Codes and Standards Enhancement (CASE) Initiative

2028 California Energy Code

Traction Elevators

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Acronyms

Table 1 presents a list of acronyms used in this report. Title24stakeholders.com also maintains a glossary of terms.

Table 1: List of Acronyms

Acronym	Definition
ACM	Alternative Calculation Method
ADA	Americans with Disabilities Act
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCR	Benefit-to-cost Ratio
Btu	British Thermal Units
Cal/OSHA	California Occupational Safety and Health Administration
CASE	Codes and Standards Enhancement
CBECC	California Building Energy Code Compliance Software
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO2e	Carbon Dioxide Equivalent
CZ	Climate Zone
EIR	Environmental Impact Report
ESJ	Environmental and Social Justice
GHG	Greenhouse Gas
GWh	Gigawatt-Hour
IECC	International Energy Conservation Code
kBtu	Kilo-British Thermal Unit
kWh	Kilowatt-Hour
kW	Kilowatt
LSC	Long-term System Cost
MW	Megawatt
NR	Nonresidential
PIR	Passive Infrared
PV	Present Value
TBD	To Be Determined
W	Watt

1. Introduction

This is a draft addendum. The Statewide Codes and Standards Enhancement (CASE) Team encourages readers to provide comments on the proposed code changes and supporting analyses. When applicable, include supporting data and justifications in addition to comments. Suggested revisions will be considered when refining proposals and analysis. The final addendum will be submitted to the CEC in 2026 The Statewide CASE Team will consider all comments as it refines the proposals and analyses. The Final CASE Report is scheduled for submission to the California Energy Commission (CEC) in Spring 2026.

The Statewide CASE Team is seeking the following information to inform the change proposal:

1. *Costs*

   The Statewide CASE Team has engaged with industry consultants to estimate negligible additional costs for adding a regenerative drive to a traction elevator. Please provide additional cost estimates for our review.

2. *Feasibility*

   Under what circumstances is a regenerative drive not be well suited for a building type or use?

3. *Code Changes*

   The Statewide CASE Team provided an exception to the regenerative drive requirement for various circumstances where the building's electrical load may be incompatible. We are looking for expert assessment of whether the code language is ambiguous or challenging to interpret.

   The Statewide CASE Team requests comments on the interaction of this code proposal with other existing California regulations, industry standards, or best practices.

4. *Lifecycle*

   The elevators were assumed to require an overhaul / modernization every 25 years, with standard maintenance needed yearly. If your maintenance or modernization timelines are different, please let us know.

Email comments and suggestions to info@title24stakeholders.com *and Sean Steffensen, ssteffensen@energy-solution.com. Comments will either remain confidential or anonymized if shared publicly.*

1.1 Report Context

This proposal describes specific energy efficiency code changes (referred to as "measures") aimed at reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy in California. These measures are submitted to the CEC for consideration and potential inclusion in California's Energy Code (Title 24, Part 6), which sets statewide energy efficiency requirements for newly constructed buildings and for additions and alterations to existing buildings. Measures may also be considered for inclusion in California Green Building Standards Code (Title 24, Part 11) as voluntary energy efficiency standards, which would take effect only if adopted by a local jurisdiction seeking to exceed the minimum requirements of the Energy Code. Measures submitted to the CEC will be reviewed, may be modified, and may be incorporated into a broader regulatory package proposed and adopted by the CEC. To be included in the Energy Code, proposed measures must be both cost effective and technically feasible.

1.2 Proposal Sponsors

Three California Investor-Owned Utilities (IOUs) — Pacific Gas & Electric Company, San Diego Gas & Electric, and Southern California Edison sponsored this effort as a group. Where the term, "Statewide CASE Team" is used in this report, it refers the authors of the CASE report and the Codes & Standards programs of the supporting California Investor-Owned Utilities.

1.3 Stakeholder Engagement to Inform Proposal

When developing the code change proposal and associated technical information presented in this report, the Statewide CASE Team worked with many industry stakeholders including manufacturers, builders, Title 24 energy analysts, trade associations, and others involved in the code compliance process. The proposal incorporates feedback received during a public stakeholder workshop that the Statewide CASE Team held on September 30, 2025.

The 2025 Elevator Energy Efficiency CASE Report (hereby referred simply as "CASE Report") is available here: 2025 Elevator Energy Efficiency CASE Report. The full report is also provided as an attachment to this addendum (Kunczynski, et al. 2025).

The Statewide CASE Team contacted many industry stakeholders during the 2025 cycle, as referenced in Appendix F of the CASE Report. During this cycle, the Statewide CASE Team has engaged five elevator and elevator component manufacturers and two elevator contractors via email surveys to further refine our assumptions for regenerative drive installation costs. The Statewide CASE Team aimed to work with stakeholders at all levels of the elevator market, therefore three of these manufacturers are part of the group of large manufacturers holding 45% of the United States elevator market, while the other two belong to the group of independent companies holding the rest of the market. The Statewide CASE Team have researched interactions with existing California regulations and maintenance and modernization timelines for elevators. The results from this outreach will be incorporated into the final version of this addendum.

See Appendix E for details on the Statewide CASE Team's stakeholder engagement during the 2028 code cycle.

2. Code Change Proposal

2.1 Reintroducing Elevator Proposal

Elevator operation accounts for five to 15% electricity usage in modern buildings (Thebuwena 2024). Most modern elevators use either hydraulic or traction drive technology. Hydraulic elevators use a hydraulic piston to raise and lower the cab while traction elevators use a system of cables, counterweight and drive machinery for movement. This proposal focuses on traction elevators to add a regenerative drive to capture energy from the elevator cab's movement that would otherwise be lost.

Figure 1 shows a typical traction elevator. The elevator cab transports people and freight while the counterweight helps to ease the burden on the motor by balancing the load as the cab ascends and descends the building. A cable connects the elevator cab to the counterweight. The weight of both the cab and the counterweight maintains traction between the cable and the elevator motor. As the cab ascends the counterweight descends and vice versa. The counterweight is typically 40 percent of the weight of the cab.

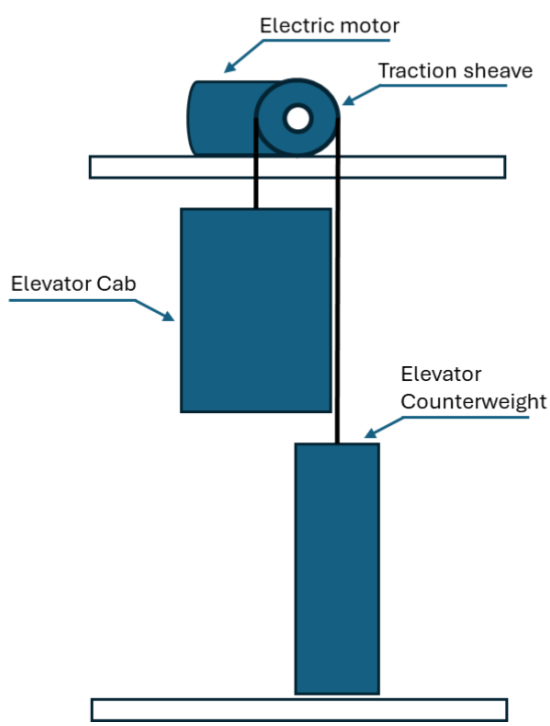

Figure 1: Typical traction elevator.

