes to compliance determinations. Local governments will need to train building department staff on the revised Title 24, Part 6 Standards. While this retraining is an expense to local governments, **it is not a new cost associated with the 2019 code change cycle.** The building code is updated on a triennial basis, and local governments plan and budget for retraining every time the code is updated. There are numerous resources available to local governments to support compliance training that can help mitigate the cost of retraining, including tools, training and resources provided by the IOU codes and standards program (such as Energy Code Ace). . . .*

The Statewide CASE Team does not expect this code change will impact costs to local governments.”

The new Title 24 revisions were as follows:

“SECTION 101 – DEFINITIONS

CONDENSER is a refrigeration component that condenses refrigerant vapor by rejecting heat to air mechanically circulated over its heat transfer surface.

ADIABATIC CONDENSER is a condenser that has the ability to use two heat transfer processes in series as accomplished by a single factory-made unit. The first heat transfer process is the pre-cooling of the entering air by lowering the entering air drybulb temperature. The second heat transfer process is forced-air circulation cooling over the heat transfer surface of the condenser.

DRY MODE is an operating condition of an adiabatic condenser wherein the only

means of heat transfer is accomplished through forced-air circulation over the heat transfer surface of the condenser without any pre-cooling of the entering air.

PRE-COOL MODE is an operating condition of an adiabatic condenser wherein the entering air is pre-cooled.

ADIABATIC PAD is a material located before the heat transfer surface of an adiabatic condenser, which precools the ambient air by becoming fully wetted during pre-cool mode operation.

TRANSCRITICAL CO₂ REFRIGERATION SYSTEM is a type of refrigeration system that uses CO₂ as the refrigerant where the ultimate heat rejection to ambient air can take place above the critical point.

TRANSCRITICAL MODE is a system operating condition for a refrigeration system wherein the refrigerant pressure and temperature leaving the compressor is such that the refrigerant is at or above the critical point. Typically used in reference to CO₂ refrigeration systems.

SUBCRITICAL MODE is a system operating condition for a refrigeration system wherein the refrigerant pressure and temperature leaving the compressor is such that the refrigerant is below the critical point. Typically used in reference to CO₂ refrigeration systems.

CASCADE REFRIGERATION SYSTEM is a type of refrigeration system that uses a low-stage refrigeration system where the heat rejected from condensing the low-stage refrigerant is absorbed using a heat-exchanger by a separate high-stage refrigeration system, and the ultimate heat rejection to ambient air is accomplished by the high-stage system.

CRITICAL POINT is a thermodynamic state point for pure substances defined by its pressure and temperature wherein the distinction between the liquid phase and gas phase no longer exists.

GAS COOLER is a refrigeration component that reduces the temperature of a refrigerant vapor by rejecting heat to air mechanically circulated over its heat transfer surface. Used by a CO₂ refrigeration systems in transcritical mode, and normally also capable of operating in subcritical mode.

SECTION 120.6 – MANDATORY REQUIREMENTS FOR COVERED PROCESSES

(a) Mandatory Requirements for Refrigerated Warehouses

4. Condensers. New fan-powered condensers on new refrigeration systems shall conform to the following, listed in Table 120.6-B:

- A. Design saturated condensing temperatures for evaporative-cooled condensers and water-cooled condensers served by fluid coolers or cooling towers shall be less than or equal to:
 - i. The design wetbulb temperature plus 20°F in locations where the design wetbulb temperature is less than or equal to 76°F; or
 - ii. The design wetbulb temperature plus 19°F in locations where the design wetbulb temperature is between 76°F and 78°F; or
 - iii. The design wetbulb temperature plus 18°F in locations where the design wetbulb temperature is greater than or equal to 78°F.

TABLE 120.6-B FAN-POWERED CONDENSERS-MINIMUM EFFICIENCY

REQUIREMENTS

<u>DESIGN WET BULB TEMPERATURE</u>	<u>DESIGN SATURATED CONDENSING TEMPERATURE</u>
$T_{WB} \leq 76^{\circ}\text{F}$	$T_{WB} + 20^{\circ}\text{F}$
$76^{\circ}\text{F} < T_{WB} < 78^{\circ}\text{F}$	$T_{WB} + 19^{\circ}\text{F}$
$T_{WB} \geq 78^{\circ}\text{F}$	$T_{WB} + 18^{\circ}\text{F}$

EXCEPTION to Section 120.6(a) 4A: Compressors and condensers on a refrigeration system for which more than 20 percent of the total design refrigeration cooling load is for quick chilling or freezing, or process refrigeration cooling for other than a refrigerated space.

