California Energy Alliance

Navigating Mechanical Controls and Sensor Requirements in California's Energy Codes, Standards, and Efficiency Programs

May 24, 2023, 10:00 a.m. - 11:30 a.m.

Welcome

Josh Dean, CEA Executive Director

CEA Antitrust Statement

The purpose of the CEA is to explore avenues of mutual interest and cooperation in building energy policy. It is important to recognize that these activities are subject to certain legal limits imposed by state and federal antitrust laws. One central concern of these laws is with combinations or agreements in restraint of trade whereby competition is reduced by design. In the course of all CEA activities, discussions among members involving pricing, sale terms, territories, production or other aspects of competition, must be avoided. In the event any member ever feels that the course of Alliance activities or statements or actions in Alliance meetings is headed into such an area, members should raise the issue immediately so that further discussion of such matters can be suspended pending receipt of advice satisfactory to the members that the topics addressed do not give rise to antitrust problems.

Agenda

10:00 a.m.	Welcome & Webinar Overview *Josh Dean, CEA Executive Director*
10:15 a.m.	Presentation: “Navigating Mechanical Controls and Sensor Requirements in California's Energy Codes, Standards, and Efficiency Programs” *Michael Shewmaker, California Energy Commission* *David Velazquez, California Energy Commission*
11:15 a.m.	Moderated Discussion *All*
11:30 a.m.	Adjourn

California Energy Alliance

...envisions a healthy and equitable built environment that is powered by carbon-free, reliable energy sources.

...works to bring beneficial, equitable change to energy standards, policies and programs by developing consensus among diverse and engaged stakeholders.

“Be the conduit between policy & code makers and the market”


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CAL SMACNA
ADC energy
NEMIC
NATIONAL ENERGY MANAGEMENT INSTITUTE COMMITTEE
LEVITON
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bios
KDC Inc.
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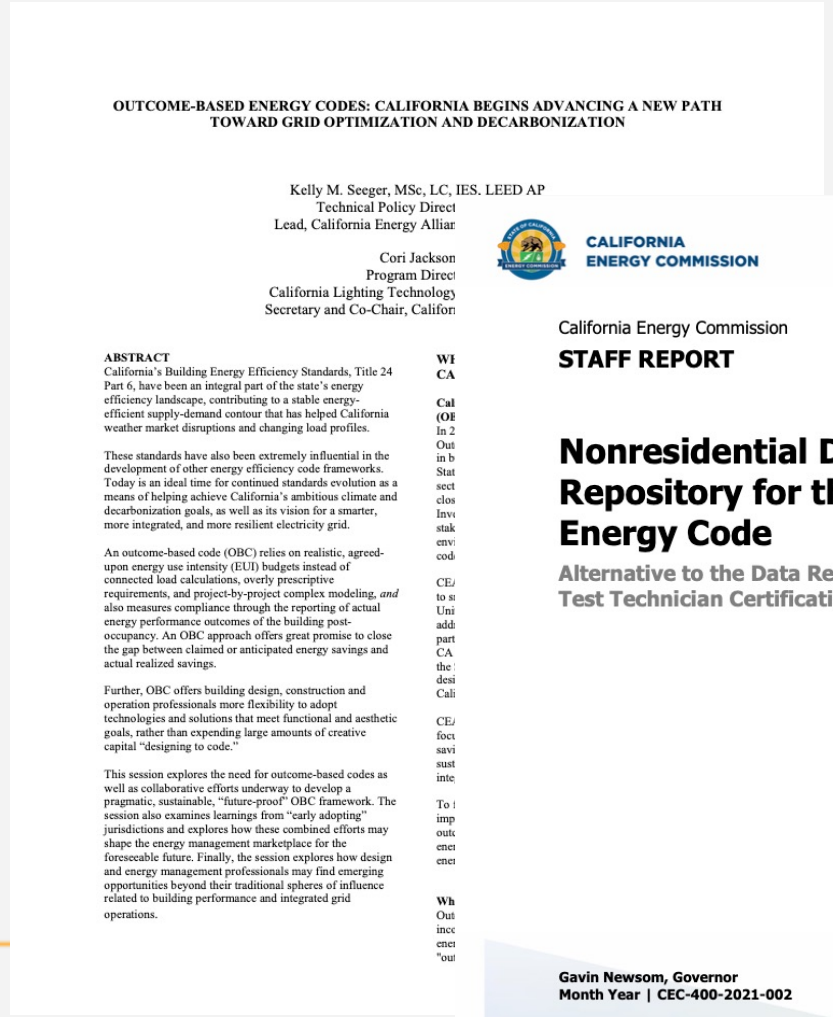
ETC
California Advanced Lighting Controls Training Program
ALC
Life Is On
Schneider Electric
Current
nbi new buildings institute

CEA Impact



OUTCOME-BASED ENERGY CODES: CALIFORNIA BEGINS ADVANCING A NEW PATH TOWARD GRID OPTIMIZATION AND DECARBONIZATION

Kelly M. Seeger, MSc, LC, IES. LEED AP
Technical Policy Direct
Lead, California Energy Alliar

Cori Jackson
Program Direct
California Lighting Technology
Secretary and Co-Chair, Californ

ABSTRACT

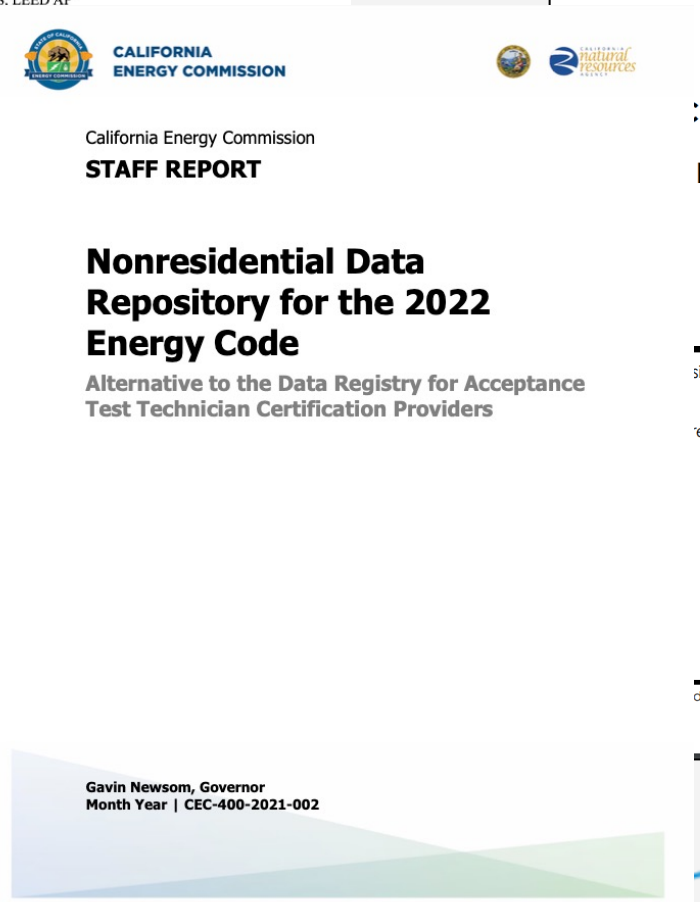
California's Building Energy Efficiency Standards, Title 24 Part 6, have been an integral part of the state's energy efficiency landscape, contributing to a stable energy-efficient supply-demand contour that has helped California weather market disruptions and changing load profiles.