Source: Statewide CASE Team

The electric motor is responsible for lifting and lowering the cab and stopping the cab at its destinations. Electrical power is consumed by the traction motor when the motor is accelerating the cab. This could be pushing the cab against forces of gravity; up when the cab is heavier than the counterweight and actively driven down when the counterweight is heavier than the cab and trying to pull the cab upwards. Electrical power is also consumed when the motor is accelerating the cab in the same direction that gravity is pulling it, speeding up the trip rather than relying on gravity. Electrical power is generated by a motor when it absorbs inertial and potential energy from decelerating the cab and counterweight. This absorbed energy imparts force on the motor shaft and drives electrical current out of the motor, to be consumed by braking resistors or consumed as useful energy by other electrical consuming loads in the building. Historically, this electricity was of low quality and therefore dissipated across a resistor bank in the elevator room. With modern power electronic drives this regenerated electricity is reconditioned to be of high quality and sent back to serve other loads within the building. The elevator industry refers to the power electronic drives as regenerative drives when used to regenerate electricity from the elevator motor.

Manufacturers have calculated that using regenerative drives can reduce an elevator's electrical energy usage by up to 75 percent in the tallest buildings, although 25-45 percent savings would be a more common scenario. (Electrical and Mechanical Services Department Government of Hong Kong Special Administrative Region 2015) This measure would achieve additional energy savings by regenerating the electricity to the building rather than passing it through a resistor bank and heating the elevator machine room, lowering the cooling load on the building. The Statewide CASE Team estimates the reduction in cooling load would be an additional energy savings of up to 20 percent of the electrical energy savings due to regeneration.

The Statewide CASE Team recommended a similar change for the 2025 code cycle, but the CEC did not adopt the proposed requirements. The Statewide CASE Team, along with KP Elevator Consulting and Peters Research, performed a new energy analysis presented in this addendum.

This addendum contains pertinent information to recommend the proposal for consideration for the 2028 code cycle. The Statewide CASE Team completed a full analysis during the 2025 code cycle and provided the CEC with the information needed to consider a code change, including market feasibility, energy, and cost-effectiveness calculations. The CASE Team has updated the energy saving analysis using results documented in a recent report on elevator regeneration using a wider variety of building prototypes to demonstrate the effects of various elevator operational characteristics. The analysis in this addendum also uses the incremental cost information gathered for the report. (Brooks 2025) Much of the information in the 2025 CASE Report remains relevant without updates. However, this addendum provides updated demand savings, energy cost savings, and cost effectiveness using the Long-term Systemwide Cost (LSC) factors.

The 2028 proposal expands the scope of the regeneration requirement compared to the 2025 requirement. The rated capacity, rated speed, and total rise of the elevator system are used to identify where regeneration will provide significant and cost-effective energy savings.

2.2 Measure Description

The proposed code change would add requirements as new subsections to Section 120.6(f) of the Title 24, Part 6 mandatory requirements for elevators. The changes would add mandatory requirements for the power conversion system, which drives the elevator motor. Existing code requirements for elevator lighting and ventilation efficiency would not be affected. The existing exception for healthcare facilities would not be changed. The code language is modeled after the recently adopted proposal for the 2027 International Energy Conservation Code (IECC), section C405.10.3. (McHugh 2025)

This measure would impact new elevators that meet the following criteria:

- Have a rise equal to or greater than 20 feet.
- Have a rated capacity equal to or greater than 2,000 lbs.
- Have a rated speed equal to or greater than 150 feet per minute.
- Use counterweight traction technology. (hydraulic elevators and drum style machines are exempt)

Elevators with lower rise and lower rated capacity were found to not be cost-effective and thus were excluded from the criteria. Similarly, elevators that do not use counterweight traction technology have less opportunity for the benefit of regenerative drives and are excluded from the criteria. Hydraulic elevators use fluid pumped from an oil reservoir into the piston and cylinder to raise the cab and open a valve for the oil in the cylinder to be returned to the reservoir while lowering the cab. This process is very inefficient, and the energy not used is converted to heat and cannot be captured. On the other hand, drum style machines require the elevator motor to work while raising and lowering the cab and are less likely to benefit from regenerative drive because of the transmission losses when power is delivered to the system and when it’s returned. Drum style machines are also expected to be less cost-effective since they are typically older, inefficient systems with fewer trips.

This measure would also impact existing elevators that meet the criteria when the alteration includes the replacement of the elevator control system. Adding regeneration during the replacement of the elevator control system requires a minimal to zero additional incremental cost in most cases.

The elevators meeting the above criteria would be required to have a regenerative drive that recovers potential energy and returns it to the building electrical system rather than dissipating the electricity in a resistor bank.

The Statewide CASE Team proposes an exception for stand-alone parking garages, where the calculated total building electrical load under normal operation is less than the load needed to absorb regenerated power from the elevator system.

Table 2 summarizes the scope of the proposed code change.

A ☑ indicates the proposed code change is relevant.

Table 2: Scope of Proposed Code Change

A ☑ indicates the proposed code change is relevant.

Building Type(s)	Construction Type(s)	Type of Change
☐ Single Family	☑ New Construction	☐ Mandatory
☐ Multifamily	☑ Additions	☑ Prescriptive
☑ Nonresidential (not Group R uses)	☑ Alterations	☐ Performance

Application Climate Zones	Energy Code Sections	Compliance Forms	Sections of ACM Reference Manuals
Climate Zones 1-16	• Part 6, Section 140.4 • Nonresidential Reference Appendix Section 7.5.6	N/A	Mandatory

Third Party Verification	Updates to Compliance Software
☐ No changes to third-party verification	☐ No updates
☑ Update existing verification requirements	☑ Update existing feature
☐ Add new verification requirements	☐ Add new feature

3. Energy Savings and Cost Effectiveness

3.1 Cost-Effectiveness Methodology

The Statewide CASE Team collaborated with CEC staff to confirm that the cost-effectiveness methodology aligns with CEC 2028 guidelines, including cost inclusion parameters. The 2028 CASE Methodology Report and Appendix A provide calculation details.

Per California Law (Public Resources Code 25000), a measure is considered cost effective if its benefit-to-cost ratio (BCR) is 1.0 or greater, amortized over the economic life of the structure. The Statewide CASE Team calculates BCR by dividing total dollar benefits by total dollar costs over a 30-year analysis period.

Benefits are based on LSC, which assigns an hourly dollar value to energy use. LSC hourly factors weigh the long-term value of each hour differently, where times of peak demand are valued more than off-peak hours. These factors are not utility rates, forecasts, or bill estimates. The CEC develops and publishes LSC hourly conversion factors for each code cycle.

Costs include first costs and ongoing maintenance costs assessed over the 30-year period. Benefits and costs are evaluated incrementally, relative to the most recently adopted Energy Code. The analysis excludes design costs and incremental code compliance verification costs.

The overall methodology is presented in Section 3.3.1 Energy Savings Methodology, pages 21 and 22 of the 2025 Draft CASE Report.

In addition to the aforementioned methodology, the Statewide CASE Team has recently conducted an extensive survey and analysis of various building prototypes to determine energy savings due to regeneration. The analysis used the Elevate elevator energy and traffic simulation software to predict energy use over five minute intervals. The analysis provides a comparison of the baseline and proposal scenarios for an extensive list of buildings shown in Table 3. The savings were developed for the following building types.

