

California's Lighting Language Cleanup Initiative

California's Energy Code, also known as Title 24, is updated every three years to follow the requirements established by the Warren-Alquist State Energy Resources Conservation & Development Act that was signed into law in response to the energy crisis of the early 1970s during Ronald Reagan's second term as California's governor. This law ensures the use of efficient, cost-effective building technologies by requiring that the state establish and maintain "building design and construction standards that increase efficiency in the use of energy for new residential and nonresidential buildings to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy." These standards are commonly referred to as the Energy Code and are managed by the California Energy Commission.

As shown in **Figure 1**, the process to prove a technology is ready to be incorporated into the Energy Code is a huge undertaking and demands input from subject matter experts, research and demonstration efforts, and the public. Each cycle is four years long, with the final year of the cycle overlapping with the first year of the next cycle.

Once there is consensus that the technology is technically feasible and cost-effective, the task of updating the Energy Code falls to the California Energy Commission staff. Taking recommendations from the stakeholders into consideration, updated Energy Code language drafts are provided by the Energy Commission for public input before their final publication.

Given the evolution of technology over the last 45 years, it is no surprise that the Energy Code—which addresses both commercial and residential applications—has expanded to keep up. The first edition of the Energy Code was released in 1978 and was 114 pages long. Now the state is enforcing its 15th edition (known as the 2022 Energy Code), which has 533 pages and is 4.6 times longer than the first edition. **Figure 2** highlights the success of this approach, coupled with California's overall temperate climate. Today's average Californian is using 31% less electricity than the average American. This decrease is despite the overall increase in commercial and residential building square footage across the state.

As more technical requirements were added to the Energy Code, the structure and written descriptions of the new requirements resulted in increased complexity. To help avoid confusion and poten-

tial inconsistencies, each code cycle update includes education and compliance improvement activities to ensure the new Energy Code is well understood by practitioners and the public, as shown in Figure 1. This effort helps California ensure that its projects and the resulting buildings are designed, constructed and commissioned in compliance with the current Energy Code requirements. These activities are supported broadly by California's investor-owned utilities as well as the California Energy Commission.

Working towards the upcoming 2025 Energy Code, the Compliance Improvement team at Southern California Edison launched a new *Lighting Language Clean-up Initiative* (Initiative) to engage with stakeholders on topics specifically focused on improving code

