HCAi Department of Health Care Access and Information
2020 West El Camino Avenue, Suite 800
Sacramento, CA 95833
hcai.ca.gov

AMENDED

Hospital Building Safety Board
Education and Outreach Committee
AGENDA
April 29, 2026
10:00 a.m. – 4:00 p.m.

The Committee may not discuss or act on any matter raised during the public comment section that is not included on this agenda, except to place the matter on a future meeting agenda. (Government Code §§ 11125, 11125.7, subd. (a).)

Locations:
2020 West El Camino Ave, Conference Room 930, Sacramento, CA 95833
355 South Grand Avenue, Conference Room 2000, Los Angeles, CA 90071
Teams Meeting Access; Meeting ID: 280 085 117 404 44; Passcode: kD2kk76f
Call in: (916) 535-0978; Phone Conference ID: 839 563 243#

Item #1 Call to Order and Welcome

Facilitator: Teresa Endres, AIA, ACHA, EDAC, AAH, Principal, HOK;
Committee Chair (or designee)

Item #2 Roll Call and Meeting Advisories/Expectations

Facilitator: Veronica Yuke, HCAI; HBSB Executive Director (or designee)

Item #3 Review and prioritize the committee's 2026 goals:

a. Support the development of webinars
b. Develop a regular curriculum and predictable calendar for webinars
c. Revisions to "Guide for Working on OSHPD Projects – Tips from the Experts"
d. Emergency Design Guide
e. Collaborative Inspection Approach to Hospital Construction Seminar (Collaborative Inspection Approach to Hospital Construction Webinar Development Subcommittee)
f. Work with Instrumentation Committee regarding webinar/seminar on instrumentation white paper
g. Advisory Guides
    - Discussion and public input

Facilitator: Teresa Endres (or designee)

Item #4 Update from the Ad Hoc “HCAI Design Guide for Planning and Preparing for Disasters” Webinar Development Subcommittee
Facilitator: Teresa Endres, Subcommittee Chair (or designee)

- Review draft slides for Topic 1 Webinar: *Power Resilience, Regulatory Compliance, and the Future of Healthcare Infrastructure*
  - Scheduled for July 2026
  - Webinar presenters: David Bliss, MD; John Griffiths, PE; and Jamie Schnick, PE

FOR INFO

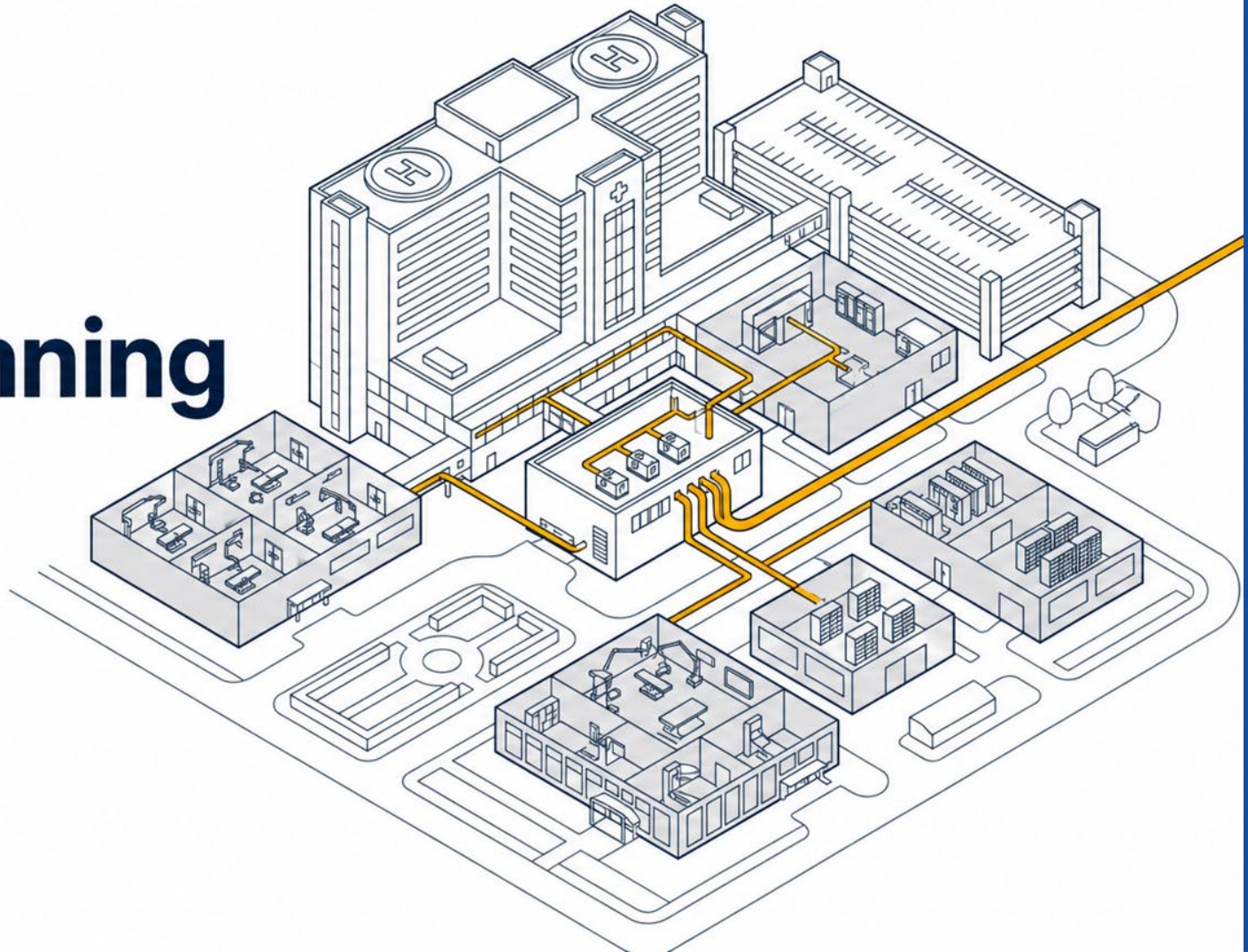
TOPIC	WHO		TIME
	PRIME	SUPPORT	
Introduction & KO	JG	DB, JS	10 mins
Defining Resilience Emerging Threats	JG		10 mins
Solution, Opportunities & Implementation Timeline	JS	DB, JS	15 mins
Feasibility & Real-World Examples	DB	JS, JG	10 mins
Q&A NextSteps	JG	DB, JS	15 mins
		TOTAL	**60 mins**

Add QR codes

HCAI
Department of Health Care Access and Information

HCAI Design Guide for Planning Preparing for Disasters

Power Resilience, Regulatory Compliance, and the Future of Healthcare Infrastructure.