- B. Design saturated condensing temperatures for air-cooled condensers shall be less than or equal to:
- The design drybulb temperature plus 10°F for systems serving freezers
 - The design drybulb temperature plus 15°F for systems serving coolers

EXCEPTION 1 to Section 120.6(a) 4B: Condensing units with a total compressor horsepower less than 100 HP.

EXCEPTION 2 to Section 120.6(a) 4B: Compressors and condensers on a refrigeration system for which more than 20 percent of the total design refrigeration cooling load is for quick chilling or freezing, or process refrigeration cooling for other than a refrigerated space.

- C. The saturated condensing temperature necessary for adiabatic condensers to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be less than or equal to:
- The design drybulb temperature plus 20°F for systems serving freezers
 - The design drybulb temperature plus 30°F for systems serving coolers

EXCEPTION 1 to Section 120.6(a) 4C: Compressors and condensers on a refrigeration system for which more than 20 percent of the total design refrigeration cooling load is for quick chilling or freezing, or process refrigeration cooling for other than a refrigerated space.

- D. All condenser fans for air-cooled condensers, evaporative-cooled condensers, adiabatic condensers, gas coolers, air or water-cooled fluid coolers or cooling towers shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.
- E. The minimum condensing temperature setpoint shall be less than or equal to 70°F for air-cooled condensers, evaporative-cooled condensers, adiabatic condensers, gas coolers, air or water-cooled fluid coolers or cooling towers.
- F. Condensing temperature reset. The condensing temperature set point of systems served by air-cooled condensers shall be reset in response to ambient drybulb temperature. The condensing temperature set point of systems served by evaporative-cooled condensers or water-cooled condensers (via cooling towers or fluid coolers) shall be reset in response to ambient wetbulb temperatures. The condensing temperature set point for systems served by adiabatic condensers shall be reset in response to ambient drybulb temperature while operating in dry mode.

EXCEPTION to Section 120.6(a) 4GE: Condensing temperature control

strategies approved by the Executive Director that have been demonstrated to provide at least equal energy savings.

EXCEPTION 2 to Section 120.6(a) 4GF: Systems served by adiabatic condensers in Climate Zones 1, 3, 5, 12, 14, and 16.

- G. Fan-powered condensers shall meet the condenser efficiency requirements listed in TABLE 120.6-B. Condenser efficiency is defined as the Total Heat of Rejection (THR) capacity divided by all electrical input power, including fan power at 100 percent fan speed, and power of spray pumps for evaporative condensers.

EXCEPTION 2 to Section 120.6(b) 4HG: Adiabatic condensers with ammonia as refrigerant.

- H. Air-cooled condensers shall have a fin density no greater than 10 fins per inch.

EXCEPTION to Section 120.6(a) 4GH: Micro-channel condensers

TABLE 120.6-~~C~~**B** FAN-POWERED CONDENSERS-MINIMUM EFFICIENCY REQUIREMENTS

CONDENSER TYPE	REFRIGERANT TYPE	MINIMUM SPECIFIC EFFICIENCY*	RATING CONDITION
Outdoor Evaporative-Cooled with THR Capacity > 8,000 MBH	All	350 Btuh/W	100°F Saturated Condensing Temperature (SCT), 70°F Outdoor Wetbulb Temperature
Outdoor Evaporative-Cooled with THR Capacity < 8,000 MBH and Indoor Evaporative-Cooled	All	160 Btuh/W	
Outdoor Air-Cooled	Ammonia	75 Btuh/W	105°F Saturated Condensing Temperature (SCT), 95°F Outdoor Drybulb Temperature
	Halocarbon	65 Btuh/W	
<u>Adiabatic Dry Mode</u>	<u>Halocarbon</u>	<u>45 Btuh/W</u>	<u>105°F Saturated Condensing Temperature (SCT), 95°F Outdoor Drybulb Temperature</u>
Indoor Air-Cooled	All	Exempt	

EXCEPTION to Section 120.6(a) 1A, 1B, 1C, 1E, 1F, 1G: Transcritical CO₂ refrigeration systems.