Table 3: Relevant Building Prototype from the Code-Readiness Study

Prototype	Floors	Elevators
Large sized office buildings (OfficeLarge_1)	11	10
Large sized office buildings (OfficeLarge_2)	13	12
Large sized office buildings (OfficeLarge_3)	17	16
Medium sized office buildings (OfficeMedium_1)	3	2
Medium sized office buildings (OfficeMedium_2)	6	3
Medium sized office buildings (OfficeMedium_3)	9	4
Medium sized office buildings (OfficeMedium_4)	12	5
Parking Garage	4	2

The Statewide CASE Team hired Peters Research, an elevator consulting firm, to perform elevator traffic and energy analysis. Peters Research used Elevate, an elevator simulation program, to determine the number of elevators needed per building. The Elevate software integrates a core building model with two algorithms: one governing elevator movement (up and down) and another optimizing occupant evacuation. The energy model incorporates real-world data from elevator field studies in London and Chicago. Elevate is designed to simulate energy use in any building type under varying traffic conditions, accommodating different elevator quantities and specifications. The Elevate model can provide a two-way traffic analysis that simulates the frequency, duration, and load of elevator trips based on building and elevator data and typical occupant behavior. Key parameters include elevator capacity and speed, building characteristics, dispatching algorithm, and traffic. The software built a traffic model to predict the pattern of use. Figure 2 provides a plot of building elevator electrical power use in a typical day for an office building. The plot shows most energy is used during the occupied part of the day from 8:00 A.M. to 6:00 P.M.

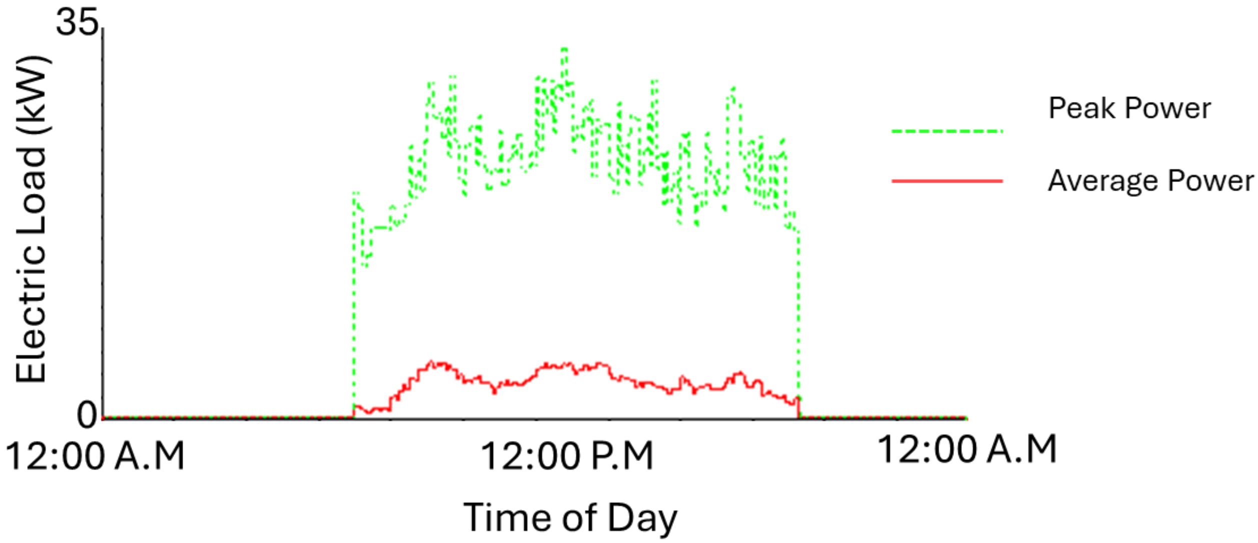

Figure 2: Elevator electrical load for three-story office building.

Source: Peters Research

The Elevate software calculated energy use for both elevators with and without regeneration. The difference in energy use is the energy savings.

Additional energy savings include the reduction of air conditioning load from the regeneration of electricity to the building rather than dissipation in a resistive bank. The elevator energy use and energy savings is assumed to be constant across all climate zones.

3.2 Energy and Energy Cost Savings Results

The regenerative drive savings represent a varying fraction of total elevator energy consumption. The large office buildings would have the largest savings due to having more elevators and more energy use due to their larger size. Energy savings are less for medium office buildings because there is less travel distance, lower elevator speeds, fewer elevators, and elevator trips serve a smaller number of building occupants.

Table 4 presents total per-building energy cost savings for newly constructed buildings and additions and alterations, as well as first-year LSC savings in 2029 present value dollars (2029 PV$). The LSC methodology allows peak electricity savings to be valued more than electricity savings during non-peak periods. The peak demand reductions per building range from 130 W to 3,200 W. Over a 30-year LSC period, office prototypes achieved $13,000 to $290,000 in cost savings, and parking garages saved about $14,000. LSC savings do not differ by climate zone. The LSC savings also do not differ if the project is new construction or alteration. The change to the elevator system does not interact with environment or other building systems.

Table 4: First-Year Impacts Per Building

Prototype	First-Year Electricity Savings (kWh)	First-Year Peak Demand Reduction (W)	First-Year Natural Gas Savings (kBtu)	First-Year Source Energy Savings (kBtu)	Total 30-Year LSC Savings (2029 PV$)
OfficeLarge_1	19,000	1,600	-	19,000	140,000
OfficeLarge_2	25,000	2,100	-	26,000	190,000
OfficeLarge_3	37,000	3,200	-	39,000	290,000
OfficeMedium_1	2,000	130	-	1,400	13,000
OfficeMedium_2	5,300	440	-	5,300	40,000
OfficeMedium_3	14,000	1,200	-	14,000	110,000
OfficeMedium_4	20,000	1,800	-	22,000	160,000
Parking Garage	2,100	140	-	1,600	14,000

Table 4 shows the breakdown of total savings. Note all savings come from electricity since elevators do not use natural gas.

3.3 Incremental First Cost

Incremental first costs represent the cost difference between a proposed elevator system with a regenerative drive and a baseline minimally code-compliant elevator system without regeneration. The incremental first costs and maintenance costs were gathered as part of the recent code readiness data brief (Brooks 2025).. These cost estimates were developed by KP Elevator Consulting using market observations from over 30 years of elevator design and taking into account number of elevators, capacity, speed, door width, and door type for each prototype studied. The main cost difference between the base and proposed cases is the cost of the regenerative drive, as other major components of the elevator system remain unchanged. The Statewide CASE team will continue to confirm the directionality and accuracy of these estimates through stakeholder feedback before the final version of this report is delivered.

Elevator regeneration systems are becoming the default option. The Statewide CASE Team found through industry surveys that systems with regeneration cost less than systems without regeneration. Systems without regeneration are special order.

Table 5 shows a comparison of the estimated incremental cost of the 2025 and 2028 Title 24, Part 6 code cycles. The costs for each code cycle came from different elevator consulting firms. While each estimate is different, the estimate of incremental cost is small in comparison to the overall elevator system cost. The costs of a complete elevator system range from $189,000 to $638,000. Incremental cost ranges from $4,800 to $-10,100 per building. The Statewide CASE Team does not expect incremental costs to change over time. The Statewide CASE Team presented these incremental first costs at the September 30, 2025, utility-sponsored stakeholder meeting.

Table 5: Summary and Comparison of Incremental Costs for New Construction

Prototype	2025 CASE Report Incremental Cost per Building (2029 PV$)	2028 CASE Report Incremental Cost per Building (Average) (2029 PV$)
Large Office	$28,000	-$10,100
Medium Office	$3,000	$1,200
Parking	$3,000	$4,800

Table 6 shows incremental cost estimates for alterations. The alteration cost is 25% higher to account for modifications to existing elevator systems. There are no estimates for the alteration cost for the 2025 CASE Report since the Statewide CASE Team did not propose regeneration drives for existing elevators in the previous code change cycle.