Presenters

- *John Griffiths, PE, Electrical Engineer, CONTECH-CA*
- *David Bliss, MD, Faraday Microgrids*
- *Jamie Schnick, PE, Senior Electrical Engineer, HCAI*

Agenda

- Defining Resilience
- Emerging Threats
- Solutions & Opportunities
- Implementation Timeline
- Feasibility & Real-World Examples
- Q&A
- Next Steps

Definition of Resilience?

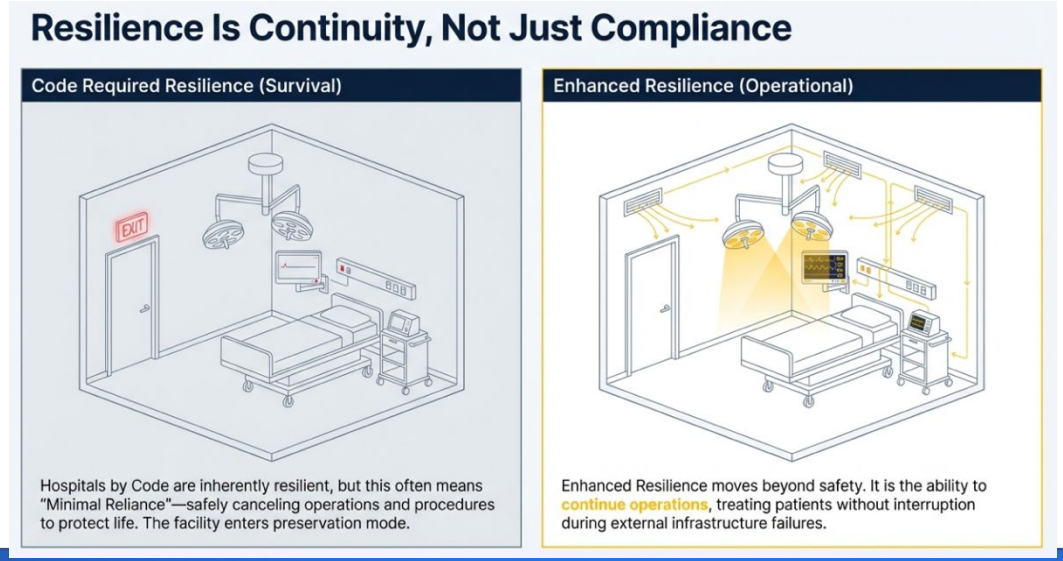
What does it mean to be resilient?

Code Resilience (The Baseline):

- Current Code ensures hospitals are "inherently resilient" but focuses on minimal reliance,.
- Goal: Maintain basic operations, often requiring the cancellation of elective procedures.

• Enhanced Resilience (The Goal):

- Designing beyond the code.
- Goal: Operations and procedures can continue without interruption.



Emerging Threats

Internal **Threats**

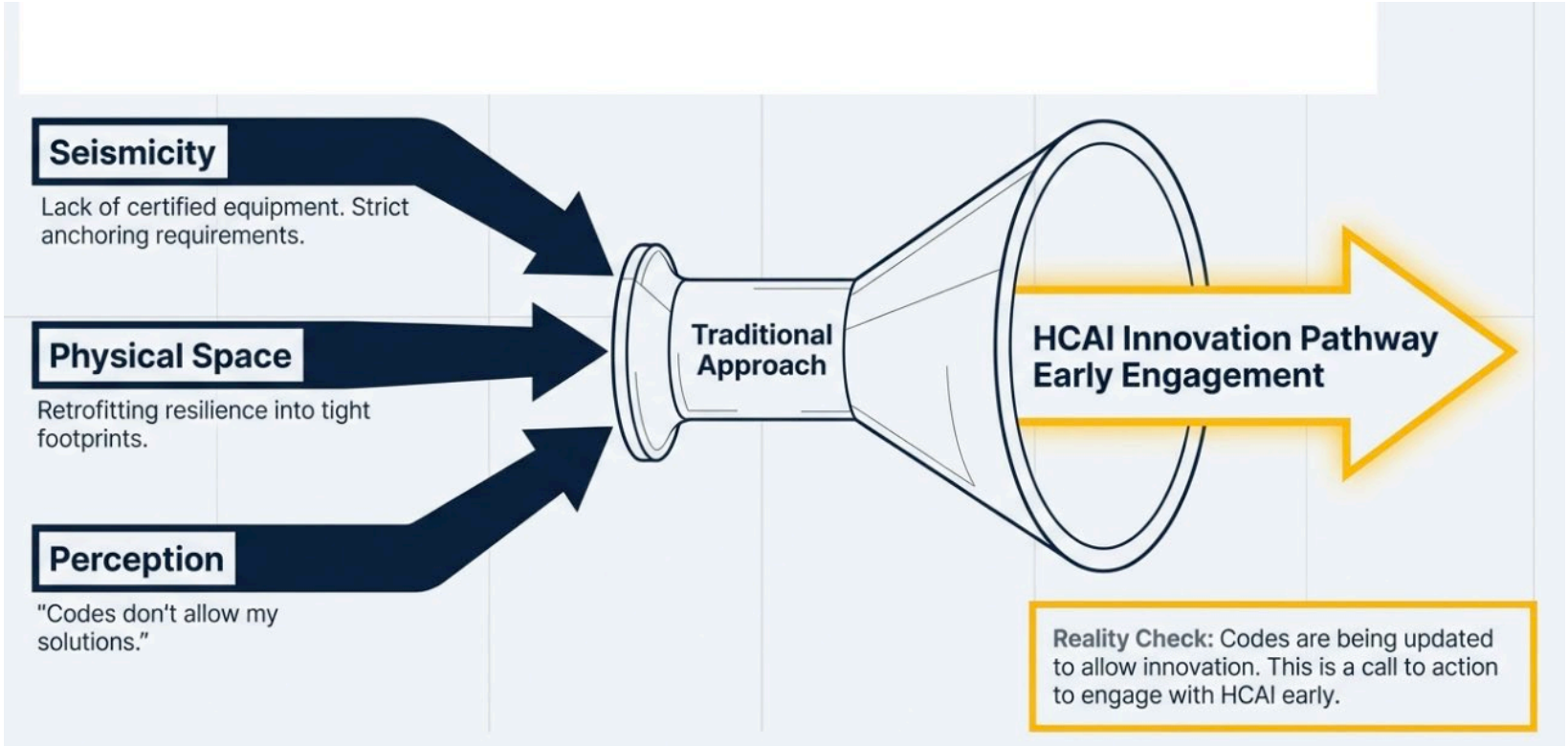
- Aging equipment
  - Increasing reliance on reliable power to deliver healthcare
  - Deferred maintenance budget
  - Shortage of skilled maintenance s
- External Risk
  - Unreliable utility

External Threats

- Unreliable utility
- Increasing extreme climatic events
- Supply chain limiting availability of critical components

Constraints & Solutions

- Constraints
  - Money
  - Space to install systems
  - Equipment needs to be seismically certified
  - ~~"Codes don't allow my solutions“~~
    - (call to action for people to engage with HCAI; Code is being updated to allow)
  - New solutions are not a one-size-fits-all
  - Fragmented supply chain


Seismicity
Lack of certified equipment. Strict anchoring requirements.
Physical Space
Retrofitting resilience into tight footprints.
Perception
"Codes don't allow my solutions."
Traditional Approach
HCAI Innovation Pathway
Early Engagement
Reality Check: Codes are being updated to allow innovation. This is a call to action to engage with HCAI early.