These standards have also been extremely influential in the development of other energy efficiency code frameworks. Today is an ideal time for continued standards evolution as a means of helping achieve California's ambitious climate and decarbonization goals, as well as its vision for a smarter, more integrated, and more resilient electricity grid.

An outcome-based code (OBC) relies on realistic, agreed-upon energy use intensity (EUI) budgets instead of connected load calculations, overly prescriptive requirements, and project-by-project complex modeling, *and* also measures compliance through the reporting of actual energy performance outcomes of the building post-occupancy. An OBC approach offers great promise to close the gap between claimed or anticipated energy savings and actual realized savings.

Further, OBC offers building design, construction and operation professionals more flexibility to adopt technologies and solutions that meet functional and aesthetic goals, rather than expending large amounts of creative capital "designing to code."

This session explores the need for outcome-based codes as well as collaborative efforts underway to develop a pragmatic, sustainable, "future-proof" OBC framework. The session also examines learnings from "early adopting" jurisdictions and explores how these combined efforts may shape the energy management marketplace for the foreseeable future. Finally, the session explores how design and energy management professionals may find emerging opportunities beyond their traditional spheres of influence related to building performance and integrated grid operations.



CALIFORNIA ENERGY COMMISSION

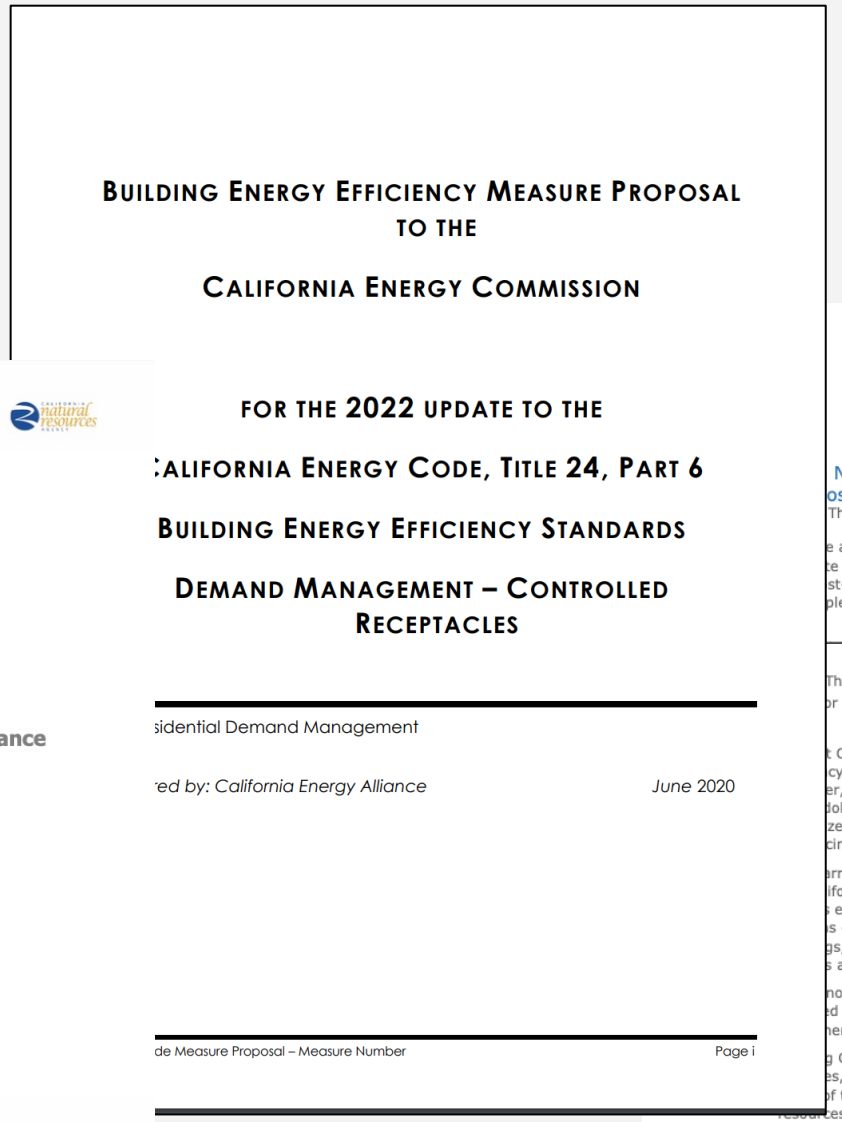
California Energy Commission

STAFF REPORT

Nonresidential Data Repository for the 2022 Energy Code

Alternative to the Data Registry for Acceptance Test Technician Certification Providers

