

Reach Code Candidate Measures At a Glance

The California Energy Codes and Standards Program is seeking feedback from local jurisdictions regarding candidate measures for local reach codes that could be implemented before the 2022 code cycle (i.e., before January 2023). Measures are selected from proposed code changes that the Statewide Utility Codes and Standards Enhancement (CASE) Team is developing for the California Energy Commission's consideration for the [2022 California Energy Code](#). The Statewide CASE Team has completed technical analyses for proposed code changes and there appears to be sufficient support for adoption at this time. Local governments have the authority to adopt these measures irrespective of the ultimate Title 24, Part 6 disposition. Measures that aren't adopted in the next statewide code cycle could be renewed as reach code provisions by local jurisdictions and be effective through 2025. The selected measures do not require changes to the compliance software (since such changes may not be ready to support early adoption) and require little or no incremental enforcement activities.

Based on the results of the survey and the final measure studies, the California Energy Codes and Standards Program may prepare model reach code language and supporting implementation materials, to be posted at [LocalEnergyCodes.com](#).

Note that most of the measures impact nonresidential buildings. The reasons for this are that the 2022 code cycle is more focused on nonresidential (2019 was focused on residential) and that many of the residential measures under consideration will require revisions to the compliance software.

Each measure includes a short description with a link to the relevant draft or final CASE Report.

For additional information on 2022 Energy Code update process and to access recent information on each code change proposal please visit [Title24Stakeholders.com](#), the Statewide CASE Team's website. Note that proposed code changes are evolving and are expected to be refined until the California Energy Commission adopts the 2022 Energy Code in July 2021.

Name of Measure	Description	Res (R) Nonres (N)	Cost-Effectiveness	1 st -year statewide GHG savings (est.)	CASE Report
Horticulture Lighting	The horticultural lighting minimum efficacy measure proposes a mandatory requirement for minimum photosynthetic photon efficacy (PPE) in facilities with more than 40 Watts total connected horticultural lighting load. The proposal would essentially mandate LEDs for luminaires used for plant growth and maintenance in indoor growing facilities (i.e., opaque roofs), and require LEDs or certain non-LED luminaires in greenhouses (daylit facilities). The measure requires time-switch controls and multilevel lighting controls in both types of facilities.	N	cost-effective in all climate zones (benefit-to-cost ratio ranges from 2.0 to 7.3).	45,750 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/06/NR-CEH-Draft-CASE-Report.pdf
Compressed Air	The compressed air monitoring measure proposes a mandatory requirement for the installation of meters to facilitate continuous monitoring of load and efficiency of any new compressed air system with capacities greater than or equal to 100 horsepower (hp). Additions or replacements of compressors to existing systems would also trigger this requirement if the 100 hp threshold is met. The measure would require that system pressure and airflow be monitored as well as power of each individual compressor. Specific efficiency monitoring could help flag issues – those caused by control system parameters or otherwise – that can cause a system to operate inefficiently.	N	cost-effective in all climate zones (benefit-to-cost ratio ranges from 2.4 to 9.5).	7,049 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/09/NR-Compressed-Air_Final-CASE-Report.pdf

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Steam trap monitoring	<p>The steam trap monitoring measure proposes requiring the installation of fault detection devices (FDD) in new construction. Specifically, the proposed requirements could apply to steam trap systems exceeding 30 pounds per square inch gauge (psig) of connected steam line pressure when the connected boiler capacity is greater than 2.0 million British thermal units per hour (MMBtu/hr). Systems that meet these pressure and capacity thresholds would need to install FDD systems.</p> <p>New installer acceptance test required.</p>	N	cost-effective in all climate zones (benefit-to-cost ratio of 2.0).	6,988 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/06/NR_Steam-Trap-Monitoring_Draft-CASE-Report-1.pdf
Boilers	<p>The boiler oxygen concentration measure proposes requiring controls to maintain oxygen concentration at or below 3 percent (currently 5%) for process boilers with input capacity of 5 MMBtu/h or greater and require oxygen concentration controls on commercial boilers with efficiencies below 90% (currently 85%).</p>	N	cost-effective in all climate zones (benefit-to-cost ratio of 4.8).	3,392 metric tons of CO ₂ e (process boilers) 453 metric tons of CO ₂ e (commercial boilers)	https://title24stakeholders.com/wp-content/uploads/2020/08/NR-Boilers-and-Water-Heating_Final-CASE-Report.pdf

