TITLE 24, PART 6 | 2028 CODE CYCLE

Healthcare

Codes and Standards Enhancement (CASE) Proposal

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March 17, 2026

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Agenda

- Proposal Description
- Per Unit Energy and Cost Methodology
- Compliance and Enforcement
- Discussion and Next Steps

Background Information—Codes and Standards

California Department of Health Care Access and Information (HCAI)

- HCAI and the Hospital Building Safety Board develop codes and standards for healthcare facilities and enforce them through Office of Statewide Hospital Planning and Development (OSHPD)
- HCAI regulations are adopted into the California Buildings Standards Code as per the Code Application Notice §129851

Title 24, Part 6

- The Statewide CASE Team has been working with HCAI and Healthcare SMEs to identify changes to Title 24 Part 6 that would bring significant energy savings in healthcare buildings

National Model Codes

- IECC & Standard 90.1 already require many of the requirements for healthcare facilities included in this CASE Proposal

AHJs

- Non-licensed healthcare facilities, some healthcare-specific areas, outpatient facilities are under the control of AHJs

Goal: increased alignment between HCAI, Title 24 Part 6, and ASHRAE 90.1/IECC

Background Information—Building Types

OSHPD Classification	Facility Type	Occupancy Classification	Enforcing Agency
OSHPD 1	**Hospitals: general acute care hospitals**	**Institutional Group I-2**	**HCAI and LBD**
OSHPD 2	**Skilled Nursing Facilities: intermediate care facilities**	**Institutional Group I-2**	**HCAI**
OSHDP 3	Licensed Clinics: out-patient clinical services, primary-care clinics, and specialty clinics	Business Group B	HCAI and LBD
OSHPD 4	Correctional Treatment Centers	Institutional Group I-3	HCAI and LBD
OSHPD 5	Psychiatric Hospitals: Acute Psychiatric Hospital	Institutional Group I-2	HCAI
OSHPD 6	Chemical Dependency Recovery Hospital: not with an acute care hospital building or psychiatric facility	Institutional Group I-2	HCAI and LBD

Note: Jurisdictional limits should not be thought of as a physical or spatial boundary, but as specifically related to the codes and regulations being enforced, as charged to the respective authorities. The extent of OSHPD's jurisdiction is not simply everything inside the exterior skin (or 5 feet beyond) of those buildings or structures with everything outside the building remaining under the jurisdiction of the local enforcing agencies. Some local jurisdiction is retained inside these buildings, and OSHPD does have some jurisdiction over certain elements of the site or campus outside the building.

Proposed Code Change Update

New Construction

- Modify or remove exceptions for healthcare buildings for new construction requirements in sections 120.2(e), 140.4(d), and 140.4(m).
  - **120.2(e) Shut-off and reset controls for space-conditioning systems.** New healthcare requirement to reset to the minimum occupied or unoccupied turndown air flow allowance
  - **140.4(d) Space-conditioning zone controls.** New healthcare specific provision to limit volume of air to zone or mixed zone to not exceed minimum allowable levels – limiting simultaneous heating and cooling or VAV to reduce cooled air before reheating
  - **140.4 (m) Fan control.** At least two stage fan control for DX > 65 kBtu/h, variable speed fans for VAV systems

See Title24stakeholders.com for proposal description, justification, draft code language, and requested data https://title24stakeholders.com/wp-content/uploads/2025/08/2028_T24_Measure_Summary_Healthcare48.pdf

120.2(e) Shut-off and reset controls for space-conditioning systems

Healthcare facilities will still be exempted from 120.2(e)1,2,3, which requires automatic shut-off control, requiring controls to automatically reset to heating and cooling setbacks and occupant sensing zone controls. This exception is retained:

1. 120.2(e)1,2 - Healthcare facilities cannot shut off the system per CMC
2. 120.2(e)3 – Occupancy sensing control only applies to spaces governed by 120.1- ventilation. Healthcare is governed by CMC Chapter 4, so this is also not applicable.