Solutions

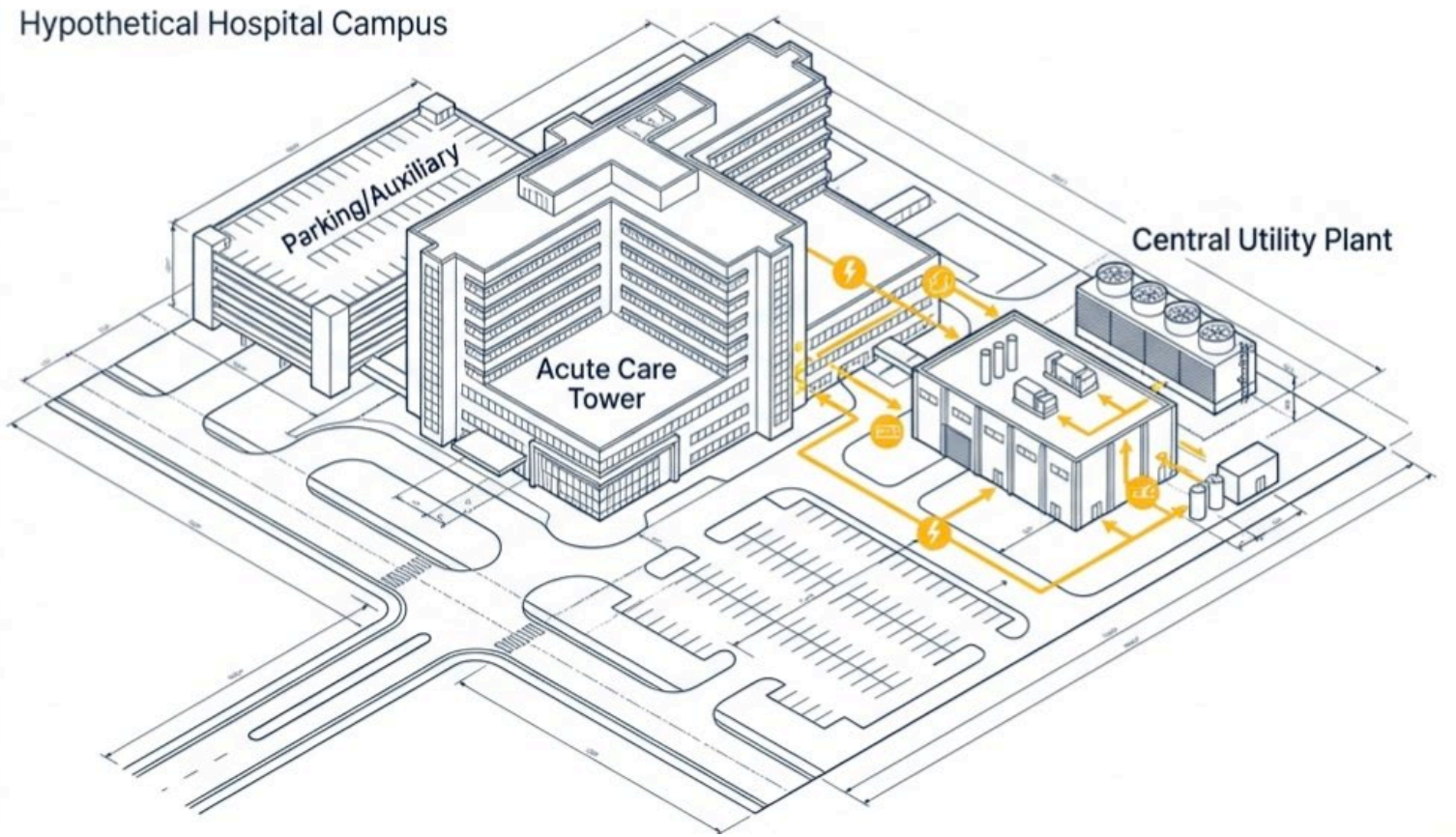
- Future proofing systems
  - Designed for forward compatibility with emerging systems
- Distributed generation resources (DER)
  - Many emerging solutions that provide facilities the opportunity for additional revenue, streams, and funding of projects
- HCAi support
  - HCAi have a significant amount of knowledge and expertise supporting the delivery of these projects
- Supportive codes
  - Codes are being updated to support creative resilience solutions