Table 6: Summary Incremental Costs for Alterations

Prototype	2028 CASE Report Incremental Cost per Building (Average) (2029 PV$)
Large Office	-$12,700
Medium Office	$1,500
Parking	$6,000

3.4 Incremental Maintenance and Replacement Costs

For the 2025 CASE Report, the Statewide CASE Team assumed no incremental maintenance cost. This was per the recommendation of the Statewide CASE Team's elevator industry consultant. The Statewide CASE Team reexamined this recommendation for the 2028 code cycle and decided that industry practice provides no incremental maintenance cost between traction elevator systems with or without regeneration systems.

The incremental modernization cost occurs at the end of the assumed 25-year lifetime for elevator system. The Statewide CASE Team assumed the same incremental first cost to replace the regenerative drive.

3.5 Cost Effectiveness

This measure proposes a mandatory requirement. As such, California Statutes require a cost analysis to identify the costs and benefits of the measure and demonstrate that the measure is cost effective over the 30-year period of analysis.

The CEC establishes the procedures for calculating cost effectiveness. The Statewide CASE Team collaborated with CEC staff to confirm that the methodology in this report is consistent with their guidelines, including which costs to include in the analysis. The assumptions were shared with stakeholders for their review and feedback. Appendix E summarizes stakeholder engagement.

Results of the per-unit cost-effectiveness analyses are presented in Table 7 and Table 8 for new construction/additions and alterations, respectively.

The proposed measure saves money over the 30-year period of analysis relative to the existing conditions. The proposed code change is cost effective in every climate zone for new construction and alterations.

Values in the Table 7 and Table 8 are presented in 2029 present value dollars (2029 PV$). Benefits include 30-year LSC savings, incremental first-cost savings, incremental maintenance savings, and residual value at the end of the 30-year period of analysis. Costs include the total incremental present-value (PV) cost, incremental equipment costs, Incremental replacement costs, and incremental maintenance costs over the period of analysis. Negative incremental costs represent savings to the building owner and are included in the "benefits" column. The BCR in the tables are "benefits only" if total incremental costs are zero. Future costs and savings are discounted at a real (inflation-adjusted) three percent rate to represent their present value.

Table 7: 30-Year Cost-Effectiveness Summary Per Building – New Construction and Additions

Building Prototype	Benefits LSC Savings + Other PV Savings (2029 PV$)	Costs Total Incremental PV Costs (2029 PV$)	Benefit-to-Cost Ratio
OfficeLarge_1	150,000	0	Benefits Only
OfficeLarge_2	210,000	0	Benefits Only
OfficeLarge_3	310,000	0	Benefits Only
OfficeMedium_1	15,000	7,100	2.1
OfficeMedium_2	43,000	11,000	4.0
OfficeMedium_3	110,000	0	Benefits Only
OfficeMedium_4	160,000	0	Benefits Only
Parking Garage	16,000	7,100	2.2

Table 8: 30-Year Cost-Effectiveness Summary Per Building – Alterations

Building Prototype	Benefits LSC Savings + Other PV Savings (2029 PV$)	Costs Total Incremental PV Costs (2029 PV$)	Benefit-to-Cost Ratio
OfficeLarge_1	160,000	0	Benefits Only
OfficeLarge_2	210,000	0	Benefits Only
OfficeLarge_3	310,000	0	Benefits Only
OfficeMedium_1	15,000	8,900	1.7
OfficeMedium_2	43,000	13,000	3.3
OfficeMedium_3	110,000	0	Benefits Only
OfficeMedium_4	160,000	0	Benefits Only
Parking Garage	16,000	8,900	1.8

4. Statewide Impacts

4.1 Statewide Energy and Energy Cost Savings

The methodology to determine statewide savings from new construction, additions, and alterations uses the same core approach as the 2025 code cycle, detailed in Section 3.3 of the 2025 Draft CASE Report. Statewide savings were calculated by applying the per-building energy savings impacts to the forecasted number of buildings affected by the code change. The key difference from the previous analysis is the use of updated research and modeling data, which refined the per-building impacts. Specifically, elevator traffic was simulated using the Elevate software with improved passenger traffic profiles, providing more accurate energy usage data.

See the 2028 CASE Methodology Report for details on how statewide savings are calculated. Appendix C presents the assumptions on the percentage of the total construction forecast that the proposed measure would impact.

The Statewide CASE Team estimated 60 percent of medium office buildings would be affected by the measure to match the estimated 60 percent market share of traction elevators. The remaining 40 percent of medium office buildings have hydraulic elevators and would not be impacted. All parking garages are assumed to have traction elevators.

The tables below present the first-year statewide energy and LSC savings from newly constructed buildings and additions (Table 9) and alterations (Table 10).

Table 11 presents first-year statewide savings from new construction, additions, and alterations.

The estimate total statewide savings is similar to the previous code cycle estimate although the scope of each proposal differs.

Table 9: Statewide Energy and LSC Impacts – New Construction and Additions

Building Prototype	Statewide New Construction & Additions Impacted by Proposed Change in 2026 (per Building)	First-Year Electricity Savings (GWh)	First-Year Peak Electrical Demand Reduction (MW)	First-Year Natural Gas Savings (Million Therm)	First-Year Source Energy Savings (Million kBtu)	30-Year Present Valued LSC Savings (Million 2029 PV$)
OfficeLarge_1	9.6	0.18	0.05	-	0.18	$1.38
OfficeLarge_2	8.9	0.22	0.06	-	0.23	$1.71
OfficeLarge_3	6.8	0.25	0.07	-	0.26	$1.95
OfficeMedium_1	28.8	0.06	0.01	-	0.04	$0.38
OfficeMedium_2	43.3	0.23	0.03	-	0.23	$1.75
OfficeMedium_3	9.6	0.14	0.02	-	0.14	$1.04
OfficeMedium_4	7.2	0.15	0.02	-	0.16	$1.14
Parking Garage	106.5	0.22	0.02	-	0.17	$1.52
Total	**215.1**	**1.5**	**0.3**	**-**	**1.4**	**$10.9**

Table 10: Statewide Energy and LSC Impacts – Alterations

Building Prototype	Statewide New Construction & Additions Impacted by Proposed Change in 2026 (Per Building)	First-Year Electricity Savings (GWh)	First-Year Peak Electrical Demand Reduction (MW)	First-Year Natural Gas Savings (Million Therm)	First-Year Source Energy Savings (Million kBtu)	30-Year Present Valued LSC Savings (Million 2029 PV$)
OfficeLarge_1	30	0.56	0.05	-	0.57	$4.3
OfficeLarge_2	28	0.69	0.06	-	0.71	$5.3
OfficeLarge_3	21	0.79	0.07	-	0.82	$6.1
OfficeMedium_1	48	0.10	0.01	-	0.07	$0.6
OfficeMedium_2	72	0.39	0.03	-	0.38	$2.9
OfficeMedium_3	16	0.23	0.02	-	0.23	$1.7
OfficeMedium_4	12	0.24	0.02	-	0.26	$1.9
Parking Garage	118	0.25	0.02	-	0.19	$1.7
Total	**345**	**3.2**	**0.3**	**-**	**3.2**	**$25**

Table 11: Statewide Energy and LSC Impacts – New Construction, Additions, and Alterations

Construction Type	First-Year Electricity Savings (GWh)	First-Year Peak Electrical Demand Reduction (MW)	First -Year Natural Gas Savings (Million Therm)	First-Year Source Energy Savings (Million kBtu)	30-Year Present Valued LSC Savings (Million 2029 PV$)
New Construction & Additions	1.5	0.1	-	1.4	$11
Alterations	3.2	0.3	-	3.2	$25
Total	**4.7**	**0.4**	**-**	**4.6**	**$35**

4.2 Statewide Greenhouse Gas Emissions Reductions

Table 12 presents the estimated first-year reduction in greenhouse gas (GHG) emissions resulting from the proposed code change. In this initial year, the Statewide CASE Team expects to avoid 245 metric tons of carbon dioxide equivalent (CO_2e) emissions. These reductions, along with their associated monetary value, were calculated using hourly GHG emissions factors published alongside the LSC hourly factors and source energy hourly factors from the CEC's 2028 Metrics Report (CEC 2028). See the 2028 CASE Methodology Report for additional information.