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



BUILDING ENERGY EFFICIENCY MEASURE PROPOSAL TO THE

CALIFORNIA ENERGY COMMISSION

FOR THE 2022 UPDATE TO THE

CALIFORNIA ENERGY CODE, TITLE 24, PART 6

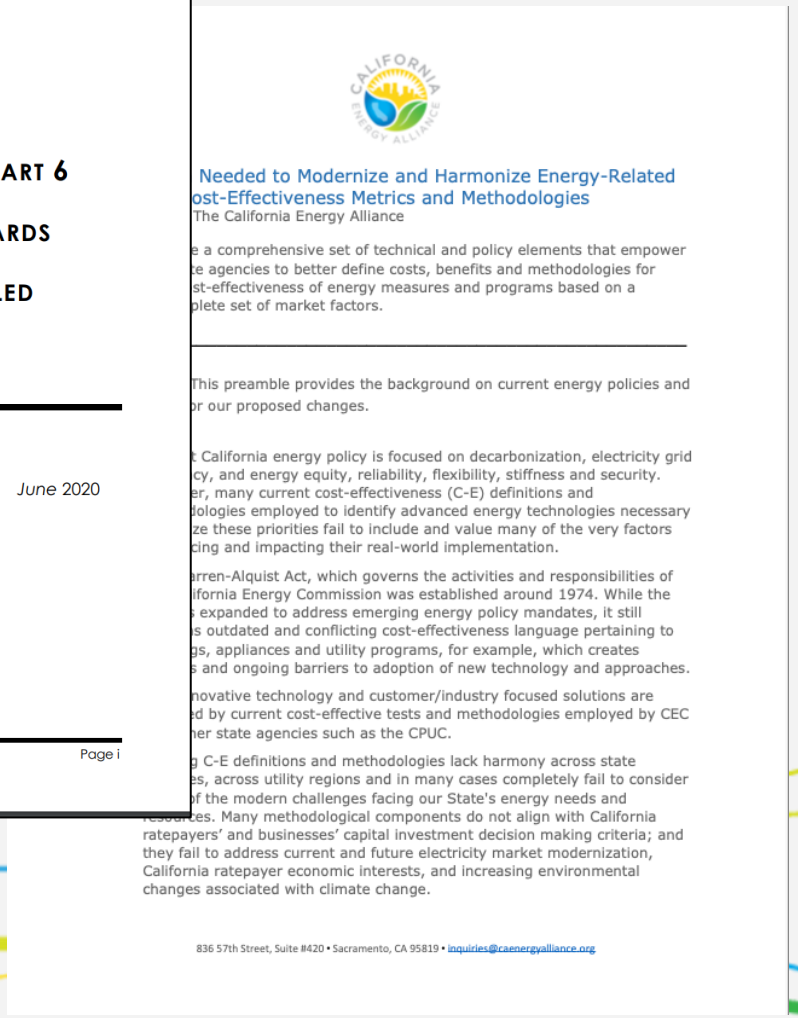
BUILDING ENERGY EFFICIENCY STANDARDS

DEMAND MANAGEMENT – CONTROLLED RECEPTACLES

sidential Demand Management

ed by: California Energy Alliance June 2020

de Measure Proposal – Measure Number Page i



Needed to Modernize and Harmonize Energy-Related ost-Effectiveness Metrics and Methodologies

The California Energy Alliance

e a comprehensive set of technical and policy elements that empower te agencies to better define costs, benefits and methodologies for st-effectiveness of energy measures and programs based on a plete set of market factors.

This preamble provides the background on current energy policies and or our proposed changes.

t California energy policy is focused on decarbonization, electricity grid cy, and energy equity, reliability, flexibility, stiffness and security. er, many current cost-effectiveness (C-E) definitions and dologies employed to identify advanced energy technologies necessary ze these priorities fail to include and value many of the very factors cing and impacting their real-world implementation.

rren-Alquist Act, which governs the activities and responsibilities of lifornia Energy Commission was established around 1974. While the s expanded to address emerging energy policy mandates, it still s outdated and conflicting cost-effectiveness language pertaining to gs, appliances and utility programs, for example, which creates s and ongoing barriers to adoption of new technology and approaches.

novative technology and customer/industry focused solutions are d by current cost-effective tests and methodologies employed by CEC her state agencies such as the CPUC.

g C-E definitions and methodologies lack harmony across state es, across utility regions and in many cases completely fail to consider f the modern challenges facing our State's energy needs and rces. Many methodological components do not align with California ratepayers' and businesses' capital investment decision making criteria; and they fail to address current and future electricity market modernization, California ratepayer economic interests, and increasing environmental changes associated with climate change.

836 57th Street, Suite #420 • Sacramento, CA 95819 • inquiries@caenergyalliance.org

CEA Initiatives

- Codes & Standards Evolution
- Code Compliance Improvement
- Cost-Effectiveness Metrics
- Outcome-Based Approach
- Healthy Existing Buildings
- Education & Outreach

Thank You to our Webinar Sponsor!

Webinar Overview &
Guest Speaker Introduction

"Navigating Mechanical Controls and Sensor Requirements in California's Energy Codes, Standards, and Efficiency Programs"

Michael Shewmaker,
Supervisor – Standards Development Unit
Efficiency Division, Building Standards Branch

David Velazquez
Supervisor – Grant Management Unit
California Schools Healthy Air, Plumbing,
and Efficiency Program (CalSHAPE)

CALIFORNIA ENERGY COMMISSION

California Energy Code (Title 24, Part 6)

Michael Shewmaker, Supervisor – Standards Development Unit
Efficiency Division, Building Standards Branch
California Energy Commission
May 24, 2023

Introduction

Michael “Mikey” Shewmaker

Supervisor, Standards Development Unit

Been with the Energy Commission since 2014, and the 2025 Energy Code will be my 5th code cycle with the CEC

Previously functioned as the lead on the compliance documents (2013/2016), residential compliance software (2019/2022), and residential envelope measures (2019/2022).

CEC Building Standards Branch

1. Energy Code – CA's Building Energy Efficiency Standards for newly constructed buildings, additions and alterations (Title 24, Parts 6 & 11)
2. CBECCs – Public domain computer program, certification process, manuals, sample calculations, field testing, model designs
3. Education & Outreach – Technical assistance program, seminars, monthly newsletter, hotline

Building Standards Branch

Our mission statement:

“On behalf of all Californians, uphold and advance the most impactful building energy efficiency standards in the nation.”

2022 Energy Code
Mechanical Controls & Sensors

Mandatory Requirements for Space Conditioning Equipment

§110.2 – Mandatory Requirements for Space Conditioning Equipment

- 110.2(b) – Controls for heat pumps with supplementary electric resistance heaters.
- 110.2(c) – **Thermostats.** All heating or cooling systems not controlled by a central energy management control system (EMCS) shall have a setback thermostat. [setback thermostat]

Setback Thermostats

Section 110.2(c) – Thermostats

1. **Setback capabilities.** All thermostats shall have a clock mechanism that allows the building occupant to program the temperature setpoints for at least four period within 24 hours. Thermostats for heat pumps shall meet the requirements of Section 110.2(b)

Exception to Section 110.2(c): Gravity gas wall heaters, gravity floor heaters, gravity room heaters, noncentral electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners and room air-conditioner heat pumps.

Mandatory Requirements for Demand Management

§110.12 – Mandatory Requirements for Demand Management

- 110.12(a) – Demand Responsive Controls [OCST]
- 110.12(b) – Demand Responsive Zonal HVAC Controls [EMCS]

Occupant Controlled Smart Thermostats (OCST)

Intended to be compatible with National Electrical Manufacturers Association (NEMA) Standard DC 3-2013 Residential Controls – Electrical Wall Mounted Thermostats and NEMA DC 3 Annex A-2013 Energy-Efficiency Requirements for Programmable Thermostats

An OCST is compliant with Title 24, Part 6, only if it has been certified to the Energy Commission as meeting all of the requirements in this Appendix. Certification to the Energy Commission shall be as specified in Section 110.0.