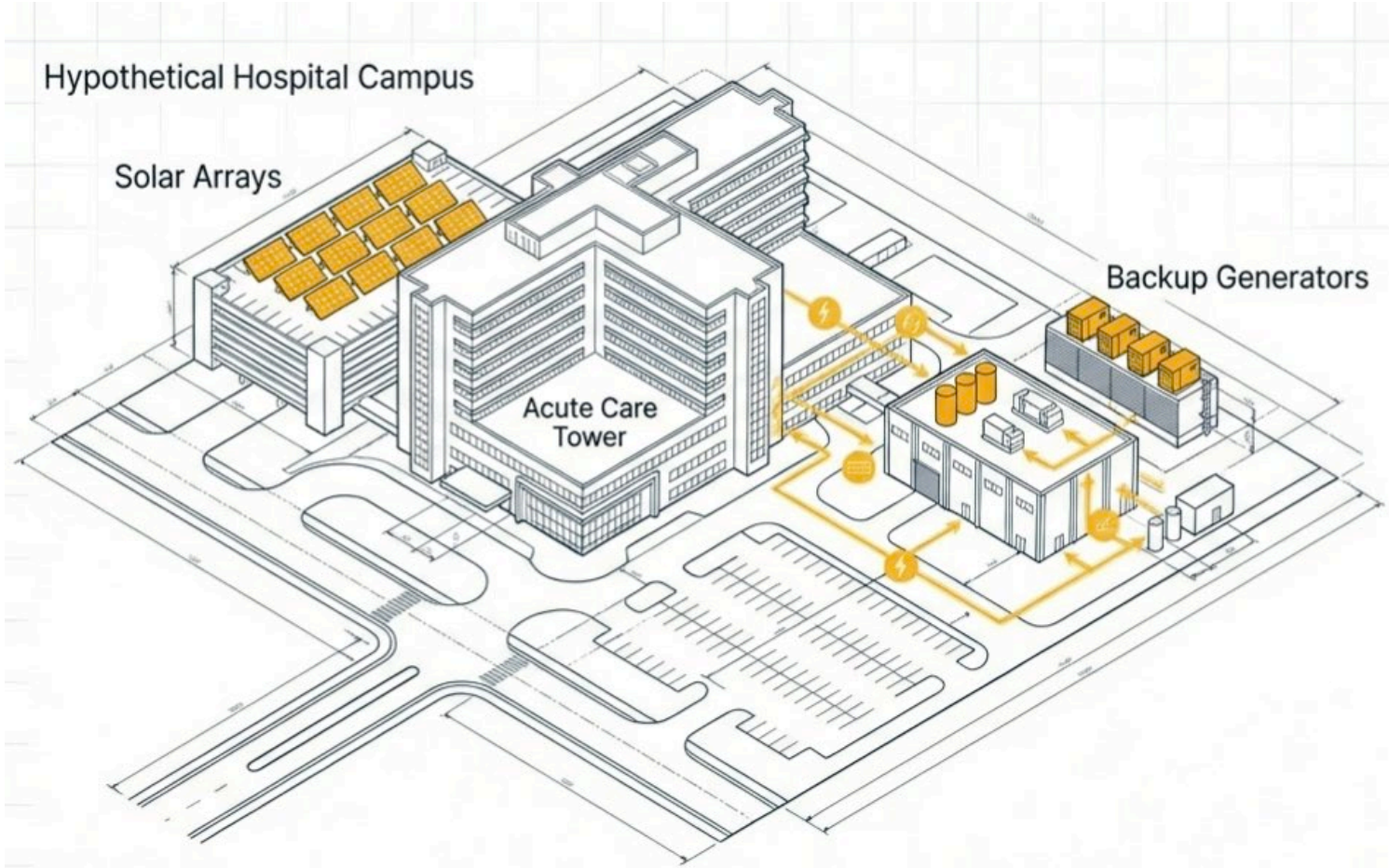
The Design Strategy: A Site-Specific Approach

Core Principle:
There is no one-size-fits-all solution.

Design Inputs:

- Seismic Zone Requirements
- Available Footprint for Generation
- Utility Connection Points
- Critical Load Demand





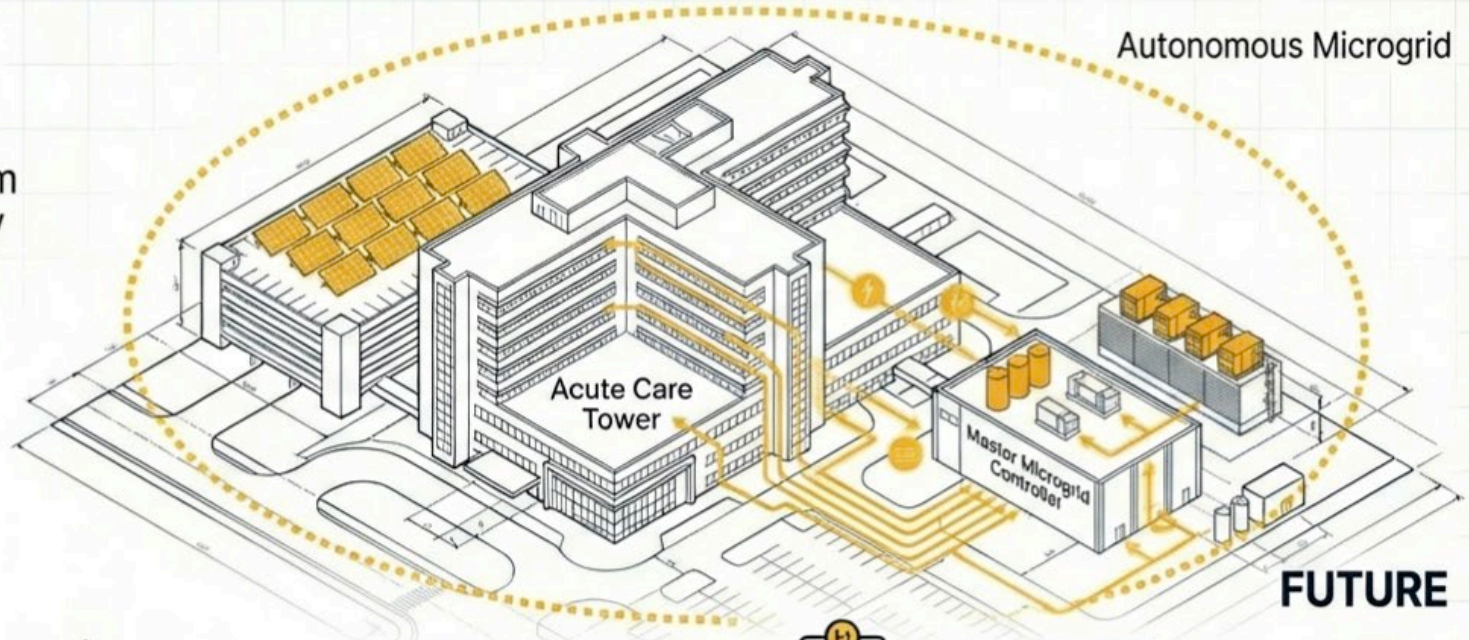
Generation Mix

- Diversifying power sources to avoid single points of failure.
- Seismic Considerations: All generation assets require specific anchoring and certification for their location.
- Engineer's Perspective: Redundancy through independent generation.

The Integrated Solution: Microgrids & Future Proofing

The Microgrid Concept: A self-sufficient energy system that operates independently during disasters.

Future Proofing: We design for adaptability, not just immediate compliance.