New Healthcare Specific Requirement – 120.2(e)5

- Require airflow at system level to turn down to minimum occupied and unoccupied airflow per CMC
- 5. In healthcare facilities, systems serving spaces that are allowed to turn down air flow per Table 4-A of the California Mechanical Code, the system shall reset to the minimum occupied or unoccupied turn down air flow as allowed based on room occupancy.
- Exception to Sections 120.2(e) 5: Where a zone or system serves multiple spaces, airflow shall not be reduced below the most restrictive applicable minimum required for any space served.

140.4(d) Space-conditioning zone controls

Healthcare facilities will still be exempted from 140.4(d)1, 2, which requires controls that prevent or limit reheat, recool, and simultaneous heating/cooling. This exception is retained:

1. It's not feasible for healthcare facilities to completely prevent reheat, given the high ventilation requirements
2. The measures are primarily geared towards non-clinical spaces, creating implementation challenges for healthcare facilities.

As such, the Statewide CASE Team is proposing a new section, Section 3, which will require the following for occupied and unoccupied zones or mixed zones served by VAV systems:

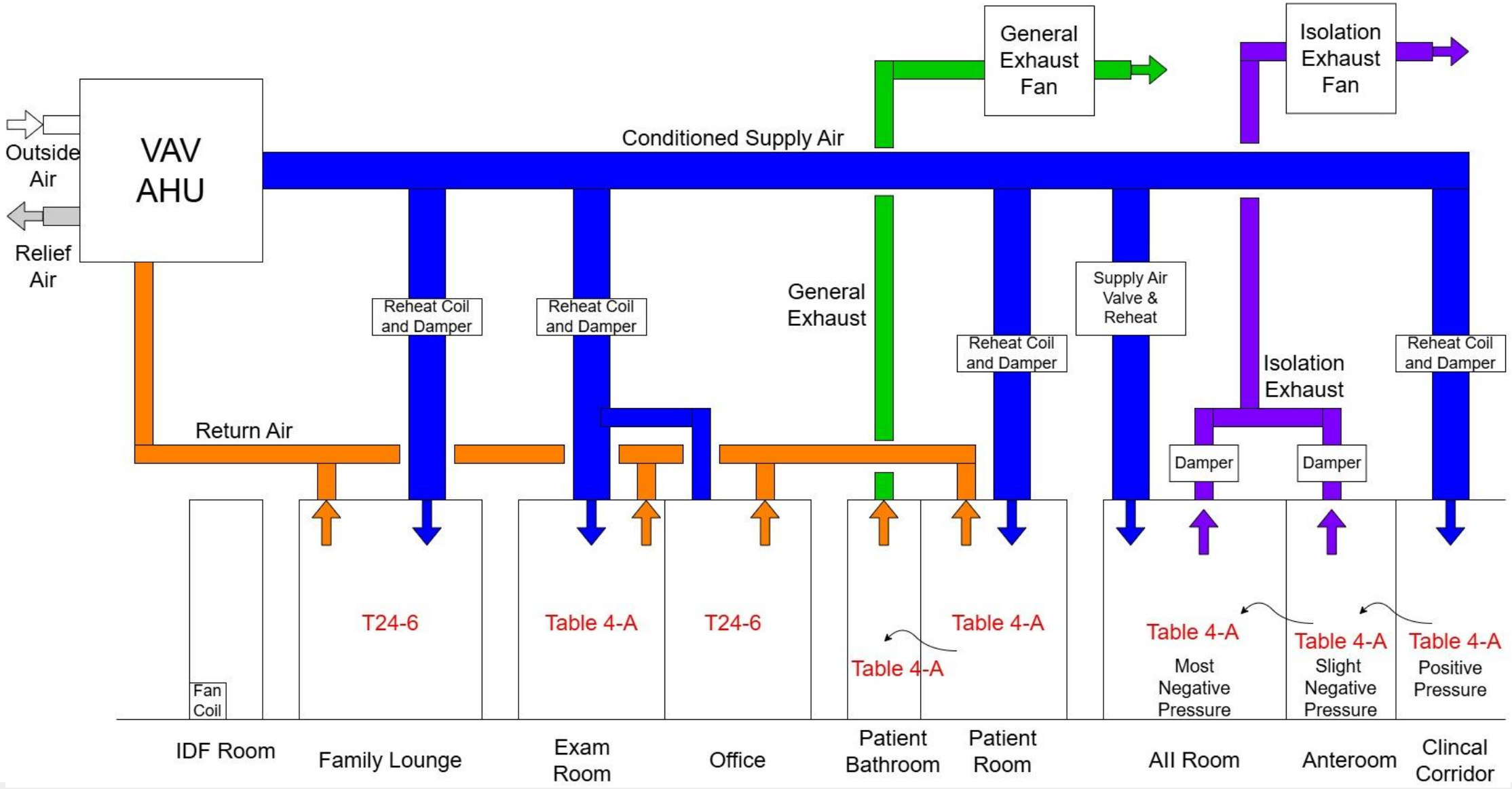
- The volume of air to the zone or mixed zone shall not exceed minimum ventilation rates defined by Table 4-A of the CMC or the referenced design standard applicable to the space for occupied and unoccupied zones, while accounting for ventilation, temperature, humidity and pressure requirements.