- CEC certified OCST devices

Energy Management Control System (EMCS)

Energy Management Control System (EMCS) is an automated control system that regulates the energy consumption of a building by controlling the operation of energy consuming systems and is capable of monitoring loads and adjusting operations in order to optimize energy usage and respond to demand response signals.

[NR] Requirements for Ventilation and Indoor Air Quality

§120.1 – Requirements for Ventilation and Indoor Air Quality

- 120.1(c)2 – Natural ventilation
  - 120.1(c)2C – Control and accessibility
- 120.1(d) – Operation and control requirements for minimum quantities of outdoor air
  - 120.1(d)4 – Demand control ventilation devices [CO2 sensors]
  - 120.1(d)5 – Occupant sensor ventilation control devices [occupant sensors]
- 120.1(f) – Design and control requirements for quantities of outdoor air

CO2 Sensors

Section 120.1(d)4 – Demand Control Ventilation Devices

A. Shall be installed in each room that meets the criteria of Section 120.1(d)3 with no less than one sensor per 10,000 square feet of floor space. When a zone or space is served by more than one sensor, a signal from any sensor indicating that CO2 is near or at the setpoint within the zone or space, shall trigger an increase in ventilation.

B. CO2 sensors shall be located in the room between 3 feet and 6 feet above the floor or at the anticipated height of occupant's heads.

C. CO2 sensors shall be certified by the manufacturer to be accurate within plus or minus 75 ppm at a 600 and 1,000 ppm concentration when measured at sea level and 25°C, factory calibrated and certified by the manufacturer to require calibration no more frequently than every 5 years.

D. Sensor readings for each zone shall be displayed continuously and shall be recorded on systems with DDC to the zone level.

Occupant Sensors

Section 120.1(d)5 – Occupant Sensor Control Devices

Occupant sensor ventilation control devices used to reduce the rate of outdoor airflow when occupants are not present shall comply with the following:

A. Occupant sensors shall have suitable coverage and placement to detect occupants in the entire space ventilated. In 20 minutes or less after no occupancy is detected by any sensors covering the room, occupant sensing controls shall indicate room is vacant.

B. When Occupant sensors controlling lighting are also used for ventilation, the ventilation signal shall be independent of daylighting, manual lighting overrides or manual control of lighting.

C. When a single zone damper or a single zone system serves multiple rooms, there shall be an occupant sensor in each room and the zone shall not be considered vacant until all rooms in the zone are vacant.

Occupant Sensors

D. One hour prior to normal scheduled occupancy, the occupant sensor ventilation control shall allow pre-occupancy purge as described in Section 120.1(d)2.

E. When the zone is scheduled to be occupied and occupant sensing controls in all rooms and areas served by the zone indicate the spaces are unoccupied, the zone shall be placed in occupied-standby mode.

F. In 5 minutes or less after entering occupied-standby mode, mechanical ventilation to the zone shall be shut off until the space becomes occupied or until ventilation is needed to provide space heating or conditioning. When mechanical ventilation is shut off to the zone, the ventilation system serving the zone shall reduce the system outside air rate by the amount of outside air required for the zone.

Occupant Sensors

G. Where the system providing space conditioning also provides ventilation the zone, in 5 minutes or less after entering occupied-standby mode, space conditioning zone setpoints shall be reset in accordance with Section 120.2(e)3.

[NR] Requirements for Space Conditioning Systems

§120.2 – Requirements for Space Conditioning Systems

- 120.2(a) – Thermostatic controls for each zone
- 120.2(b) – Criteria for zonal thermostatic controls
- 120.2(c) – Hotel/motel guest room thermostats
- 120.2(d) – Heat pump controls
- 120.2(e) – Shut-off controls and reset controls for space conditioning systems
  - 120.2(e)3 – Occupant sensing zone controls
- 120.2(h) – Automatic demand shed controls
- 120.2(i) – Economizer fault detection and diagnostics [FDD]
- 120.2(j) – Direct digital controls [DDC]

Economizer FDD

Section 120.2(i) – Economizer Fault Detection and Diagnostics

All newly installed air handlers with a mechanical cooling capacity greater than 33,000 Btu/hr and an installed air economizer are to include stand-alone or integrated Fault Detection and Diagnostics (FDD) meeting the criteria of Section 120.2(i)1 through 120.2(i)8.

Relies on manufacturer self-certification to the Energy Commission.

- CEC Fault Detection and Diagnostics System Certification List

Direct digital controls (DDC)

Section 120.2(j) – Direct Digital Controls (DDC)

Direct digital controls to the zone shall be provided as specified by Table 120.2-A.

The provided DDC system shall meet the control logic requirements of Sections 120.1(d), 110.12(a) and 110.12(b), and be capable of the following:

1. Monitoring zone and system demand for fan pressure, pump pressure, heating and cooling;
2. Transferring zone and system demand information from zones to air distribution system controllers and from air distribution system to heating and cooling plant controllers;
3. Automatically detecting the zones and systems that may be excessively driving the reset logic and generate an alarm or other indication to the system operator;

Direct digital controls (DDC)

4. Readily allow operator removal of zone(s) from the reset algorithm;
5. For new buildings, trending and graphically displaying input and output points; and
6. Resetting heating and cooling setpoints in all noncritical zones upon receipt of a signal from a centralized contact or software point as described in Section 110.12(b).

[NR] Mandatory Requirements for Covered Processes

§120.6 – Mandatory Requirements for Covered Processes

- 120.6(c) – Mandatory requirements for enclosed parking garages [CO sensors]

CO Sensors

Section 120.6(c) – Mandatory Requirements for Enclosed Parking Garages

7. CO sensors shall be:
   A. Certified by the manufacturer to be accurate within plus or minus 5 percent of measurement.
   B. Factory calibrated.
   C. Certified by the manufacturer to drift no more than 5 percent per year.
   D. Certified by the manufacturer to require calibration no more frequently than once a year.

CO Sensors

E. Monitored by a control system. The system shall have logic that automatically checks for sensor failure by the following means. Upon detection of a failure, the system shall reset to design ventilation rates and transmit an alarm to the facility operators.
   i. If any sensor has not been calibrated according to the manufacturer's recommendations within the specified calibration period, the sensor has failed.
   ii. During occupied periods, the system compares the readings of all sensors, e.g., if any sensor is more than 15 ppm above or below the average of all sensors for longer than four hours, the sensor has failed.
   iii. During occupied periods, the system compares the readings of sensors in the same proximity zone, e.g., if the 30-minute rolling average for any sensor in a proximity zone is more than 15 ppm above or below the 30-minute rolling average for other sensor(s) in that proximity zone, the sensor has failed.