(b) Mandatory Requirements for Commercial Refrigeration

Retail food stores with 8,000 square feet or more of conditioned area, and that utilize either: refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units, shall meet the requirements of Subsections 1 through 4.

1. Condensers serving refrigeration systems. Fan-powered condensers shall conform to the following requirements:

- A. All condenser fans for air-cooled condensers, evaporative-cooled condensers, adiabatic condensers, gas coolers, air or water-cooled fluid coolers or cooling towers shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.
- B. The refrigeration system condenser controls for systems with air-cooled condensers shall use variable setpoint control logic to reset the condensing temperature setpoint in response to ambient drybulb temperature.
- C. The refrigeration system condenser controls for systems with evaporative-cooled condensers shall use variable-setpoint control logic to reset the condensing temperature setpoint in response to ambient wetbulb temperature.
- D. The refrigeration system condenser controls for systems with adiabatic condensers shall use variable setpoint control logic to reset the condensing temperature setpoint in response to ambient drybulb temperature while operating in dry mode.

EXCEPTION 1 to Section 120.6(b) 1B, and C, and D: Condensing temperature control strategies approved by the executive director that have been demonstrated to provide equal energy savings.

EXCEPTION 2 to Section 120.6(b) 1D: Systems served by adiabatic condensers in Climate Zone 16.

- E. The saturated condensing temperature necessary for adiabatic condensers to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be less than or equal to:
 - i. The design drybulb temperature plus 20°F for systems serving freezers
 - ii. The design drybulb temperature plus 30°F for systems serving coolers
- F. The minimum condensing temperature setpoint shall be less than or equal to 70°F.
- G. Fan-powered condensers shall meet the specific efficiency requirements listed in Table 120.6- ~~DC~~.

TABLE 120.6-~~DC~~ FAN-POWERED CONDENSERS-SPECIFIC EFFICIENCY REQUIREMENTS

CONDENSER TYPE	MINIMUM SPECIFIC EFFICIENCY*	RATING CONDITION
Evaporative-Cooled	160 Btuh/W	100°F Saturated Condensing Temperature (SCT), 70°F Entering Wetbulb Temperature
Air-Cooled	65 Btuh/W	105°F Saturated Condensing Temperature (SCT), 95°F Entering Drybulb Temperature
<u>Adiabatic Dry Mode</u>	<u>45 Btuh/W (Halocarbon)</u>	<u>105°F Saturated Condensing Temperature (SCT), 95°F Entering Drybulb Temperature</u>
*See Section 100.1 for definition of condenser specific efficiency		

EXCEPTION 1 to Section 120.6(b)1E~~G~~: Condensers with a Total Heat Rejection capacity of less than 150,000 Btuh at the specific efficiency rating condition.

EXCEPTION 2 to Section 120.6(b)1E~~G~~: Stores located in Climate Zone 1.

EXCEPTION 3 to Section 120.6(b)1E~~G~~: Existing condensers that are reused for an addition or alteration.

H. Air-cooled condensers shall have a fin density no greater than 10 fins per inch.

EXCEPTION 1 to Section 120.6(b)1F~~H~~: Microchannel condensers.

EXCEPTION 2 to Section 120.6(b)1F~~H~~: Existing condensers that are reused for an addition or alteration.

EXCEPTION to Section 120.6(b)1B, 1C, 1D, 1E, 1F, 1G: Transcritical CO₂ refrigeration systems.”

There are immensely complicated ideas related to adiabatic condensers in Title 24. The new regulations will also reach a wider array of buildings than the prior standards. The increased complexity and increased applicability create an additional enforcement burden for AHJs that the CEC expects AHJs to fulfill as a legal obligation. At the same time, the IOUs and CEC have asserted that there will be no new costs to local governments to fulfill that legal obligation.

CEC *Form STD 399* for Title 24-2019 also does not acknowledge that there will be any costs to local governments to enforce these new measures, whether individually or collectively.