AUTHORS

NICOLE HATHAWAY,
JAE YONG SUK,
MICHAEL
SIMINOVITCH

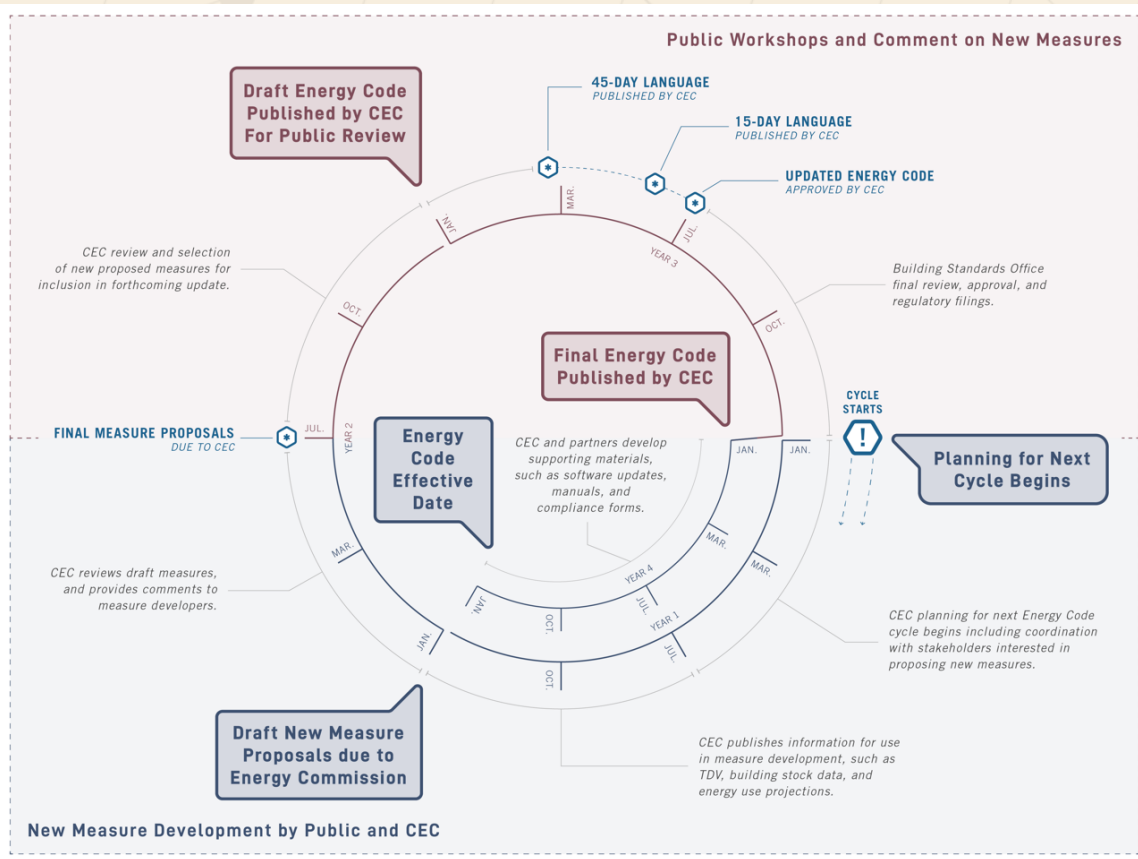


Figure 1: Typical update cycle and process for California's Energy Code.

comprehension. This article provides a deeper look at the goals and procedures of the Initiative as well as key recommendations that were made by the Initiative members for inclusion in the 2025 Energy Code.

The Initiative. The California Lighting Technology Center, in collaboration with Southern California Edison, RMS

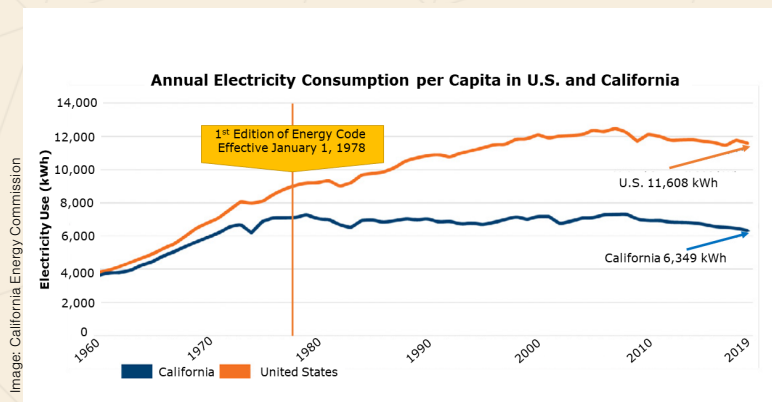


Figure 2: Annual electricity per capita in the U.S. and California.

Figure 3: Seventy-six individuals were invited to take part in the Initiative, representing six key stakeholder groups.

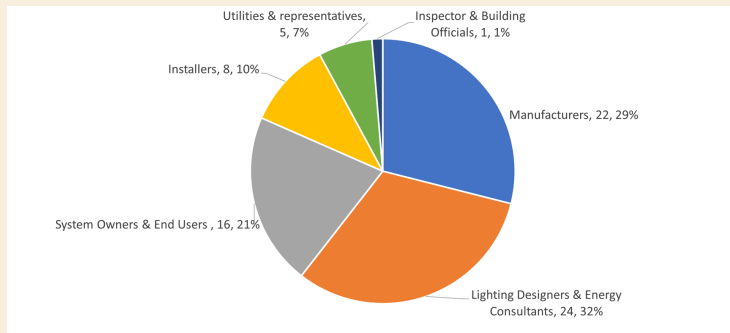


Image: California Lighting Technology Center

Energy Consulting LLC and the California Energy Alliance, established a working group of industry stakeholders to develop recommendations that simplify and clarify the nonresidential and residential lighting and lighting controls language contained in the 2022 Title 24, Part 6 Building Energy Efficiency Standards (Energy Code). Specifically, the Energy Code sections addressed include 100.1, 120.6, 130.1, 130.2, 130.3, 130.5, 140.6, 140.8, 150.0, 160.5, Appendix NA7, Appendix JA8 and the Compliance Manual.

The goal of this work was to improve code comprehension and compliance among contractors, code officials, building owners and others involved in regulated lighting projects in California by simplifying lighting-related Energy Code language.

To address this goal, the project team:

- **Step 1:** Launched an industry-focused initiative in early 2022 and hosted stakeholder meetings on 19 targeted lighting-related Energy Code

topics over the course of the year to ask for a wide range of perspectives, comments and recommendations.

- **Step 2:** Collected Energy Code improvement ideas and shared them with the Statewide CASE team¹ for consideration in their 2025 and 2028 Title 24 portfolios.
 - **Step 3:** Reviewed working drafts with the California Energy Commission to discuss the direction of recommendations and incorporate their suggestions.
 - **Step 4:** Identified ideas that needed more stakeholder feedback in collaboration with the California Energy Commission.
 - **Step 5:** Presented key ideas from Step 4 at Title 24 Stakeholder Workshops to ask for public comments.
 - **Step 6:** Finalized and submitted recommendations with the California Energy Commission for the 2025 Title 24 cycle.
- Based on guidance provided by the California Energy Commission, the project team focused on targeting participa-

tion from six key stakeholder groups: 1) manufacturers, 2) lighting designers and energy consultants, 3) system owners and end users, 4) installers, 5) utilities and representatives, and 6) inspectors and building officials.