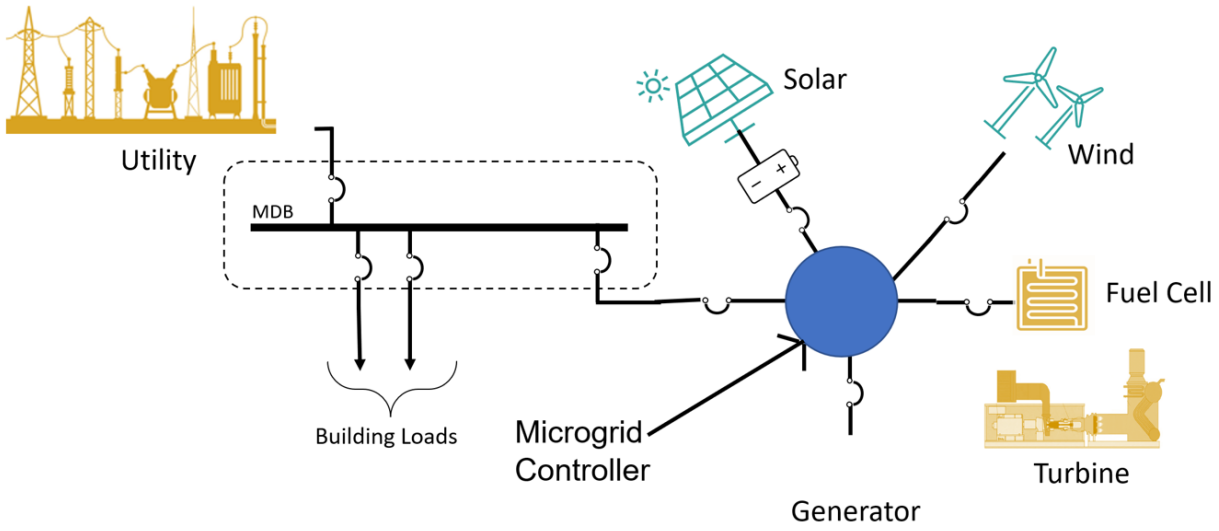
NOW

FUTURE

Designing infrastructure now with 'hooks' for the technology of 2030.

HCAI's Role in the Project Lifecycle

Healthcare Microgrids

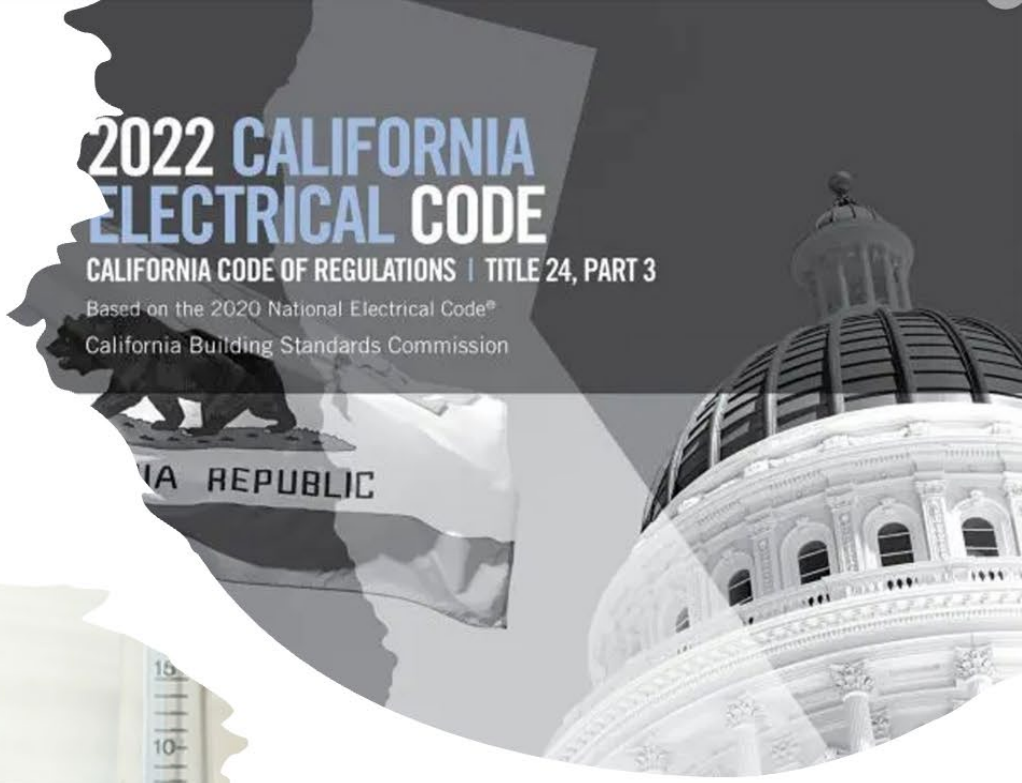


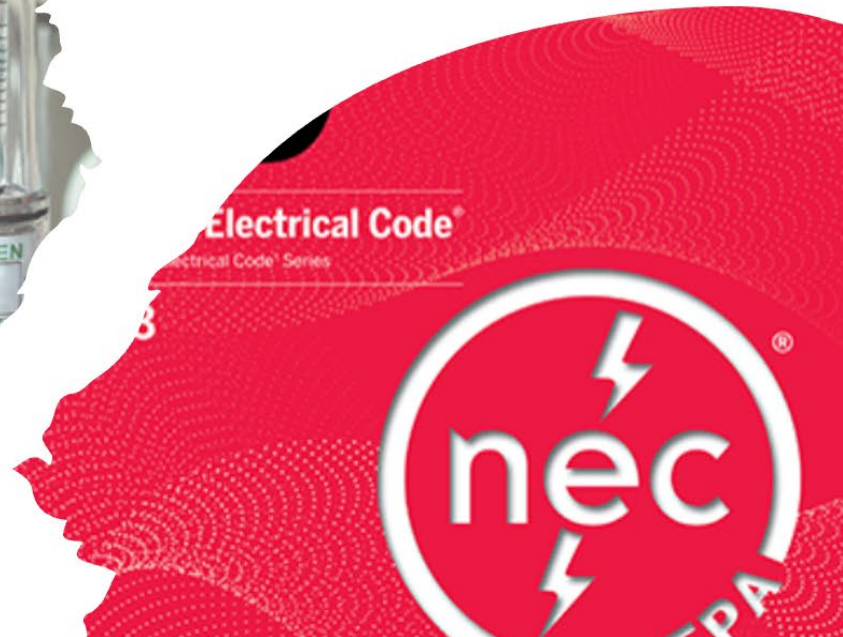
A group of interconnected loads and distributed energy resources (DER's) within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.

Evolving Codes

<u>Microgrids as EPSS added to the code in:</u>

- 2021 NFPA 99
- 2023 NEC
- 2022 California Intervening Electrical Code





DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland 21244-1850

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

Center for Clinical Standards and Quality

Ref: QSO-23-11-LSC

DATE: March 31, 2023

TO: State Survey Agency Directors

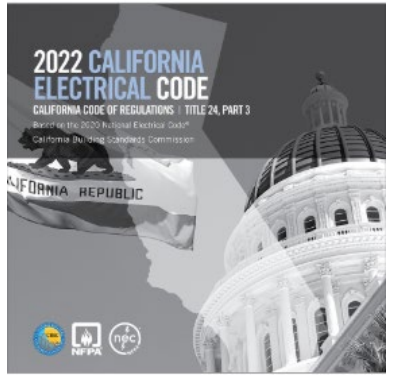
FROM: Directors, Quality, Safety & Oversight Group (QSOG) and Survey & Operations Group (SOG)

SUBJECT: Categorical Waiver – Health Care Microgrid Systems (HCMSs)

Memorandum Summary

- Various CMS regulations governing certain providers and certified suppliers require compliance with the 2012 edition of the National Fire Protection Association (NFPA) Health Care Facilities Code (NFPA 99).
- 2012 edition of NFPA 99 requires emergency power for an essential electric system (EES) to be supplied by a generator or battery system.
- 2021 edition of the NFPA 99 permits emergency power for an EES to be supplied by sources other than a generator or battery system, including a health care microgrid system (HCMS)
- HCMSs are small-scale electrical grids where the sources of electricity can be provided by clean energy technologies (e.g., fuel cells, solar, wind, energy storage, etc.).
- Except as noted below, CMS is issuing a categorical waiver permitting new and existing health care facilities subject to CMS requirements to utilize alternate sources of power other than a generator set or battery system only if in accordance with the 2021 edition of the NFPA 99, 2023 edition of the National Electric Code (NFPA 70), and associated references.