Most electrical energy savings occur during the day while the elevator is in active mode, and the office buildings and parking garages are occupied. This electrical energy use coincides with when the California electric generation relies heavily on solar photovoltaic generation. Therefore, the significant electrical energy savings result in modest GHG emission reductions.

Table 12: First-Year Statewide GHG Emissions Impacts

Construction Type	Reduced GHG Emissions from Electricity Savings (Metric Tons CO2e)	Reduced GHG Emissions from Natural Gas Savings (Metric Tons CO2e)	Total Reduced GHG Emissions (Metric Ton CO2e)	Total Monetary Value of Reduced GHG Emissions ($)
Total	**245**	**-**	**245**	**30,000**

4.3 Statewide Water Use Impacts

The proposed code change would not result in water use impacts.

4.4 Statewide Material Impacts

The Statewide CASE Team identified that the proposal requires the addition of a regenerative drive to comply. The Statewide CASE Team estimated the drives weigh between 100 and 200 pounds.

Table 13 provides both the per regenerative drive and statewide material impacts. The Statewide CASE Team concluded through research that one regenerative drive is needed per elevator group. The Statewide CASE Team divided the material impacts by four to estimate that one regenerative drive is needed per every four elevators on average. The Statewide CASE Team estimates the measure would require approximately 600 regenerative drives to be installed statewide each year (WEG Electric Corp. 2023).

Table 13: First-Year Statewide Impacts on Material Use

Material	Impact	Per-Unit Impacts (Pounds per Regenerative Drive)	First-Year Statewide Impacts (Pounds)	Embodied GHG emissions saved (Metric Tons CO2e)
Copper	Increase	55	78,023	-99
Steel	Increase	132	187,255	-103
Plastic	Increase	11	15,605	-13
Aluminum	Increase	22	31,209	-143
TOTAL	**N/A**	**N/A**	**N/A**	**-358**

4.5 Environmental Impacts

This information is summarized in Appendix D of the 2025 CASE Report.

4.6 Other Non-Energy Impacts

No other impacts have been identified.

5. Proposed Language Code

5.1 Guide to Markup Language

The proposed changes to the standards, Reference Appendices, and the Alternative Calculation Method (ACM) Reference Manuals are provided below. Changes to the 2025 documents should be marked with dark blue underlining (new language) and ~~strikethroughs~~ (deletions).

5.2 Administrative Code (Title 24, Part 1)

There are no proposed changes to Title 24, Part 1.

5.3 Energy Code (Title 24, Part 6)

Section 100

ELEVATOR CONTROL SYSTEM. The overall system governing the starting, stopping, direction of motion, acceleration, speed, and slowing of the moving elevator as defined in ASME A17.1/CSA B44

Section 120.6(f) Mandatory requirements for elevators. Elevators shall meet the following requirements**:**

1. Elevator energy recovery: New traction elevators with a rated capacity of 2,000 pounds or greater, a rated speed of 150 feet per minute or greater, and have a total rise of 20 feet or greater, shall have a regenerative drive that recovers energy released during motion and supplies electrical energy to the building electrical system. Braking resistors or resistive load bank shall be permitted to absorb regenerated energy only during emergency generator operation.

> **Exception 1 to Section 120.6(f)1**. Stand-alone parking garages, where the calculated total building electrical load under normal operation is less than the load needed to absorb regenerated power from the elevator system.
>
> **Exception 2 to Section 120.6(f)1**. Elevators located in buildings with Group R Occupancy, and Common or Public Use Areas serving that Occupancy.

2. ~~1~~ The lighting power density for the luminaires inside the elevator cab shall be no greater than 0.6 watts per square foot.

> **Exception to Section 120.6(f)2~~1~~:** Interior signal lighting and interior display lighting are not included in the calculation of lighting power density.

3. ~~2~~ Elevator cab ventilation fans for cabs without space conditioning shall not exceed 0.33 watts per cfm as measured at maximum speed.

4. ~~3~~ When the elevator cab is stopped and unoccupied with doors closed for over 15 minutes, the cab interior lighting and ventilation fans shall be switched off until elevator cab operation resumes.

5. 4 Lighting and ventilation shall remain operational in the event that the elevator cabin gets stuck when passengers are in the cabin.

6. ~~5~~ Elevator Lighting and Ventilation Control Acceptance. Before an occupancy permit is granted for elevators subject to 120.6(f), the following equipment and systems shall be certified as meeting the Acceptance Requirement for Code Compliance, as specified by the Reference Nonresidential Appendix NA7. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements specified in NA7.14.

Exception to Section 120.6(f): Elevators located in healthcare facilities.

SECTION 141.1 – REQUIREMENTS FOR COVERED PROCESSES IN ADDITIONS, ALTERATIONS TO EXISTING NONRESIDENTIAL, AND HOTEL/MOTEL BUILDINGS

Covered processes in additions or alterations to existing buildings that will be nonresidential, and hotel/motel occupancies shall comply with the applicable subsections of section 120.6 and 140.9.

(e) Elevator energy recovery: Additions and alterations to traction elevators with a new elevator control system shall meet the requirements of Section 120.6(f)(1).

Exception 1 to Section 141.1(e). Elevator alterations where the lowest measured or calculated total building electrical load under normal operation is less than the load needed to absorb regenerated power

Exception 2 to Section 141.1(e). Elevators using a winding drum machine.

Exception 3 to Section 141.1(e). Elevators located in buildings with Group R Occupancy, and Common or Public Use Areas serving that Occupancy.

5.4 Reference Appendices

Nonresidential Appendix

NA7 Appendix NA7 – Installation and Acceptance Requirements for Nonresidential Buildings and Covered Processes

NA7.14 Elevator Regenerative Drive, Lighting and Ventilation Controls

NA7.14.1 Construction Inspection

Verify and document the following prior to functional testing:

a) Elevator has regenerative drive enabled for traction elevators.

b) The occupancy sensor has been located to minimize false signals, and the elevator cab does not have any obstructions that could adversely affect the sensor's performance.

~~b~~ c) For Passive Infrared (PIR) sensors, the sensor pattern does not enter into the elevator lobby.

~~c~~ d) For ultrasonic sensors, the sensor does not emit audible sound.

Note that some elevators are able to use weight sensors to provide occupancy sensing. In this case, document that the elevator uses weight sensing to provide occupant sensing and proceed to the functional test.

NA7.14.2 Functional Testing

For each elevator cab being tested, confirm the following:

a) Verify that the lighting and ventilation controlled inside the elevator cab turn off 15 minutes after the start of an unoccupied condition.

b) Verify that the signal sensitivity is adequate to achieve desired control. The sensor should not detect motion in the elevator lobby.

c) Verify that lighting and ventilation immediately turn "on" when an unoccupied condition becomes occupied.

d) Verify that the lighting and ventilation will not shut off when occupied. Stand in the elevator with the door closed.

5.5 Compliance Manuals

The Statewide CASE Team will provide the CEC with recommended revisions to compliance manuals after the 45-Day Language is published.

5.6 ACM Reference Manual

There are no proposed changes to the ACM Reference Manual.

5.7 Compliance Documents

The CEC-NRCC-PRC-E, CEC-NRCA-PRC-12-F, NRCI-PRC-E compliance documents will be updated to reflect the proposed change. The Statewide CASE Team can support the CEC in implementing these updates if the proposed change is adopted.