[NR] Prescriptive Requirements for Space Conditioning Systems

§140.4 – Prescriptive Requirements for Space Conditioning Systems

- 140.4(c)2 – Variable air volume (VAV) systems [static pressure sensor]
- 140.4(d)2A – Space conditioning zone controls – variable air volume (VAV) systems [DDC]
- 140.4(f) – Supply air temperature reset controls
- 140.4(k) – Hydronic system measures
  - 140.4(k)4 – Chilled and hot water temperature reset controls
  - 140.4(k)5 – Water-cooled air conditioned and hydronic heat pump systems
  - 140.4(k)6 – Variable flow controls [static pressure sensor]
  - 140.4(k)7 – Hydronic heat pump (WLHP) controls

Static Pressure Sensors

Section 140.4(c)2 – Variable air volume (VAV) systems

A. Static pressure sensor location. Static pressure sensors used to control variable air volume fans shall be place in a position such that the controller setpoint is no greater than one-third the total design fan static pressure, except for system with zone reset control complying with Section 140.4(c)2B. If this results in the sensor being located downstream of any major duct split, multiple sensors shall be installed in each major branch with fan capacity controlled to satisfy the sensor furthest below its setpoint; and

B. Setpoint reset. For systems with direct digital control of individual zone boxes reporting to the central control panel, static pressure setpoints shall be reset based on the zone requiring the most pressure; i.e., the setpoint is reset lower until one zone damper is nearly wide open.

Static Pressure Sensors

Section 140.4(k)6 – Variable Flow Controls

B. Pressure sensor location and setpoint.

   i. For systems without direct digital control of individual coils reporting to the central control panel, differential pressure shall be measured at the most remote heat exchanger or the heat exchanger requiring the greatest differential pressure.

   ii. For systems with direct digital control of individual coils with a central control panel, the static pressure setpoint shall be reset based on the valve requiring the most pressure, and the setpoint shall be no less than 80 percent open. Pressure sensors may be mounted anywhere.

[SF] Mandatory Features and Devices

§150.0 – Mandatory Features and Devices

- 150.0(i) – Thermostats
- 150.0(o)1Biv – Central fan integrated (CFI) ventilation systems – Variable Ventilation
- 150.0(o)1Giiia – Local mechanical exhaust – Demand-controlled mechanical exhaust – control and operation
- 150.0(o)1Giva – Continuous mechanical exhaust – control and operation

Fault Indicator Display (FID) – Indoor Air Quality

Alternative Calculation Method (ACM) Reference Manuals

The nonresidential and residential ACM Reference Manuals provide compliance credit for indoor air quality FID systems which meet the requirements listed in the Residential ACM Reference Manual.

Relies on manufacturer self-certification to the Energy Commission.

- CEC Residential Fault Indicator Display Certification List

Residential ACM Reference Manual – IAQ FID System Requirements

[SF] Prescriptive Compliance

§150.1 – Performance and Prescriptive Compliance Approaches for Single-Family Residential Buildings

- 150.1(c)7AicII – Refrigerant charge [FID]

§150.2 – Energy Efficiency Standards for Additions and Alterations to Existing Single-Family Residential Buildings

- 150.2(b)1Fi – Thermostats [setback thermostat]
- 150.2(b)1Fiib – Refrigerant charge [FID]

Fault Indicator Display (FID) – Refrigerant Charge Verification

Reference Appendices, Joint Appendix, JA6.1 – Fault Indicator Display (FID)

- The Energy Code, Section 150.1(c)7A and 150.2(b)1E provide exceptions to refrigerant charge verification based on use of a fault indicator display (FID) that meets requirements specific in Joint Appendix JA6.1.

Relies on manufacturer self-certification to the Energy Commission.

- CEC Residential Fault Indicator Display Certification List

[MF] Mandatory Requirements for Ventilation and Indoor Air Quality

This section is copied from NR – 120.1

§160.2 – Mandatory Requirements for Ventilation and Indoor Air Quality

- 160.2(c)2 – Natural ventilation
  - 160.2(c)2C – Control and accessibility
- 160.2(c)5 – Operation and control requirements for minimum quantities of outdoor air
  - 160.2(c)5D – Demand control ventilation devices (CO_2 sensors)
  - 160.2(c)5E – Occupant sensing ventilation control devices
- 160.2(c)7 – Design and control requirements for quantities of outdoor air

[MF] Mandatory Requirements for Space Conditioning Systems

This section is copied from NR – 120.2

§160.3 – Mandatory Requirements for Space Conditioning Systems

- **160.3(a)1 – Dwelling unit thermostats**
- **160.3(a)2 – Common use area controls**
- 160.3(a)A – Thermostatic controls for each zone
- 160.3(a)B – Criteria for zonal thermostatic controls
- 160.3(a)C – Heat pump controls
- 160.3(a)D – Shut-off controls and reset controls for space conditioning systems
  - 160.3(a)Diii – Occupant sensing zone controls (CO_2 sensors)
- 160.3(a)G – Automatic demand she controls
- 160.3(a)H – Economizer fault detection and diagnostics (FDD)
- 160.3(a)I – Direct digital controls (DDC)

[MF] Prescriptive Approach

This section is copied from NR – 140.4

§170.2 – Prescriptive Approach

- 170.2(c)3BiaIIIB – Refrigerant charge [FID]
- 170.2(c)3Bii – Variable air volume (VAV) systems [static pressure sensors]
- 170.2(c)4B – Space conditioning zone controls [DDC]
- 170.2(c)4D – Supply air temperature reset controls
- 170.2(c)4I – Hydronic system measures
  - 170.2(c)4Iiv – Chilled and hot water temperature reset controls
  - 170.2(c)Iv – Water-cooled air conditioned and hydronic heat pump systems
  - 170.2(c)4Ivi – Variable flow controls [pressure sensors]
  - 170.2(c)4Ivii – Hydronic heat pump (WLHP) controls