140.4(d)3 – New section for Healthcare Facilities

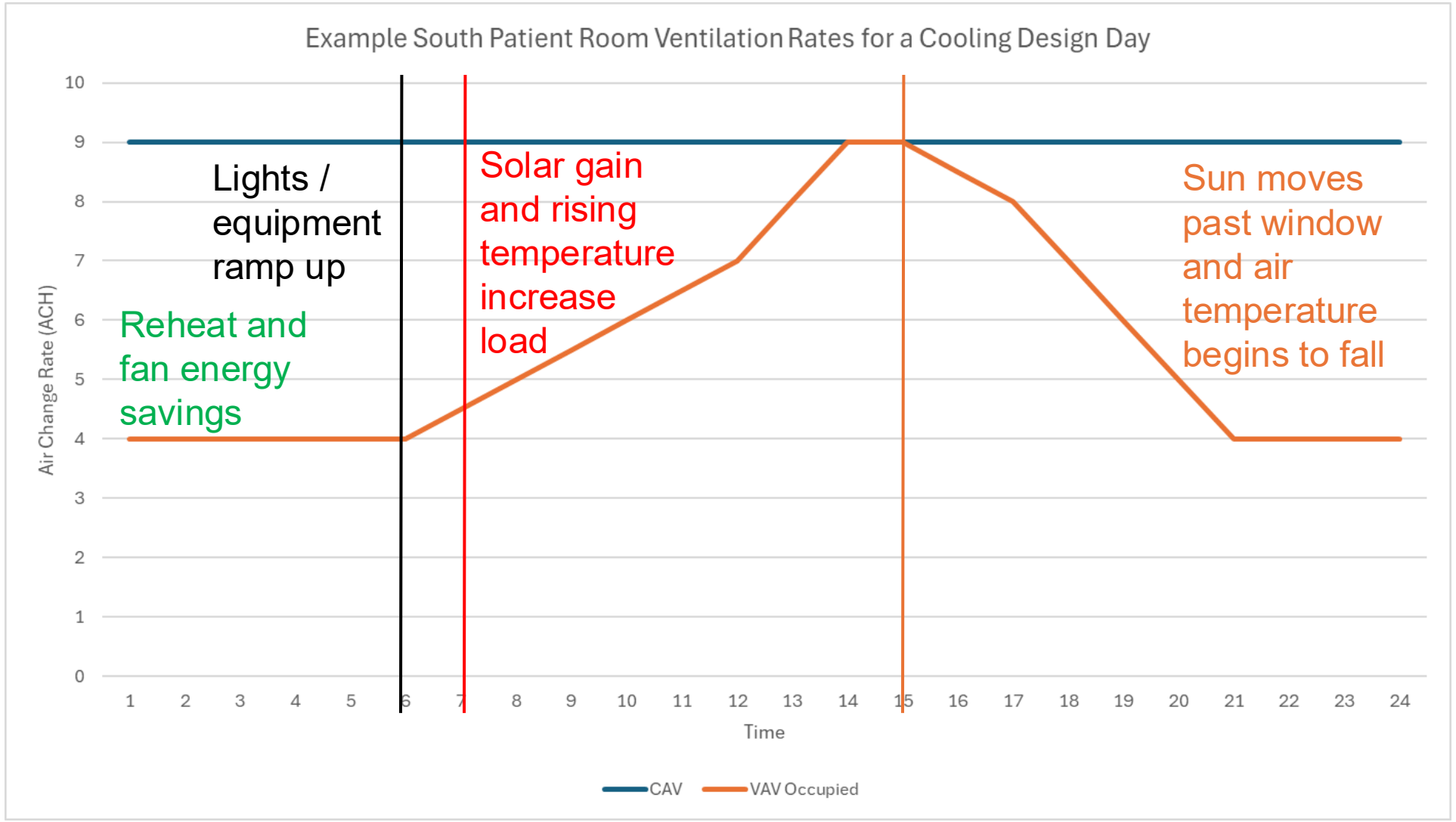
Zones or Mixed Requirement Zones served by variable air-volume systems that include a space(s) designed to California Mechanical Code Table 4-A shall be designed to meet the following requirements:

- For each occupied zone or mixed requirement zone:
  - the volume of primary air supplied to the space designed per CMC Table 4-A shall not exceed the minimum ventilation rates defined in CMC Table 4-A for the occupied condition unless required to meet temperature or humidity setpoints or pressure differential requirements.
  - the volume of primary air supplied to the space not designed per CMC Table 4-A shall comply with the referenced design standard in such that it does not prevent the space designed per CMC Table 4-A from meeting ventilation, temperature, humidity, and pressure requirements.
- For each unoccupied zone or mixed requirement zone:
  - the volume of primary air supplied to the space designed per CMC Table 4-A shall not exceed the minimum ventilation rates defined in CMC Table 4-A for the unoccupied condition unless required to meet temperature or humidity setpoints or pressure differential requirements.
  - the volume of primary air supplied to the space not designed per CMC Table 4-A shall comply with the referenced design standard in such that it does not prevent the space designed per CMC Table 4-A from meeting ventilation, temperature, humidity, and pressure requirements.

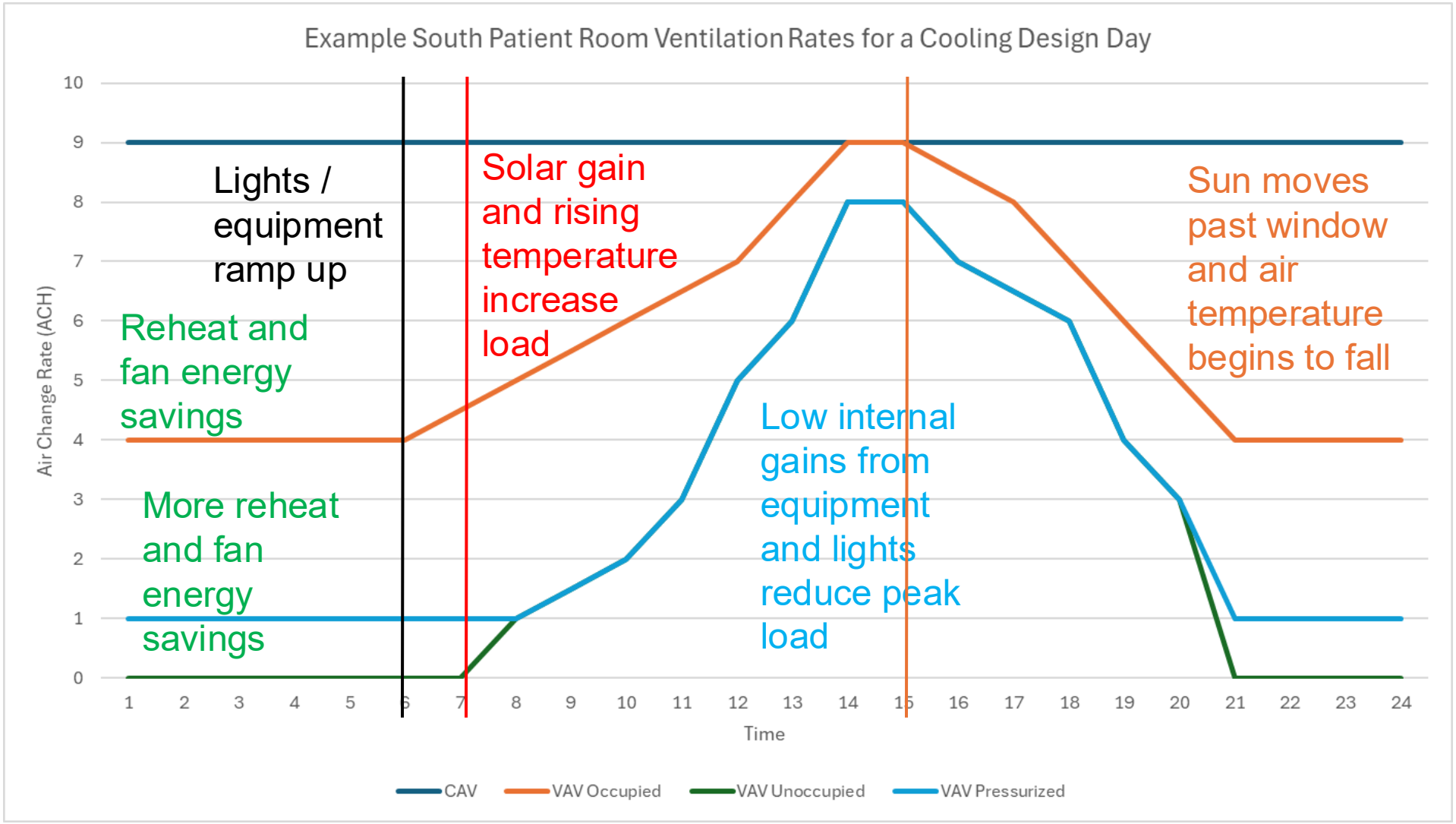
Sample Healthcare HVAC Air Flow Diagram



Example of Supply Air Flows Versus Control Methods



Example of Supply Air Flows Versus Control Methods, cont