517.30(B)(5) Health Care Microgrid. EES shall be permitted to be supplied by a health care microgrid…Health care microgrid systems shall be designed with sufficient reliability to provide effective facility operation..



OSHPD CAN 3-517.30(B.1)(4) – The requirements to meet "sufficient reliability" status for health care microgrids utilized as EES shall include, but not be limited to, the following:

- Special Seismic Certification
- Comply with NFPA standards for the sources utilized (i.e. NFPA 111 for batteries NFPA 853 for fuel cells etc.)
- Classified at type 10 Class X, Level 1 per NFPA 99 6.7.1.2.1
- Sequence of Operation and Commissioning required

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Advisory Guide Series

A7

MICROGRIDS FOR HEALTH CARE FACILITIES

FOR HOSPITALS, ACUTE PSYCHIATRIC, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES AND CLINICS [OSHPD 1, 2, 3 & 5]

Office of Statewide Hospital Planning and Development

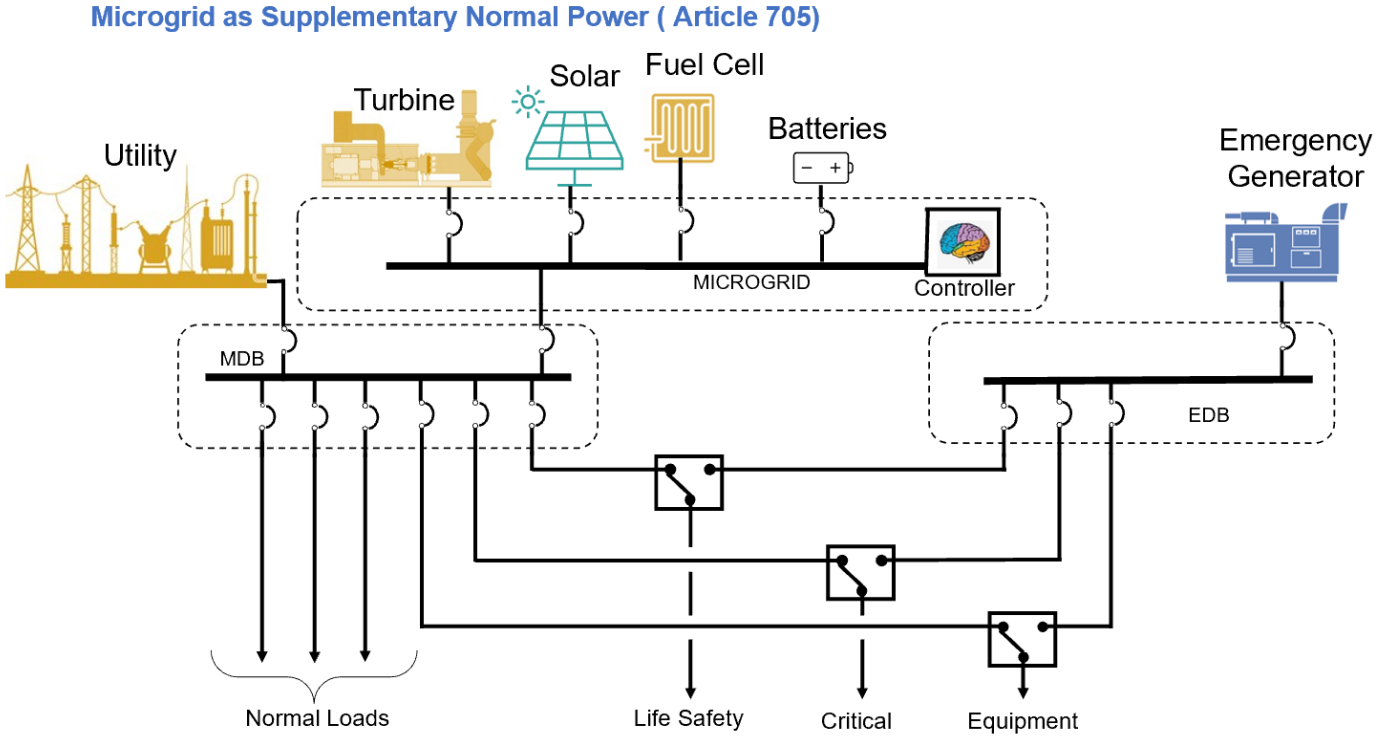
April 2025 Version 1.0

TABLE OF CONTENTS

	Requirements/Codes/Standards - Applicable Codes Matrix	Microgrid Power Source					
		Solar (PV's)	Wind	Fuel Cells	CHP	Energy Storage	Gas Turbine
	Codes/ Requirements						
1	CARB - California Air Resources Board - Air Quality Requirements	no	no	no	yes	no	yes
2	CPUC - California Public Utility Commission (Rule 21)	yes	yes	yes	yes	yes	yes
3	OSHPD CAN 2-0 Local Approval	yes	yes	yes	yes	yes	yes
4	CBSC - California Standards Building Code (Title 24)						
4a	CBC - California Building Code	yes	yes	yes	yes	yes	yes
4b	CFC - California Fire Code						
4b-1	1207 Electrical Energy Storage Systems	no	no	no	no	yes	no
4b-2	1205 Solar Photovoltaics Power Systems	yes	no	no	no	no	no
4b-3	1206 Stationary Fuel Cell Power Systems	no	no	yes	no	no	no
4c	CEC - California Electrical Code						
4c-1	517 Healthcare Facilities	Only if in OSHPD building and/or serving as alternate source					
4c-2	690 Solar Photovolatic (PV) Systems	yes	no	no	no	no	no
4c-3	692 Fuel Cell Systems	no	no	yes	no	no	no
4c-4	694 Wind Electric Systems	no	yes	no	no	no	no
4c-5	700 Emergency Power	Only if in OSHPD building and/or serving as alternate source					
4c-6	705 Interconnected Electric Power Production Sources	yes	yes	yes	yes	yes	yes