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Outdoor Lighting	<p>This proposal revisits the current population-based approach to nonresidential lighting zone classification to provide more discrete lighting zone applications based on U.S Census classifications. In addition to reducing energy use the measure will minimize sky glow and light trespass. Specifically, this proposal updates the lighting zone definitions to more closely match the Illuminating Engineering Society’s (IES) lighting zone definitions.</p> <ul style="list-style-type: none"> • LZ1: Would still include developed portions of government designated parks, recreation areas, and wildlife preserves, but “rural” areas previously part of LZ2 would now be included here, along with residential and agricultural areas. “Rural” is defined as less than 2,500 people per square mile. • Lighting Zone 2 (LZ2): Was previously “rural” areas but is now “urban cluster” areas as well as mixed use residential, light commercial, and industrial areas. “Urban clusters” are defined as areas with between 2,500 and 50,000 people per square mile. • Lighting Zone 3 (LZ3): is still defined as “urban” areas, but now specifically includes high intensity commercial, entertainment centers, and heavy industrial and manufacturing. “Urban” areas are defined as greater than 50,000 people per square mile. 	N	cost-effective in all climate zones (benefit-to-cost ratio is infinite, i.e., no incremental costs).	677 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/09/NR-Outdoor-Light-Sources_Final-CASE-Report_Statewide-CASE-Team.pdf

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Daylighting	<p>This proposed code change would transition the prescriptive requirements for automatic daylighting controls in secondary sidelit daylit zones (SDZs) to a mandatory requirement. Currently, the requirement for automatic daylighting controls in SDZs is the only prescriptive lighting control requirement, creating confusion in implementation as this is the only control requirement that can be traded away. Moving the requirements for controls in SDZs to the mandatory section would simplify the lighting control requirements and subsequently the compliance and enforcement process for lighting controls. This change would also align the daylighting requirements in Title 24, Part 6 with daylighting requirements in ASHRAE 90.1.</p>	N	cost-effective in all climate zones.	624 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/09/NR-Daylighting_Final-CASE-Report_Statewide-CASE-Team.pdf
Refrigeration	<p>The refrigerator door closer measure proposes to require automatic door closers for refrigerated spaces 3,000 square feet and over to better align requirements for smaller walk-in coolers and freezers.</p> <p>There are two types of automatic door closers: the first is a mechanism that automatically closes the door from a standing-open position. Applicable hardware includes cam hinge or spring hinge. The second closer type is a mechanism that tightly seals the door to the door frame to eliminate air leakage. Applicable hardware includes snap type door closers or magnetic gaskets.</p>	N	cost-effective in all climate zones except CZ 16 (benefit-to-cost ration ranges from 1.3 to 1.6).	86 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2020/09/NR_Refrig-System-Opps_Final-CASE-Report.pdf

Name of Measure	Description	Res (R) Nonres (N)	Cost-Effectiveness	1 st -year statewide GHG savings (est.)	CASE Report
Fans	<p>The Fan Energy Index measure proposes requiring that certain fans achieve an FEI of 1.0 or higher, similar to ASHRAE 90.1-2019.</p> <p>Fan Energy Index (FEI) is a straightforward metric to encourage mechanical designers to make fan selections closer to a fan’s peak efficiency. The higher the FEI, the less power is consumed at a given duty point (airflow and pressure). FEI is a ratio of the input power of a reference fan and the actual fan at the same duty point. To learn more about FEI see the Air Movement and Controls Association’s (AMCA) webpage on FEI here: https://www.amca.org/advocate/energy-efficiency/about-fan-energy-index/</p> <p>This measure would only apply to new construction, not alterations or additions.</p>	N	cost-effective in all climate zones (benefit-to-cost ratio ranges from 1.6 to 3.1).	375 metric tons of CO ₂ e	https://title24stakeholders.com/wp-content/uploads/2020/09/2022_T24-Final-CASE-Report_Air-Distribution.pdf
Indoor Lighting	<p>The multi-zone occupancy sensing in large offices measure proposes requiring mandatory controls for nonresidential indoor lighting systems in “large” offices, defined as enclosed offices greater than 250 ft² (current threshold is 5,000 ft²). This proposed measure specifically includes open office workstations, although the term “open office” itself is undefined in Title 24, Part 6.</p> <p>The proposed measure reduces the maximum area that each occupancy sensor in a large office controls no more than 600 ft². The 600 ft² limit ensures both cost effectiveness and alignment with similar requirements in other national model codes, including the International Energy Conservation Code (IECC). This divides the space into smaller occupancy control zones than in past code cycles. It also includes a recommendation that lighting and HVAC sensors work in concert.</p>	N	cost-effective in all climate zones (benefit-to-cost ratio ranges from 3.5 to 7.4).	15,103 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2020/09/2022-T24-Indoor-Lighting_Final-CASE-Report_Statewide-CASE-Team.pdf