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Appendix A: Assumptions for Cost-effectiveness Analysis

Key Assumptions for Energy Savings Analysis

- Since savings do not vary by climate zone, the Statewide CASE Team used the statewide average LSC hourly factors when calculating energy and energy cost impacts.
- The Statewide CASE Team collaborated with elevator consultants and experts to obtain input on cost assumptions, elevator types per prototypical building, floor elevation, population on each floor, number of elevators assumed per building, speed, capacity and acceleration rate of elevators, and door size and type of door for elevator.
- The Statewide CASE Team presented during the first utility-sponsored stakeholder meeting and conducted outreach to elevator experts to validate data.

Energy Savings Methodology per Prototypical Building

The 2028 CASE Methodology Report provides details on estimating energy savings per prototypical building and unit. The CEC directed the Statewide CASE Team to model energy impacts using specific prototypical building models that represent typical building geometries for different building types. The Statewide CASE team worked with Peter's Research to conduct this study and utilized Elevate® software to determine the number and specifications of the elevators for the prototype buildings selected. The software is used to simulate elevator traffic handling performance using building characteristics, such as floor-to-floor heights and number of floors, and dispatching algorithms, which determine which elevator will answer a call. The dispatching algorithm used in this study is a generic Group Collective algorithm, which is based on choosing the closest car that can stop in time for the call. The Statewide CASE team estimates that proprietary algorithms would provide similar or better results.

Elevate also takes into consideration traffic patterns, which differ between prototype building. The Statewide CASE Team selected several office prototypes based on the California Building Energy Code Compliance Software (CBECC) and developed buildings to measure sensitivity for cost and energy savings differences due to building height and occupancy.

Table 14Table 14 presents the prototype buildings used in the analysis and the assumptions for each.

The Statewide CASE Team selected several office prototypes based on the California Building Energy Code Compliance Software (CBECC) and developed buildings to measure sensitivity for cost and energy savings differences due to building height and occupancy.

Table 14: Prototype Buildings Used for Energy, Demand, Cost, and Environmental Impacts Analysis

Prototype Name	Number of Stories	Number of Elevators	Description
Office Large_1	11	10	Large Office 1 has a population of 2,114 and is served by 10 traction elevators, configured in two groups of five. Each elevator has a capacity of 4000 lbs., a speed of 350 fpm, and 4'-0" center-opening doors. The system serves 11 stops over 142 feet of travel, with floor-to-floor heights of 14'-0" from the basement to the first floor, 16'-0" from the first to second floor, and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an Average Waiting Time (AWT) of under 20-30 seconds. The population was calculated based on Large Office 2, minus two floors at 190 people per floor.
Office Large_2	13	12	Large Office 2 has a population of 2,494 and is served by 12 traction elevators, configured in two groups of six. Each elevator has a capacity of 4000 lbs., a speed of 500 fpm, and 4'-0" center opening doors. The system serves 13 stops over 170 feet of travel, with floor-to-floor heights of 14'-0" from the basement to the first floor, 16'-0" from the first to second floor, and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an AWT of under 20-30 seconds. This prototype building encompasses 498,589 square feet, with a basement and 12 stories, where the basement accounts for 8% of both the total floor area and population.
Office Large_3	17	16	Large Office 3 has a population of 3,254 and is served by 16 traction elevators, configured in two groups of eight. Each elevator has a capacity of 4000 lbs., a speed of 500 fpm, and 4'-0" center opening doors. The system serves 17 stops over 226 feet of travel, with floor-to-floor heights of 14'-0" from the basement to the first floor, 16'-0" from the first to second floor, and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an AWT of under 20-30 seconds. The population was derived from Large Office 2 by adding four floors at 190 people per floor.
Office Medium_1	3	2	Medium Office 1, a prototype with a population of 268, is served by 2 traction elevators. Each elevator has a capacity of 3500 lbs., a speed of 150 fpm, and 3’-6” side-opening doors. The system serves 3 stops over 30 feet of travel, with floor-to-floor heights of 16’-0” from the first to second floor and 14’-0” from the second to third floor. Its traffic handling is confirmed acceptable with an AWT of under 20-30 seconds, and its data was extracted from CBECC prototypes.

Office Medium_2	6	3	Medium Office 2 has a population of 538 and is served by 3 traction elevators. Each elevator has a capacity of 3500 lbs., a speed of 200 fpm, and 3'-6" side-opening doors. The system serves 6 stops over 72 feet of travel, with floor-to-floor heights of 16'-0" from the first to second floor and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an AWT of under 20-30 seconds. The population was calculated from Medium Office 1 by adding three floors at 90 people per floor.
Office Medium_3	9	4	Medium Office 3 has a population of 808 and is served by 4 traction elevators. Each elevator has a capacity of 4000 lbs., a speed of 350 fpm, and 4'-0" center-opening doors. The system serves 9 stops over 114 feet of travel, with floor-to-floor heights of 16'-0" from the first to second floor and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an AWT of under 20-30 seconds. The population was calculated from Medium Office 1 by adding six floors at 90 people per floor.
Office Medium_4	12	5	Medium Office 4 has a population of 1,078 and is served by 5 traction elevators. Each elevator has a capacity of 4000 lbs., a speed of 500 fpm, and 4'-0" center-opening doors. The system serves 12 stops over 156 feet of travel, with floor-to-floor heights of 16'-0" from the first to second floor and 14'-0" for typical floors. Its traffic handling is confirmed acceptable with an AWT of less than 20-30 seconds. The population was calculated from Medium Office 1 by adding nine floors at 90 people per floor.
Parking Garage	4	2	This facility is served by 2 traction elevators, each with a capacity of 3500 lbs. The elevators operate at a speed of 200 fpm and are equipped with 3'-6" side-opening doors. The system serves 4 stops over a total travel of 36 feet, with a consistent floor-to-floor height of 12'-0". The traffic handling performance is confirmed as acceptable, with an AWT of under 20 seconds

There are no existing requirements in Title 24, Part 6 for traction elevators. The Statewide CASE Team modified the Standard Design so that it calculated energy impacts of the most common current design practice, or industry standard practice.

Appendix B: Purpose and Necessity of Proposed Code Changes

Introduction

The sections below provide the purpose and necessity of proposed changes to Title 24, Part 6, and the reference appendices. This section intends to provide the CEC with the information needed for the Initial Statement of Reasons.

See Section 5 of this report for marked-up code language.

Purpose and Necessity of Changes to Title 24, Part 1

There are no proposed changes to Title 24, Part 1.

Purpose and Necessity of Changes to Title 24, Part 6

Section: 120.6(f)

Purpose: The specific purpose of the changes is to add new energy efficiency requirements for elevator regenerative drive for a traction elevator in new and existing buildings.

Necessity: These changes are necessary to increase energy efficiency via mandating the use of more efficient elevator equipment.

Purpose and Necessity of Changes to the Reference Appendices

Section: NA7.14.1 Construction Inspection

Purpose: The purpose of this change is to add a verification to the reference appendix to ensure that the regenerative drive is enabled for traction elevators

Necessity: The necessity for this change is to ensure that the regeneration equipment is enabled to improve the efficiency of the elevator operation.

Purpose and Necessity of Changes to the ACM Reference Manual

There are no proposed changes to the ACM Reference Manual.

Summary of Changes to the Nonresidential Compliance Manuals

The proposed code change would require that documentation showing a regenerative drive has been specified or installed or documentation showing an exception for the regenerative drive is on file.

Summary of Changes to Compliance Documents

The proposed code change would modify the compliance documents listed below.