Alignment with California Mechanical Code

Per the California Mechanical Code (CMC) and ASHRAE 170, healthcare facilities must meet specific air exchange rates and pressure relationships.

- 120.2(e) and 140.4(d) impact HVAC control at the system or zone level
- Table 4-A also provides space types in which unoccupied turndown is allowed
- All other spaces not identified in Table 4-A, need to meet Title 24 Part 6 requirements
- Align requirements to Table 4-A CMC (Highlighted Columns) in the next slide
- The slide only shows a sample of space types.

Alignment with California Mechanical Code, cont

Table 4-A PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SNFs, ICFs, OUTPATIENT FACILITIES, LICENSED CLINICS, CORRECTIONAL TREATMENT CENTERS, AND ACUTE PSYCHIATRIC HOSPITALS [OSHPD 1,2,3,4 & 5]								
Function of Space (ee)	Pressure Relationship (d)(h)	Minimum Outdoor ACH	Minimum Total ACH	Exhausted Directly to Outdoors (j)	Recirculated Room Units (a)	Unoccupied Turndown	Design Relative Humidity (k), %	Design Temperature (l), °F / °C
All anteroom (1224.14.3.3) (u)	(e)	NR	10	Yes	No	No	NR	NR
All room (1224.14.3) (u)	Negative	2	12	Yes	No	No	Max 60	70–75 / 21–24
All treatment/exam room (1224.4.4.1.3)	Negative	2	12	Yes	No	No	Max 60	70–75 / 21–24
Cesarean Delivery room (1224.32.3.1.1) (m), (o)	Positive	4	20	NR	No	Yes	20–60	68–75 / 20–24
Delivery room (1224.32.3.2) (m), (o)	Positive	4	20	NR	No	Yes	20–60	68–75 / 20–24