Name of Measure	Description	Res (R) Nonres (N)	Cost-Effectiveness	1 st -year statewide GHG savings (est.)	CASE Report
Roof Insulation	The roof insulation measure would require installing insulation upon reroofs to meet requirements for new construction and upon roof recovers to add R8 insulation.	N	certain climate zones for certain occupancies.		https://title24stakeholders.com/wp-content/uploads/2020/07/2022-T24-NR-High-Performance-Envelope-Draft-CASE-Report.pdf
Ventilation (multi-family)	For multifamily dwelling units following the balanced ventilation path (as opposed to compartmentalization path) to maintain indoor air quality this proposal would set the prescriptive standard for the ventilation system to an ERV or HRV (Energy/Heat Recovery Ventilator) in Climate Zones 1, 2, and 11-16.	R	climate zones 1, 2, and 11-16 (benefit-to-cost ratio ranges from 1.0 to 4.5).	1,635 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2020/08/SF-Additions-and-Alterations-Final-CASE-Report-Statewide-CASE-Team.pdf
Roof insulation (low-rise)	The low-rise roof insulation measure would require R14 above-deck insulation in 12 climate zones on buildings with low-sloped roofs at time of residential roof replacement. Roof deck insulation is already required on high-rise replacements. Climate zones affected include 1, 2, 4 and 8-16.	R	all climate zones where it is proposed (benefit-to-cost ratio ranges from 1.1 to 2.3).	23,041 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2020/08/SF-Additions-and-Alterations-Final-CASE-Report-Statewide-CASE-Team.pdf
Cool Roofs (low-rise)	The low-rise residential cool roofs measure would expand requirements for cool roofs upon replacement to several additional climate zones where it is cost-effective. Cool roofs are already required in several climate zones. The requirements vary for single family and multifamily and by low-sloped and steep-sloped roofs. Climate zones affected include 4, 6-12 and 14.	R	all climate zones where it is proposed (benefit-to-cost ratio ranges from 1.0 to 2.7).	4,929 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2020/08/SF-Additions-and-Alterations-Final-CASE-Report-Statewide-CASE-Team.pdf
Space Heaters	The prohibition on low-rise residential electric resistance space heat measure prohibits like-to-like replacement of existing electric resistance space heaters if a ducted air conditioning system exists. This existing condition represents a straightforward and cost-effective upgrade to a heat pump because the air conditioning and electrical infrastructure is already in place. The proposal does not cover non-ducted electric resistance heating systems or systems without central air conditioning.	R	all climate zones except SF buildings in climate zones 7 and 15 & MF buildings in climate zones 6-8 and 15 (benefit-to-cost ratio ranges from 1.2 to 17.7).	2,477 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2018/10/2022-T24-Draft-CASE-Report-MF-All-Electric.pdf

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Water Heaters	The low-rise residential electric resistance water heat measure prohibits like-to-like electric resistance water heater replacement unless the equipment is combined with a solar thermal system. Exceptions include when the existing electric resistance water heater is located within conditioned space or in spaces such as closets that are not large enough to accommodate a heat pump water heater. Multifamily buildings with water heaters located outdoors or in exterior closets are exempt as a result of the cost effectiveness analysis.	R	cost-effective in all climate zones except for multifamily buildings in climate zone 16 (benefit-to-cost ratio ranges from 1.0 to 2.1).	12,189 metric tons of CO ₂ e.	https://title24stakeholders.com/wp-content/uploads/2018/10/2022-T24-Draft-CASE-Report_MF-All-Electric.pdf