Seventy-six individuals representing these stakeholder groups were invited to take part in early 2022. In addition, the project team announced the call to participate on the CLTC website. **Figure 3** provides the breakdown by stakeholder group, the number of individuals invited, and the percentage of the total invited.

Including the project team and subject-matter expert guests, 40 participants were active over the Initiative's duration. To ensure the roles and expectations for participation were fully understood, the project team set up Initiative guidelines and provided the document to the participants during the kickoff meeting. Guidelines included the Initiative's goals and objectives, the membership requirements, and the targeted timeline for finalizing recommendations.

The project team hosted a public survey in February/March 2022 to understand which Energy Code lighting topics were of interest to stakeholders and develop subcommittees based on these areas. Nineteen topics received interest and are shown in **Table 1**.

Table 1: Lighting topics identified for cleanup activities and the number of recommendations to simplify/clarify the existing language.

Topic	Number of Simplification & Clarification Recommendations
Residential Lighting	10
Shut-OFF Controls	8
Outdoor Lighting	6
Lighting Definitions	6
Electrical Power Distribution	5
Compliance Manual	5
Overall Structure of the Energy Code	4
Automatic Daylighting Controls	3
Multilevel Lighting Controls	3
Manual Area Controls	3
Acceptance Testing Requirements	3
Demand Responsive Controls	2
Control Interactions	2
Lighting Power Allowances	2
Controlled Environment Horticulture Lighting	2
Multifamily Buildings	2
Power Adjustment Factors	2
Lighting Wattage Exclusions	2
Sign Lighting	1
TOTAL	71

The Recommendations. The Initiative recommends a total of 71 unique action items to simplify and clarify the existing lighting language in the 2022 Energy Code (**Table 1**). Types of recommendations include definition updates, terminology alignment with National & International Energy Codes, and the removal of language that adds unnecessary complexity. Examples of

recommendations include:

- Simplifying the Tailored Method approach to lighting power allowance calculations (Section 140.6(c)3) to reduce complexity. This idea was further supported by 80% of attendees at the Stakeholder Workshop.
- Simplifying the residential lighting language in Section 150.0(k)1 to directly point

users to Joint Appendix 8. This idea was further supported by 53% of the Stakeholder Workshop attendees.

- Updating the sub-section naming convention to support moving the code to an online format and automating it into software from a coding perspective. This idea was further supported by 42% of attendees at the Stakeholder Workshop.

Participants were encouraged to share all Energy Code related ideas. As such, 11 ideas generated by this initiative considered “beyond simplification and/or clarification” were compiled and shared with the California Energy Commission, the Statewide CASE team and the California Energy Alliance for consideration in their 2025 and 2028 Energy Code cycle measure proposals. Examples include:

- Consider a reduction of the lumen threshold to 3,500 initial lumens or less for luminaire shielding requirements to align with industry offerings and efficacy. (Section 130.2(b))
- Consider the inclusion of off-grid lighting systems as a lighting wattage exclusion, including outdoor technologies and indoor DC lighting technologies that connect directly to a distributed energy resource. (Section 140.6(a)3, and 140.7(a) Exceptions)
- Consider the inclusion of a

quality specification for non-residential LED light sources (i.e., linear LED lamps, LED retrofit kits and LED luminaires) via Title 20 or Title 24, like the JA8 approach used currently in the residential chapter. This would support the ban on linear fluorescents planned effective January 1, 2025.²

This project is a successful example of a research-informed, stakeholder-led Energy Code improvement effort. For more information, visit the full report on CLTC's website at cltc.ucdavis.edu. ©

Acknowledgments

The project team thanks all the participants from the lighting industry and design community for their contributions to this Initiative, as well as the California Energy Commission team for graciously taking part in reviewing the recommendations throughout the project.

THE AUTHORS | Nicole Hathaway, LC, is an R&D Engineer IV and the communications director at CLTC. Her work includes the testing and development of emerging lighting technologies, as well as collaborating with CLTC's industry partners

on demonstration and research projects.

Jae Yong Suk is the associate director of the California Lighting Technology Center (CLTC) and associate professor in the Department of Design at UC Davis.

Michael Siminovitch is the director of the California Lighting Technology Center and associate director of the Energy and Efficiency Institute at UC Davis.

References:

1. www.title24stakeholders.com
2. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB2208



Learn Night Light: The Ultimate Course for Lighting Design

Elevate your lighting design skills with Learn Night Light. This comprehensive program taught by Janet Lennox Moyer offers 20 sessions that cover everything you need to know about landscape lighting design. Perfect for lighting professionals, architects, interior designers, and anyone interested in creating captivating lighting experiences.

Don't miss this amazing opportunity to become a lighting design pro! Complete the course and earn 20 IES CEU, 20 LA CES, and 20 AIA LU credits.



Enroll today at <https://elearning.ies.org/LearnNightLightSeries>