- CEC-NRCC-PRC-E Process Systems Certificate of Compliance – Change the Elevator checkbox under Section B Project Scope to read "Elevator Energy Efficiency Requirements" and update Section K to read "Elevator Energy Efficiency" and modify the table to include requirements for regenerative drives.
- CEC-NRCA-PRC-12-F Elevator Light & Vent Ctrl – Update the title of this document to "Elevator Energy Efficiency Requirements" and update construction inspection requirements so they include ensuring the plans on file call for regenerative drives on traction elevators.
- NRCI-PRC-E Process System Certificate of Installation – Update Table B (Installer Scope) Section under Specialty to include Elevator Regenerative Drives.

Appendix C: Assumptions for Statewide Savings Estimates

The Statewide CASE Team used building prototypes as described in Appendix A.

The Statewide CASE Team estimated statewide impacts for the first year by multiplying per-unit savings estimates by statewide construction forecasts provided by the CEC. Because the Statewide CASE Team relied upon several building prototypes for the Large Office and Medium Office, the Statewide CASE Team divided the forecast with the advice of the elevator consultant. The results of the division of the forecast are shown in Table 15 and Table 16 for new construction and additions, and alterations, respectively. The values in the table are based on the 2025 CEC Construction Forecast (CEC 2028). The 2028 CASE Methodology Report includes additional information about the methodology and assumptions used to calculate statewide energy impacts.

Table 15: Statewide Elevator Construction Forecast – New Construction and Additions

Building Prototype	Million ft2 (Construction Forecast)	Building Total Area (ft2)	Fraction of NR Construction	Number of Buildings Statewide 1st year	Elevators per Building	Elevators Statewide 1st Year
OfficeLarge_1	13.31	460,364	1/3	9.6	10	96
OfficeLarge_2	13.31	498,589	1/3	8.9	12	107
OfficeLarge_3	13.31	651,489	1/3	6.8	16	109
OfficeMedium_1	15.47	53,628	0.1	29	2	58
OfficeMedium_2	15.47	107,256	0.3	43.3	3	130
OfficeMedium_3	15.47	160,884	0.1	3.8	4	38
OfficeMedium_4	15.47	214,512	0.1	7.2	5	36
Parking Garage	26.41	248,000	1	106.5	2	213
Total	**128**	**N/A**	**N/A**	**215.1**	**N/A**	**787**

Table 16: Statewide Elevator Construction Forecast – Alterations

Building Prototype	Million ft2 (Construction Forecast)	Building Total Area (ft2)	Fraction of NR Construction	Number of Buildings Statewide 1st year	Elevators per Building	Elevators Statewide
OfficeLarge_1	1033.49	460,364	1/3	30	10	299
OfficeLarge_2	1033.49	498,589	1/3	28	12	332
OfficeLarge_3	1033.49	651,489	1/3	21	16	338
OfficeMedium_1	644.04	53,628	0.1	48	2	96
OfficeMedium_2	644.04	107,256	0.3	72	3	216
OfficeMedium_3	644.04	160,884	0.1	16	4	64
OfficeMedium_4	644.04	214,512	0.1	12	5	60
Parking Garage	734.55	248,000	1	118	2	237
Total	**6,411**	**N/A**	**N/A**	**345**	**N/A**	**1,642**

The statewide savings and cost estimates take the current market share rate into account. The Statewide CASE Team estimated that the current market share rate for the proposed code change is 100 percent for the new construction market and 100 percent for the retrofit market.

Table 17 presents the projected nonresidential new construction that the proposed code change would impact in 2026.

Table 18 shows the projected nonresidential existing statewide building stock that the proposed code change would affect through alterations in 2026. The Statewide CASE Team developed these estimates using the methods described in this section.

The Statewide CASE Team estimated the percentage of newly constructed floor space that the proposed code change would impact. Table 19 shows the assumed percentage of affected floorspace by building type would be 100 percent for large office since the measure would apply to all large office buildings, where traction elevators are prevalent. The Statewide CASE Team estimated 60 percent of medium office buildings would be affected by the measure to match the estimated 60 percent market share of traction elevators. The remaining 40 percent of medium office buildings are assumed to have hydraulic elevators and would not be impacted. All parking garages are assumed to have traction elevators.

The measure would apply to affected buildings regardless of where they are located.

Table 17 Estimated New Nonresidential Construction Impacted by Proposed Code Change in 2026, by Climate Zone and Building Type (Million ft²)

Building Type	CZ 1	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16	All
Large Office	0.00	0.00	2.03	0.99	0.00	0.89	0.52	1.44	2.61	0.25	0.07	0.36	0.00	0.13	0.01	0.03	9.32
Medium Office	0.09	0.33	0.96	0.52	0.26	0.84	0.56	1.15	2.23	0.82	0.19	1.96	0.41	0.24	0.18	0.07	10.83
Enclosed Parking Garage	0.00	0.01	1.28	0.87	0.00	1.81	0.49	1.59	1.07	0.04	0.00	0.03	0.00	0.01	0.00	0.01	7.21
Open Parking Garage	**0.00**	**0.08**	**1.73**	**1.18**	**0.04**	**2.55**	**0.84**	**2.24**	**1.51**	**0.46**	**0.01**	**0.37**	**0.03**	**0.14**	**0.03**	**0.07**	**11.28**

Table 18: Estimated Existing Nonresidential Floorspace Impacted by Proposed Code Change in 2026 (Alterations), by Climate Zone and Building Type (Million ft²)

Building Type	CZ 1	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7	CZ 8	CZ 9	CZ 10	CZ 11	CZ 12	CZ 13	CZ 14	CZ 15	CZ 16	All
Large Office	0.10	2.48	111.84	57.88	1.47	79.63	58.17	130.08	242.48	46.78	2.09	62.89	7.41	16.22	3.55	3.73	826.79
Medium Office	2.70	24.79	63.03	33.82	10.66	38.25	35.10	47.29	69.07	53.35	13.55	81.36	20.14	10.66	8.20	3.25	515.23
Enclosed Parking Garage	0.01	0.43	32.57	24.75	0.24	23.32	16.54	46.73	58.02	2.14	0.28	2.47	0.39	0.68	0.13	0.35	209.06
Open Parking Garage	**0.18**	**5.62**	**44.02**	**33.46**	**3.09**	**32.91**	**28.14**	**65.95**	**81.92**	**27.66**	**3.57**	**31.97**	**5.05**	**8.84**	**1.72**	**4.49**	**378.59**

Table 19: Percentage of Nonresidential Floorspace Impacted by Proposed Code Change in 2026, by Building Type

Building Type	New Construction Impacted (Percent ft2)	Existing Building Stock (Alterations) Impacted (Percent ft2)
Large Office	100%	100%
Medium Office	60%	60%
Enclosed Parking Garage	100%	100%
Open Parking Garage	100%	100%

Table 20: Percentage of Nonresidential Floorspace Impacted by Proposed Measure, by Climate Zone

Climate Zone	New Construction Impacted (Percent ft2)	Existing Building Stock (Alterations) Impacted (Percent ft2)
1	100%	100%
2	100%	100%
3	100%	100%
4	100%	100%
5	100%	100%
6	100%	100%
7	100%	100%
8	100%	100%
9	100%	100%
10	100%	100%
11	100%	100%
12	100%	100%
13	100%	100%
14	100%	100%
15	100%	100%
16	100%	100%

Appendix D: Environmental Analysis

Potential Significant Environmental Effect of Proposal

The CEC is the lead agency under the California Environmental Quality Act (CEQA) for the 2028 Energy Code and must evaluate any potential significant environmental effects resulting from the proposed standards. A “significant effect on the environment” is “a substantial adverse change in the physical conditions which exist in the area affected by the proposed project (California Environmental Quality Act 2024).”