[MF] Alterations

§180.2 - Alterations

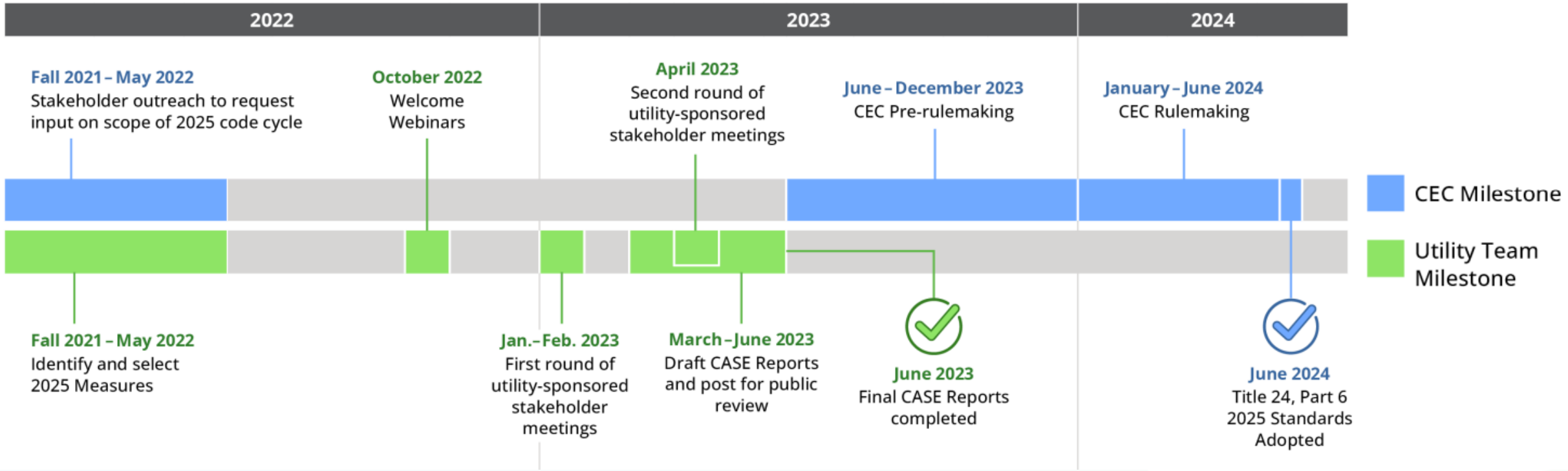
- 180.2(b)2Aiva – Thermostats [setback thermostat]
- 180.2(b)2AivbIIB – Refrigerant charge [FID]

2025 Energy Code

2025 Energy Code Potential Themes

- Heat pump baselines and refrigerants
  - Goal of 6 million heat pumps by 2030
- Solar PV generations, energy storage, and demand/load flexibility
- Additions, alterations, and ADUs
- Covered process loads and embodied carbon
- Electric vehicle (EV) readiness and EV credits
- Energy code accounting
  - Prototypes, weather data, metrics, and utility rates
- Focus on compliance strategies and tools
- Affordable housing program integration
- Interagency coordination

2025 Timeline



Estimated 2025 Schedule

Milestone	Tentative Dates
Measure identification and selection	June 2021 – May 2022
CEC Updates Weather Files and Develops 2025 TDV	November 2021 – October 2022
Research version of CBECC with 2025 TDV and weather files available	October 2022
Welcome Webinars	October 2022
First Round of Utility-Sponsored Stakeholder Meetings	January – February 2023
Utilities Submit Draft CASE Reports to CEC and Post for Public Review	March – April 2023
Second Round of Utility-Sponsored Stakeholder Meetings	April 2023
CEC Pre-rulemaking Workshops	June 2023 – December 2023
Utilities Submit Final CASE Reports to CEC and Post for Public Review	No Later than July 31, 2023
Express Term Review	October 2023
45-Day Express Terms Review	January – February 2024
15-Day Express Term Review	Beginning of April 2024
2025 Title 24, Part 6 Adopted	End of June 2024
2025 Title 24, Part 11 (CALGreen) Adopted	July 2024
2025 Compliance Manuals and ACM Reference Manuals Approved	November 2024
CASE Study Results Reports and CCSRs Complete	December 31, 2024
2025 Compliance Software Available to Public	January 1, 2025
2025 Standards Effective	January 1, 2026

How you can participate

You can follow along with the CASE team's work on their website:

Title24Stakeholders.com

The CASE team is currently accepting comments on their Draft CASE Reports, and those comments can be sent to:

info@title24stakeholders.com

Sign up to receive updates and information on news, programs, and events from the CEC: https://www.energy.ca.gov/subscriptions

- Topic: Building Energy Efficiency Standards

Contact Information

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Subject Matter Experts

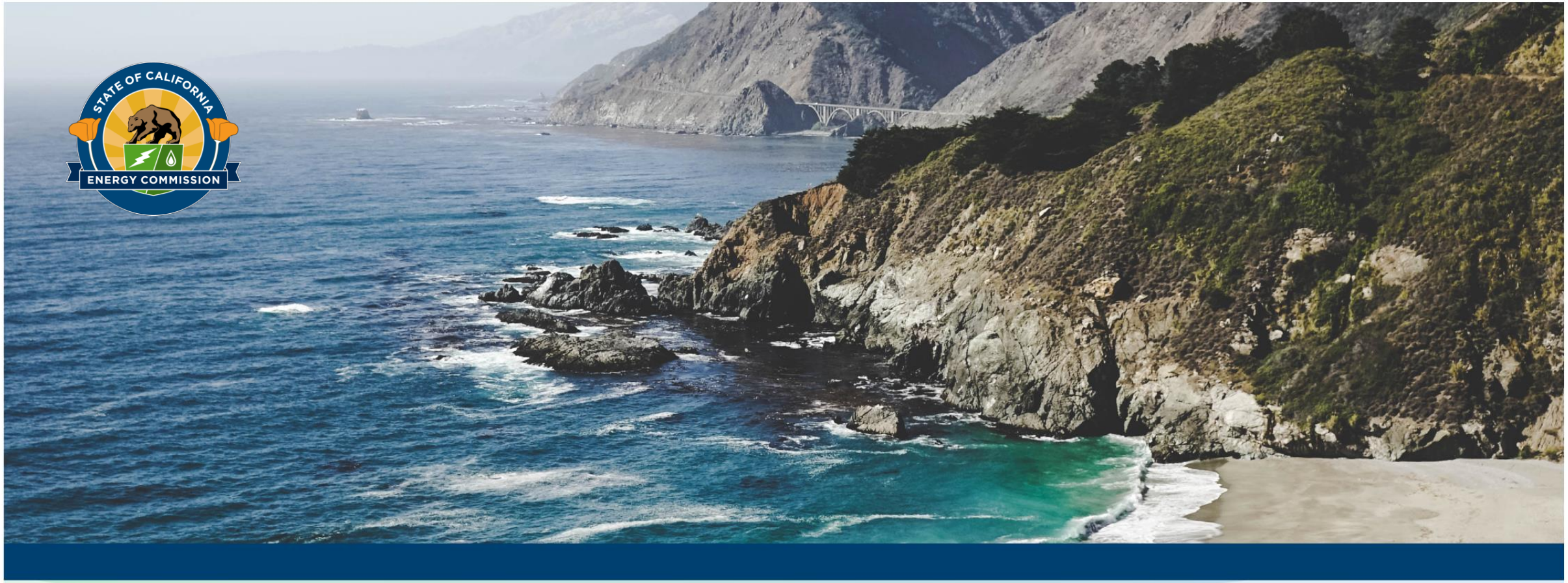
Building Standards Branch

- Anushka Raut – indoor air quality
- Danny Tam – water heating
- Danuta Drozdowicz – Part 11, local ordinances
- Ronald Balneg – NR space heating/space cooling, ventilation
- Simon Lee – lighting, EV chargers
- Thao Chao – controlled environment horticulture