4d	CMC - California Mechanical Code						
4d-1	407 - Outdoor Air Intakes	no	no	no	yes	no	yes
5	NFPA - Guides and Standards						
5a	NFPA 30 - Flammable and Combustible Liquids Code	no	no	yes	yes	no	yes
5b	NFPA 37 - Stationary Combustion Engines and Gas Turbines	no	no	no	yes	no	yes
5c	NFPA 54 - National Fuel Gas Code	no	no	yes	yes	no	yes
5d	NFPA 58 - Liquid Petroleum Gas Code	no	no	yes	yes	no	yes
5e	NFPA 59A - Production/ Storage/ Handling of Liquified Natural Gas LNG	no	no	yes	yes	no	yes
5f	NFPA 99 - Healthcare Facilities Code	yes	yes	yes	yes	yes	yes
5g	NFPA 101 - Life Safety Code	yes	yes	yes	yes	yes	yes
5h	NFPA 110 - Emergency and Standby Power	no	no	yes	yes	no	yes
5i	NFPA 111 - Stored Electrical Energy Emergency and Standby Power Systems	no	no	no	no	yes	no
5j	NFPA 400 - Hazardous Materials Code	no	no	yes	yes	yes	yes
5k	NFPA 853 - Installation of Stationary Fuel Cell Power Systems	no	no	yes	no	no	no
5l	NFPA 855 - Standard for the Installation of Stationary Energy Storage Systems	no	no	no	no	yes	no
6	Advisory Guide A9 - Sitework Under OSHPD Jurisdiction	yes	yes	yes	yes	yes	yes

Figure 1. *Applicable Requirements/Codes/Standards Matrix for Health Care Microgrid Implementation*

OSHPD-1 (Hospital) Single Line Diagram



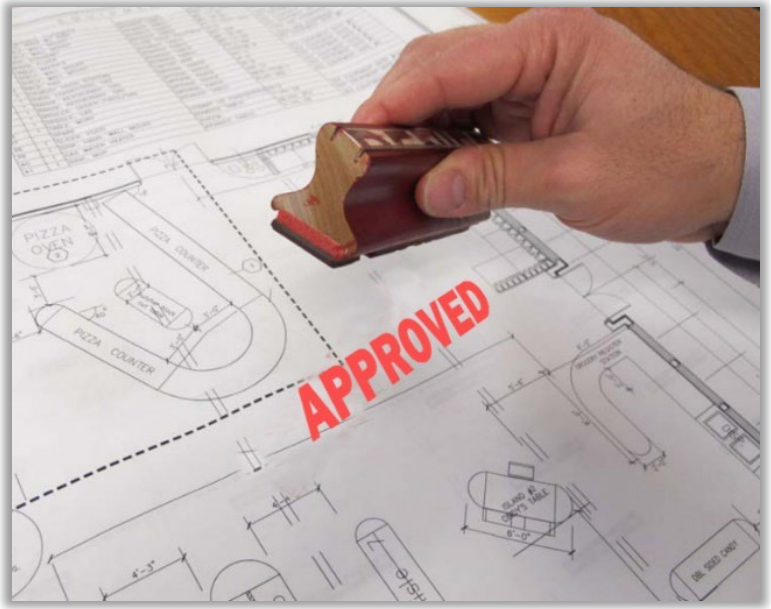
Basis of Design for this example – The proposed design is to install a microgrid as supplementary normal power source(s) at an existing or new hospital. The concept is to install DERs that are configured as a microgrid and that produce energy 24/7 to offset utility costs and provide the capability of transitioning to island mode to provide power during a utility outage. DERs for this example include a gas turbine, a solar photovoltaic (PV) system, a fuel cell, and storage batteries. The code mandated EES power requirements will be met by either new or existing emergency generator(s) and an essential electrical distribution system that meets CEC Article 517 requirements for a Type 1 EES.

Permitting of Microgrids has been Achievable at Health Care Facilities

- Dozens of projects have been installed with DER's
- Under current codes, Microgrids can be configured/installed to:

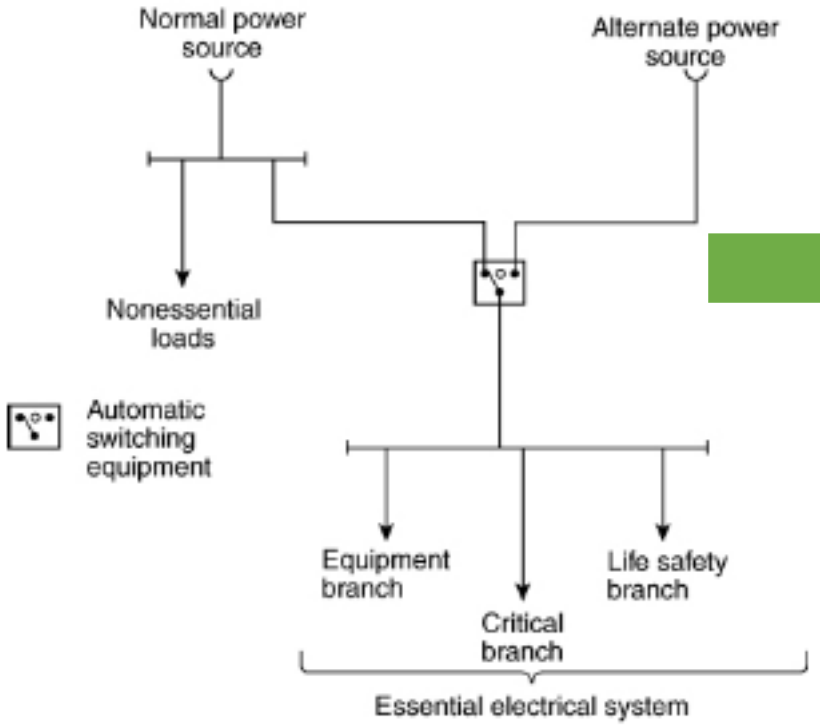
Permitting of Microgrids as EESS is Allowed by current codes