The Statewide CASE Team has considered the environmental benefits and adverse impacts of its proposal, including—but not limited to—an evaluation of factors contained in the California Code of Regulations, Title 14, section 15064, and has determined that the proposal would not result in a significant effect on the environment.

Direct Environmental Impacts

Direct Environmental Benefits

The Statewide CASE Team concludes after careful consideration of the project that there would be no direct environmental benefits or impacts due to the proposed Building Energy Efficiency Standards for elevators. The proposed regulations would not affect the health and welfare of California residents, worker safety, or the state’s environment. The most probable means to achieve the standards would not require the use of materials that are hazardous to the environment.

Indirect Environmental Impacts

Indirect Environmental Benefits

The Statewide CASE Team found that this proposal would provide significant environmental benefits through the reduced use and demand for electricity. The production of electricity generates GHG emissions and therefore, a reduction in electricity production would reduce the production of GHG emissions.

Indirect Adverse Environmental Impacts

The Statewide CASE Team concluded after careful consideration of the project that there would be no indirect adverse environmental impacts due to the proposed Building Energy Efficiency Standards for elevators.

Mitigation Measures

The Statewide CASE Team has considered opportunities to minimize the environmental impact of the proposal, including an evaluation of “specific economic, environmental, legal, social, and technological factors (California Environmental Quality Act 2024).”

Reasonable Alternatives to Proposal

The Statewide CASE Team has considered alternatives to the proposal and determined that no alternative would achieve its purpose with less environmental effect. The following section presents the alternatives and the Statewide CASE Team’s justification for not proposing them.

The Statewide CASE Team considered proposing a standard similar to the elevator requirements in (ASHRAE Addendum cf to Standard 90.1 2019) standard. The Statewide CASE Team did not choose this option since it would have had no environmental impact while it was less stringent and yielding less environmental benefits.

Water Use and Water Quality Impacts Methodology

There are no impacts to water quality or water use.

Appendix E: Summary of Stakeholder Engagement

Introduction to Stakeholder Engagement

Collaborating with stakeholders who may be affected by proposed code changes is a core component of the Statewide CASE Team's process. The Statewide CASE Team engages interested parties to identify and address issues related to the proposals, with the goal of submitting recommendations to the CEC in this Draft CASE Report that reflects broad support. Public stakeholders provide valuable feedback on draft analyses and help identify and address adoption challenges, including cost effectiveness, market and technical barriers, compliance and enforcement, and potential impacts on human health or the environment. Some stakeholders also provide data that the Statewide CASE Team uses to support analyses.

This appendix summarizes the stakeholder engagement conducted by the Statewide CASE Team during the development and refinement of the report's recommendations.

Utility-Sponsored Stakeholder Meetings

Utility-sponsored stakeholder meetings provide an opportunity to learn about the Statewide CASE Team's role in the advocacy effort and to hear about specific code change proposals that the Statewide CASE Team is pursuing for the 2028 code cycle. The goal of these meetings is to solicit input on proposals from stakeholders early enough to ensure the proposals and the supporting analyses are vetted and have as few outstanding issues as possible. To promote transparency in the development of code change proposals, the Statewide CASE Team uses stakeholder meetings to solicit feedback on:

- Proposed code changes
- Draft code language
- Draft assumptions and results of analysis
- Data to support assumptions
- Compliance and enforcement
- Technical and market feasibility

The Statewide CASE Team hosted one stakeholder meeting for traction elevators via webinar, as described in Table 21. Please see below for dates and links to event pages on Title24Stakeholders.com. Materials from each meeting, such as slide presentations, proposal summaries with code language, and meeting notes, are included in the bibliography section of this report.

Table 21: Utility-Sponsored Stakeholder Meetings

Meeting Name and Link to Materials	Meeting Date	Summary of Items Discussed
Nonresidential Covered Processes, Envelope, Utility-Sponsored Stakeholder Meeting	Tuesday, September 30, 2025	• Solar Pool Heating • Envelope – Fenestration Improvements • Traction Elevators • Data Center Improvements
Second Round of Utility-Sponsored Stakeholder Meeting	TBD, January - February, 2026	• TBD

The first round of utility-sponsored stakeholder meetings began in September 2025 and served as an early forum to promote transparency and gather stakeholder feedback on measures under consideration by the Statewide CASE Team.

The objectives of the first round of stakeholder meetings were to solicit input on the scope of the 2028 code cycle proposals; request data and feedback on the specific approaches, assumptions, and methodologies for the energy impacts and cost-effectiveness analyses; and understand potential technical and market barriers. The Statewide CASE Team also presented the initial draft code language for stakeholders to review.

The second round of utility-sponsored stakeholder meetings will take place from January to February 2026 and will provide updated details on proposed code changes. These meetings will introduce early results of energy, cost effectiveness, and incremental cost analyses, and solicit feedback on refined draft code language.

Utility-sponsored stakeholder meetings are open to the public. For each stakeholder meeting, two promotional emails were distributed from info@title24stakeholders.com. One email was sent to the full Title 24 Stakeholders listserv, which includes over 3,000 individuals. A second email targeted specific recipients based on their subscription preferences.

The Title 24 Stakeholders listserv is an opt-in service comprising participants from a diverse industries and trades, such as manufacturers, advocacy groups, local government, and building and energy professionals. Each meeting was announced on the Title 24 Stakeholders LinkedIn page and cross-promoted on the CEC LinkedIn page approximately two weeks in advance to engage individuals, organizations, and broader channels outside beyond the listserv. The Statewide CASE Team conducted extensive personal outreach to stakeholders identified in initial work plans who had not yet opted in to the listserv. Exported webinar meeting data captured attendance numbers, individual comments, and results from live attendee polls to help evaluate stakeholder participation and support.

Statewide CASE Team Communications

The Statewide CASE Team held personal communications over email and phone with numerous stakeholders when developing this report. Key organizations and influential individuals were identified for their potential contributions to the proposal. Multiple professional organizations within the elevator industry, from regulators, consultants, research organizations, and code-settings and standards development authorities, were found and contacted. Stakeholders expressed strong interest in elevator efficiency measures. ASHRAE 90.1 2022 and ASHRAE 189.1 2022 represent areas where elevator efficiency measures are under consideration. IECC participation was instrumental in shaping the exception 1 in the Statewide CASE Team proposal. The Statewide CASE Team will monitor upcoming ASHRAE 189.1 2022 working groups, where a similar elevator proposal will be discussed (ASHRAE Addendum x to Standard 189.1 2017, ASHRAE Addendum cf to Standard 90.1 2019).

The individuals and the organizations contacted by the Statewide CASE Team are listed in Table 22. Most of the stakeholders were also invited to participate in formal utility-sponsored stakeholder meetings.

Table 22: Engaged Stakeholders

Organization/Individual Name	Market Role	Mentioned in CASE Report Sections
Code Green Solutions	Sustainability and Decarbonization	-
CEC	Code-Setting Authority	-
Peters Research	Elevator Consulting Firm	3.1
State of New York	Code-Setting Authority	-
KP Elevator Consulting	Elevator Consultant	-
Kaiser Hospitals	Healthcare Building Owner	-
National Elevator Industry, Inc.	Trade Association	-
IECC	National Standards Reference	2.2
Vantage Elevator	Manufacturer	-
Otis Elevator	Manufacturer	-
International Union of Elevator Constructors	Union	-
TK Elevator	Manufacturer	-
NIDEC Drives	Manufacturer	-
KONE	Elevator Contractor	-