Air-Flow Turndown Allowance

- 407.7 in the CMC permits spaces that allow unoccupied turndown to reduce overall air exchange rates by 25% of values in Table 4-A
- Roughly 70% of spaces outlined in Table 4-A are allowed to turn down to minimum levels during unoccupied times.
- This presents a significant energy savings opportunity at the system and zone levels while still preserving minimum air exchange rates and patient health.

407.7 Unoccupied Turndown

407.7.1

*Where indicated with a **"Yes"** in the **Unoccupied Turndown** column of **Table 4-A**, the number of air changes shall be permitted to be reduced. The following conditions shall be met:*

*(1) The number of air changes may be reduced to **25 percent of the indicated value in Table 4-A** for pressurized spaces when the room is unoccupied.*

*(2) The number of air changes per hour indicated shall be **reestablished whenever the space is occupied**.*

*(3) The **pressure relationship with surrounding rooms is maintained** when the air changes per hour are reduced.*

*(4) **All operating rooms, class 3 imaging rooms, and cesarean delivery rooms** shall maintain a **minimum of six air changes per hour of total air** when not in use.*

Poll

New Construction: What percent of hospitals set back system and zone air flow to minimum allowable levels per the CMC?

a. 0-25%
b. 25%-50%
c. 50%-75%
d. 75%-100%

Poll

New Construction: Table 4-A allows total air turndown for many spaces, but there is no mention of outdoor air turndown. Do you incorporate or recommend OA turndown for these spaces in your building design?

a. Yes
b. No
c. Yes, for some spaces in some projects
d. Recommended in the design but was never implemented
e. It is not recommended

Proposed Code Change Update - Alterations

1. **The following blanket exception will be removed.**

   Existing Buildings – Alterations Exception to Section 141.0: Alterations to healthcare facilities are not required to comply with this Section.

2. Healthcare facilities are required to meet the subsections identified in the table below.

3. The Exceptions will be added to all other individual subsections that are not listed in this table

Section	Requirement	Description
141.0(b)1.A - Roof and Ceiling Insulation	Mandatory	Minimum levels for roof insulation
141.0(b)1.D - Fan Energy Index (FEI)	Mandatory	Achieving a FEI of 1.0 for constant air volume systems and 0.95 for variable air volume systems
141.0(b)1.E- Exterior Windows	Mandatory	Requires replacement windows do not exceed a maximum U-factor of 0.58
141.0(b)2.B- Altered Roof	Prescriptive	Solar reflectance and minimum insulation requirements during roof replacement
141.0(b)2F – New Lighting System	Prescriptive	Spaces with lighting systems installed for the first time shall meet the requirements of Sections 110.9, 130.0, 130.1, 130.2, 130.4, 140.3(c), 140.6 and 140.7.
141.0(b)2I - Altered indoor lighting systems	Prescriptive	Replacement lighting must meet certain lighting power density requirements

Impact of Alterations

- Healthcare facilities are uniquely impacted by alteration requirements given the rate at which facilities are altered and expanded.
- The Statewide CASE Team considered this when modifying the blanket healthcare exception, limiting new requirements to select measures with little healthcare specific challenges to implement.
- The goal is to phase in alteration requirements for healthcare facilities, starting with the seven measures previously highlighted and expanding to other measures during subsequent code cycles.
- Even with a phased in approach, new requirements will impact hospitals and skilled nursing facilities differently, with under-resourced faculties being most impacted.