Senior Engineers

- Bach Tsan – space heating/space cooling, refrigeration
- Haile Bucaneg – covered processes, demand response, alternative calculation method (ACM)
- Muhammad Saeed – PV, battery
- Payam Bozorgchami – technical lead, envelope, existing buildings

Thank you



California Energy Commission

California Schools Healthy Air, Plumbing and Efficiency Program (CalSHAPE)

May 24, 2023

Benefits to California

Energy Efficiency
Air Quality

Creates Jobs

Helps underserved communities

Sources: California Energy Commission, Alco Building Solutions

Overview: Ventilation Program

Initial phase: Assessment and Maintenance Grants

- Assessment
- Maintenance
- Adjustments of ventilation rates
- Filter replacements
- Carbon dioxide monitor installation
- Assessment Report

Next Phase: Upgrade and Repair Grants

Program Budget

Estimated Overall Program Budget

$750 M

2021 - 2026

Eligible Applicants

Eligible Applicants limited to California LEAs include:

- A school district as defined in Section 41302.5 of the Education Code
- A charter school that has been granted a charter pursuant to Part 26.8 (commencing with Section 47600) of Division 4 of Title 2 of the Education Code
- A regional occupational center established pursuant to Section 52301 of the Education Code that is operated by a joint powers authority and that has an active career technical education advisory committee pursuant to Section 8070 of the Education Code

Funding Round 4

- From December 20, 2022 until May 31, 2023, all sites in a utility funding category are eligible to be included in an application.
- Round 5 to include HVAC Upgrade and Repair grants

Program Overview

Progress Report	
Funds Available	$727.7 M
Funds Requested	$496 M

Funding Round Four Update			
	Plumbing	Ventilation	Total
Funds Available	$108 M	$160 M	$268 M
Funds Requested	$4 M	$37 M	$41 M

NOPAs and Grants Update	
NOPAs Issued	824/ $487 M
Grants Awarded	580/$311 M

CalSHAPE Ventilation

Pathways:

Pathway One:

- Heating Ventilation and Air Conditioning (HVAC) Assessment and Maintenance (A&M)

Pathway Two:

- Scheduled for Replacement

Pathway Three:

- Limited or No Mechanical Ventilation

Pathway One: HVAC A&M

Requirement:

- HVAC Assessment and Maintenance
- HVAC Assessment Report
- HVAC Verification Report
- Installation of CO_2 monitors in each classroom
- Installation of filters

Award:

- Based on number of HVAC system units at the site.
  - $10,000 + ($1,000 x # of units)
- Includes 20% of the request amount as a contingency fund for repairs, upgrades, or replacements.
- $600 per CO2 monitor unit
- $75 per filter unit

Pathway Two: Scheduled for Replacement

Requirement:

- HVAC Assessment Report
- HVAC Verification Report
- Installation of CO_2 monitors in each classroom

Optional

- Filter replacement

Max Award:

- $2,000 for Assessment Report
- $600 per CO_2 monitor unit
- $75 per filter unit

*20% contingency fund is not provided

Pathway Three: Limited or No Mechanical Ventilation

Requirement:

- Assessment
- HVAC Assessment Report
- HVAC Verification Report
- Installation of CO_2 monitors in each classroom

*Filters are not eligible

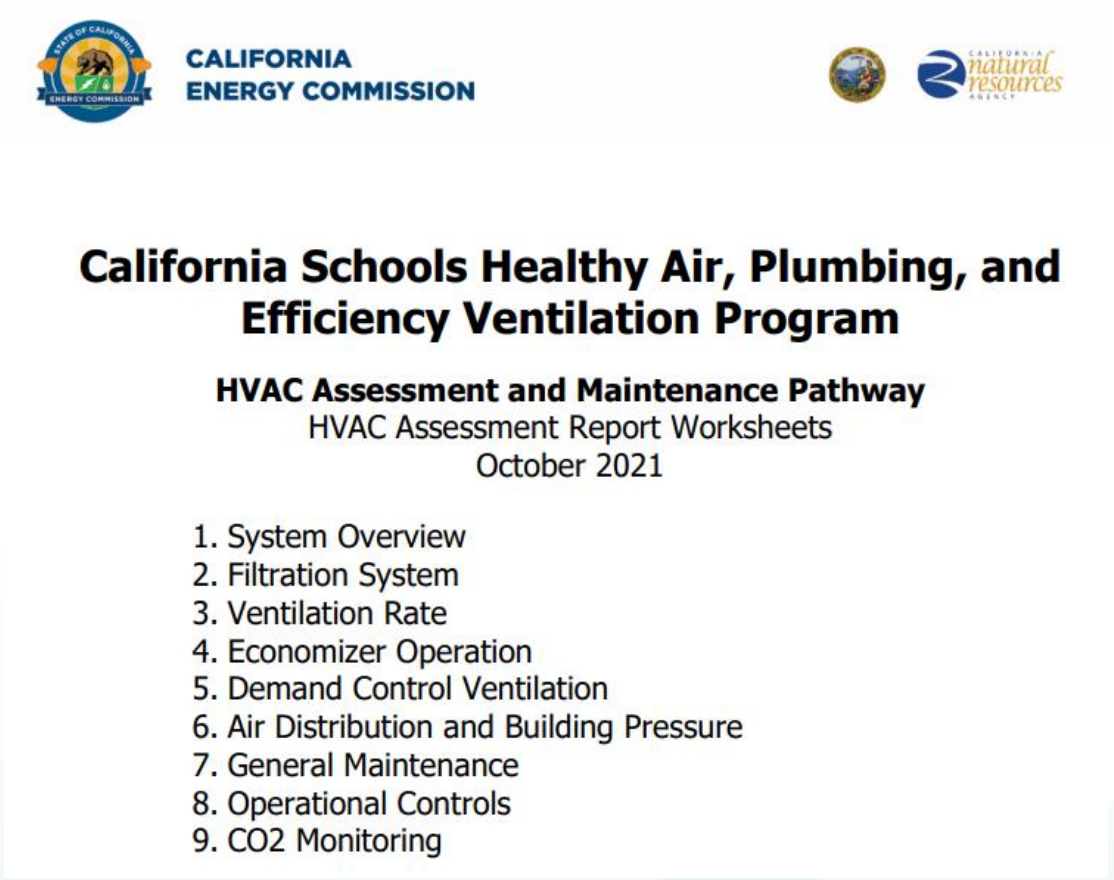
Max Award:

- $4000 for an Assessment and Assessment Report
- $600 per CO_2 monitor unit

*20% contingency fund is not provided

Assessment Reports

- Must be prepared by qualified personnel
- **HVAC Assessment Pathway:** Report must be reviewed by a licensed professional
- **Scheduled for Replacement Pathway:** Report is minimal, and no assessment is required
  - Report is not required to be reviewed by a licensed professional


CALIFORNIA ENERGY COMMISSION

California Schools Healthy Air, Plumbing, and Efficiency Ventilation Program

HVAC Assessment and Maintenance Pathway
HVAC Assessment Report Worksheets
October 2021

1. System Overview
2. Filtration System
3. Ventilation Rate
4. Economizer Operation
5. Demand Control Ventilation
6. Air Distribution and Building Pressure
7. General Maintenance
8. Operational Controls
9. CO2 Monitoring

Assessment Reports Cont'd

- **Required info includes:**
  - General unit condition
  - Ventilation rates
  - Verified exhaust rates
  - Economizer and DCV operation
  - Pressure profile
  - Verification of CO2 monitor and filter installation
  - System deficiencies & recommendations

LEAs submit assessment reports via CalSHAPE Online System

Qualified Personnel vs Licensed Professional

- **Qualified personnel:**
  - Qualified testing personnel: an HVAC acceptance test technician or a certified TAB technician
  - Qualified adjusting personnel: either a certified TAB technician, or a skilled and trained workforce supervised by a TAB technician
  - Responsible for preparing and completing HVAC Assessment Report
- **Licensed professional:** An engineer or professional that is eligible to perform HVAC system design, construction or installation of components for mechanical systems
  - Responsible for reviewing completed HVAC Assessment Reports and identifying possible adjustments, repairs, upgrades or replacements

HVAC Upgrade and Repair Grants

- **Who qualifies:**
  - LEAs that have completed either
    - HVAC Assessment and Maintenance Pathway project
    - Limited or No Mechanical Ventilation project

- **Eligibility limited to sites located in an underserved community during the first funding round**

- Funding source: Remaining utility funds plus $20 M from Greenhouse Gas Reduction Fund (GGRF)
  - HVAC System Replacement
  - Near-zero emission building technology

HVAC Upgrade and Repair Grants

- **Project Scope:**
  - Site deficiencies must be noted in HVAC Assessment Report
  - 2 year project term- June 2026 final deadline
  - GGRF requirements: no grant funding provided for purchase or installation of gas equipment

Award limits and application requirements outlined in 3rd Edition of Ventilation Guidelines

HVAC Upgrade and Repair Grants Schedule

Next Steps	Date
Draft Guidelines Posted	March 2023
CEC Business Meeting to adopt Guidelines	May 31, 2023
Upgrade and Repair Grant Funding Round Start	September 2023
Upgrade and Repair Grant Funding Round End	January 2024
Utility Funds Returned	December 2026

CalSHAPE Ventilation Application Materials

- CalSHAPE Program Webpage

California Schools Healthy Air, Plumbing, and Efficiency Program (CalSHAPE) | California Energy Commission

- Application Instructions

CalSHAPE Ventilation Program Application Video Tutorial | California Energy Commission

- Companion Document

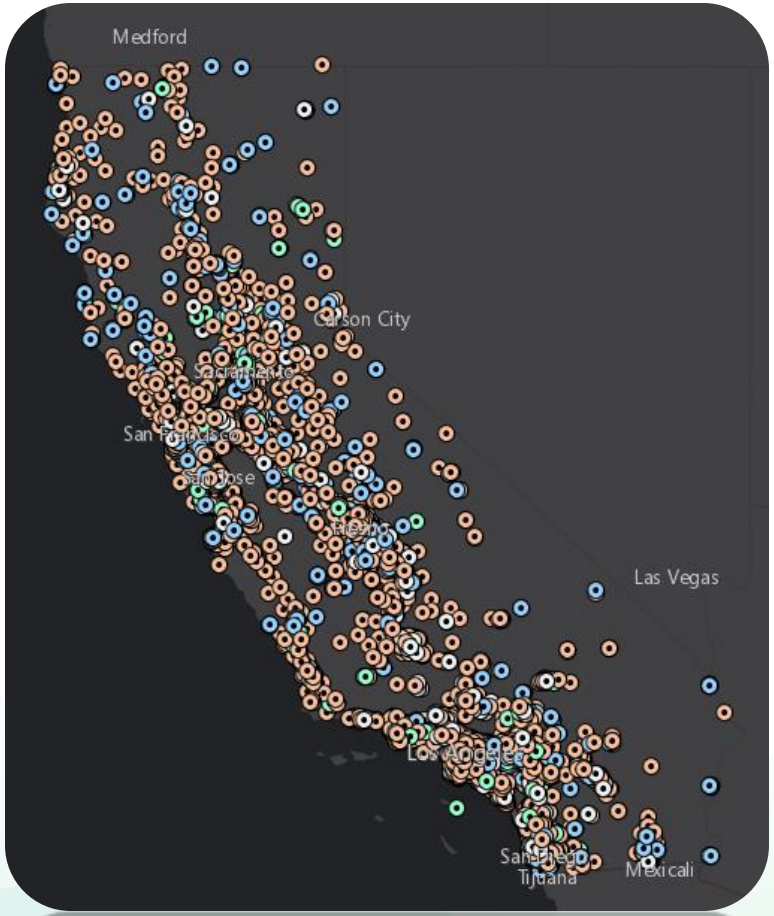
CalSHAPE Ventilation Program Application Instructions Companion Document | California Energy Commission

- Assessment Report Worksheet

HVAC Assessment and Maintenance Pathway HVAC Assessment Report Worksheets | California Energy Commission

Interested in learning more?

- Review CalSHAPE program webpage
- Check webmap for eligibility
- Subscribe to list serve
- Round 4 is now open until 5/31/2023



Thank you!

The CalSHAPE webpage provides program information, application help, and a form to submit docket comments!

Scan the QR code to get started.

Contact: CalSHAPE@energy.ca.gov

Discussion

All

California Energy Alliance

Thank You For Attending!

*Meeting materials are available to CEA Members via the member portal at caenergyalliance.org