Poll

Alterations: Should the Statewide CASE Team establish additional thresholds at the building-system level to determine when healthcare alterations must comply with the code? If yes, which measures (e.g., roof insulation)?

Marked-up Code Language

See Title24stakeholders.com for marked-up code language

The following sections would be modified

Title 24, Part 1	Title 24, Part 6	Reference Appendices
▪ No changes	▪ 120.2(e) – Shut-off and reset controls for space conditioning systems. ▪ 140.4(d) – Zone controls for space conditioning. ▪ 140.4(m) – Fan controls. ▪ 141.0(b) – Alterations.	▪ TBD

Per Unit Energy and Cost Impacts

Methodology and Assumptions

- Energy and Energy Cost Savings
- Incremental Costs

Energy and Energy Cost Savings Methodology

Using CEC's methodology and metrics to estimate energy and cost savings

Proposed Measures: HVAC and Fan Controls

- **120.2(e) – Shut-off and reset controls for space conditioning systems**
  - **Baseline:** Continuously operating schedule for HVAC space conditioning systems with (i)no shut-off control during period of non-use hours, (ii)no heating setback and cooling setup controls, (iii)no occupancy sensing controls either to setup/setback controls or turn-off mechanical ventilation when a zone is in deadband, in 5 minutes or less after entering into occupied-standby mode
  - **Proposed:** Modified schedule with controls to setback heating and cooling setup controls, and occupancy sensing controls to reduce airflow rates to minimum occupied and unoccupied turndown (to 25%) of listed in Table 4-A of the CMC.
- **140.4(d) – Zone controls for space conditioning**
  - Baseline: No space conditioning controls at the zone levels for systems with DDC
  - Proposed: Zone-level space conditioning control that limit volume of air to zones or mixed-zones to minimum allowed.

140.4(m) – Fan controls

- Baseline: HVAC system with constant fan
- Proposed: HVAC system with VAV

Energy and Energy Cost Savings Methodology, cont

Using CEC's methodology and metrics to estimate energy and cost savings

Proposed Measures: Alterations

Building System	Building Component	Baseline Design (2019 Title 24)	Proposed Design (2015 Title 24)
Envelope	Roof	Climate Zones 1, 3-9: R-8 Climate Zones 2, 10-16: R-14	Climate Zones 6-8: R-17 Climate Zones 1-5, 9-16: R-23
Envelope	Windows	U-factor: 0.86	U-factor: 0.58
Lighting	LPD	App5-4A_SpaceBySpace-T24N_2019	App5-4A_SpaceBySpace-T24N_2025
HVAC	FEI	Multiple varies based on Fan name and Climate Zone	Multiple varies based on Fan name and Climate Zone

Energy Modeling Assumptions

- The CASE team used CBECC 2025 RV0.4 hospital prototype for this draft report
- The analysis used the CEC 2028 metrics (hourly factors data for LSC, emission, source energy and peak demand) and weather files
- There will be a separate stakeholder's meeting in which the Statewide CASE team will present all recommended changes to the hospital prototype and building characteristics for new SNF prototype

Prototypical Buildings
▪ Hospitals ▪ New Construction and additions ▪ Alterations based on vintage construction and building type

Climate Zones
▪ Climate Zones 1-16

Skilled Nursing Facility- Proposed Prototype for CASE Report

- **Footprint & Height:** Two-story with an aspect ratio of 3, 13 ft floor to floor height with a 4 ft plenum space
- **Conditioned Floor Area (CFA):** 29,450 ft^2
- **WWR:** 20%
- **HVAC:** HP for patient rooms and Packaged VAV for other areas
- **Thermal Zones:**

Zone Type	Floor 1: Sum of Area (ft^2)	Floor 2: Sum of Area (ft^2)	Total Area
Activity	2,891	4,262	24%
Admin	1,289		4%
Rest Room	995	600	5%
Clinic	660		2%
Kitchen	2,238		8%
Patients Room	5,536	8,436	47%
Storage	1,284	1,260	9%
Total	14,892	14,558	100%

Poll

Skilled Nursing Facilities: Is the proposed Skilled Nursing Facility prototype representative of facilities within California? If no, please provide your recommendations or resources with your contact information for a more detailed conversation.

Control Measures Incremental Costs

Incremental costs associated with HVAC System, zone and fan controls across proposed measures. HVAC controls often enable multiple system functions so costs are combined to represent actual costs and implementation strategies.

Room Types Included	Device Cost	Installed Cost (device + wiring + mount)	BAS Points	Programming (3–4 hr. @ $400/hr.)	Installed Subtotal / Room
Patient Rooms, Offices, Corridors, Nurse Stations, Support Spaces, and Similar Areas	$200	$250 – $400	1	$1,200 – $1,600	$1,450 – $2,000

Median Costs: $4.31 / ft² across all control measures

Sources: Local controls contractors

Alteration Costs

- The Draft CASE Report represents break even costs as outlined in the table below
- The Statewide CASE Team is gathering incremental costs for each component below and those will be reflected in the final report

System	Description	Maximum Costs for Positive BCR ($/psf)
Envelope	Roof and fenestration improvements	$0.75
Lighting	LPD reduction	$0.25
Fans	Fan Energy Index	$1.20

Poll

Alterations: When assessing costs of alterations in healthcare facilities, and specifically hospitals and skilled nursing facilities, what data sources should be considered?

Would you be willing to speak with the Statewide CASE Team about cost estimates for healthcare alterations?

Preliminary Results – All Climate Zones

Measure	BCR	Statewide GWh	Statewide GHG
120.2(e) – System Airflow	>1	0.3	82
140.4(d+m) – Zone Controls + Fan Control	34.40	29.2	541
141.0(b) – Envelope Alterations	1.63	0.34	71
141.0(b) – Lighting Alterations	1.48	2.60	-183
141.0(b) – HVAC Alterations	1.61	2.61	169

Total First Year GWh

39.12 + 120.2(e)

Results vary by Climate Zone

Compliance Verification

- Key Aspects of Compliance Verification
- Barriers and Solutions
- Revisions to Compliance Software

Key Aspects of Compliance Verification

- **HCAI proposed changes to 7-118 as part of CAC Intervening Code Cycle Review** – ensure healthcare facilities are required to demonstrate compliance with Part 6 and show documentation
  - Changes: Added section (a) Documentation, which requires energy code compliance documentation with relevant sections of 10-103(a) in Title 24, Part 6
  - Documentation must be shown within 1). Certificate of Compliance, 2). Certificate of Installation, 3). Certificate of Acceptance
- **Update compliance forms to reflect code changes for healthcare facilities**
- **Update Compliance Manual**
- **Modify performance path requirements to be in compliance with Section 140.1 –** currently, standard and proposed design is the same for mechanical equipment and no credit is provided

Compliance Software Updates

CBECC Updates

- Update Hospital Prototype (OSHPD 1) to reflect current construction practices
- Develop a Skilled Nursing Facility Prototype (OSHPD 2)

ACM Updates

- Include a separate HVAC mapping system for healthcare buildings in the Alternative Calculation Methods manual, and modify the modeling standard and proposed design requirements
- Provide performance credit for measures with exceptions removed for healthcare
- Add compliance report and performance credit for healthcare buildings in line with section 140.1

Proposed Process

- Review CBECC and ACM and identify limitations with healthcare facility compliance
- Engage stakeholders to understand software challenges
- Review proposed prototypes to ensure accuracy

Note: There will be a separate stakeholder workshop in early April to discuss the Hospital and SNF prototypes in detail and the relevant materials will be posted on the Stakeholder website. Please sign up to attend and provide feedback on the assumptions, inputs and modeling methodology

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More information on
CEC's 2028 proceeding website.

We want to hear from you!

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