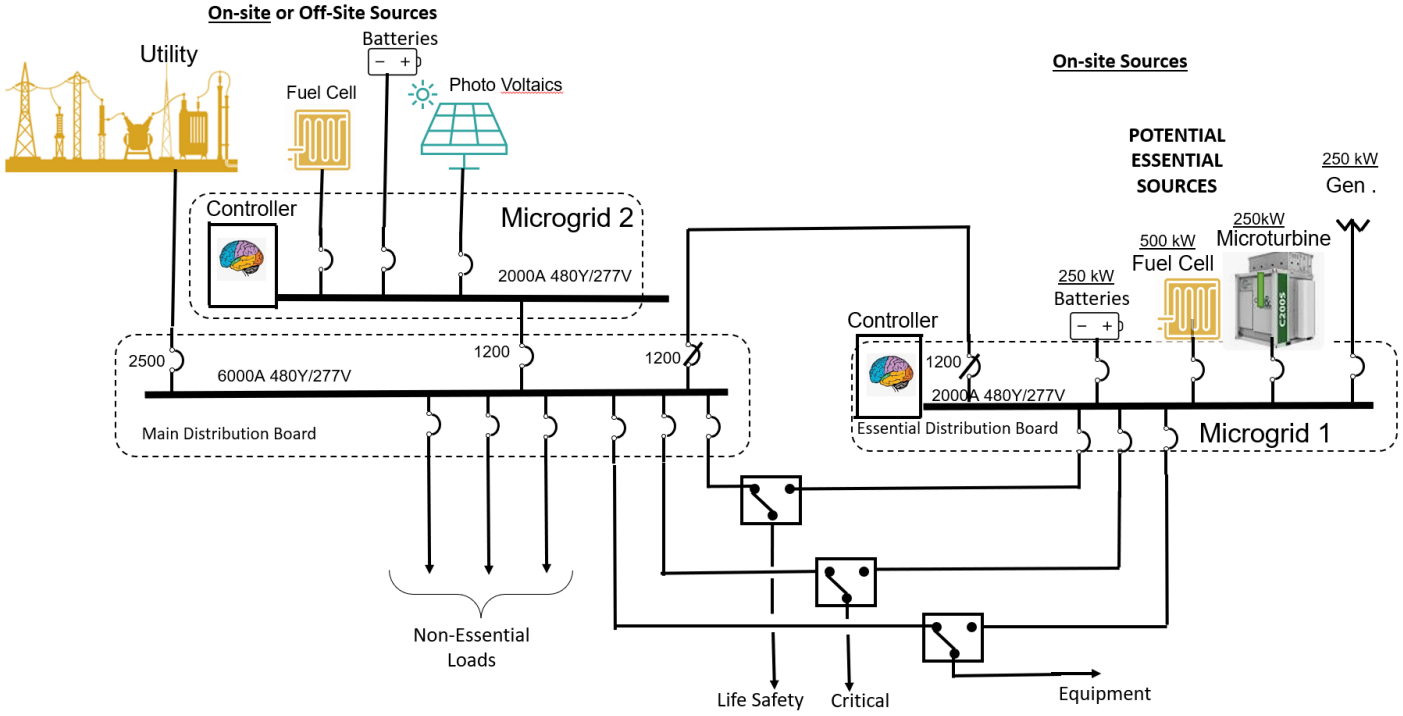
- All products used will need to have UL listing
- DER's and distribution equipment will need to have Special Seismic Certification
- Commissioning is required
- On-Site storage of "fuel" is required
  - 72 hrs for hospitals
  - 6 hrs (96 hrs in CA) for Skilled Nursing Facilities (SNFs)
  - 90 min for clinics (Special Seismic Certification is not required)

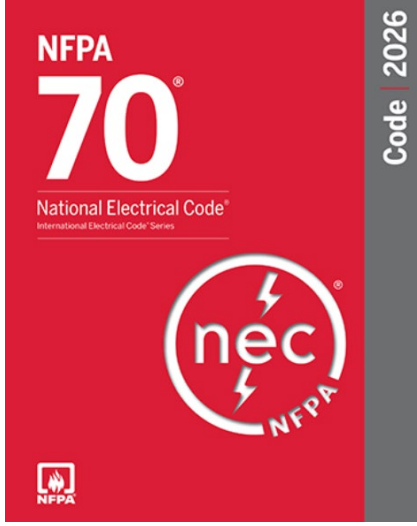


Microgrids for Emergency Power: Future Codes

2026 NEC 517.30 - 2 or more independent sources (or sets of sources) **One on-site, and another can be located off site**







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Microgrid Practicalities and Demonstration projects

Microgrid Finance and ROI

PROS

- Tax Equity is available for FOR-PROFITS ***and*** NON-PROFITS
  - NON: "DIRECT PAY"
  - FOR:
    - TAX CREDITS – 6% to 60% of eligible cost - use, sell
    - ACCELERATED DEPRECIATION - year one 65% to 97%
- Operational Savings
  - Direct offset of utility supply cost: $0.05 - $0.5/kWh)
  - Direct reduction of peak/coincident demand fees: $5 - $35/kW +
  - Participation in utility/ISO marketplace
- Indirect Value
  - Healthcare operations continuity

CONS

- High cost equipment
  - Solar: $2-$10/Watt
  - Batteries: $400-$750/kWh
  - Fuel Cell – proprietary
- "Complex" Controls and Integration
  - Coordination of assets (complexity)
  - Realtime visualization and intervention (cost)
- Other O&M
- Performance loss over time

SALUTARY OUTCOMES

QUANTITATIVE

- REDUCE UTILITY COST UP TO 40-60%
- REALIZE 6-7 FIGURE ANCILLARY MARKET REVENUE
- SIMPLE RECAPTURE – as early at 18 months
- IRR – 15-25%

QUALITATIVE

- RESILIENCY
- “GREENING”
- SHADE/AESTHETICS
- UTILIZATION OF ”DEAD” SPACES
- HEDGE AGAINST UTILITY INCREASES

TIPS FROM EXPERIENCE

TECHNICAL

- OPTIMIZE RATIO STORAGE/GENERATION/LOAD vs. TARIFF – expert analysis
- ZERO EXPORT - Expedited interconnection
- INDEPENDENT, FAST, SECURE REMOTE DIGITAL ACCESS
  - Cybersecurity
- CONTROLLER INTELLIGENCE
- ISLANDABLE VS. NON?

FINANCIAL

- LEVERAGE
  - On-bill finance
  - State loan, loan-loss programs
  - Traditional finance
- TAX EQUITY OPTIMIZATION
  - Prevailing wage – reach 30%
  - Domestic Content – added 10%
  - Energy Community – added 10%
  - Low Income/Tribal – added 10%
- CONSTRAIN O&M RISK
  - Extended warranties
  - LTSA

Kaiser Ontario


Valley Childrens Hospital
Artist Rendering

KAISER PERMANENTE
SAN MARCOS CAMPUS

Salas O'Brien

- New central plant
- New hospital
  - 430,000 SF
  - 168 beds
  - LEED platinum

U.S. GREEN BUILDING COUNCIL LEED PLATINUM USGBC

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Conclusion

- **Is it allowed by Code**
- **Is it fiscally viable**
  - New construction
  - Remodel
- **Is it doable to add these systems?**
- **Yes it is ...**
  - Kaiser Ontario, Kaiser San Marcos, Valley Children's
  - and …. what about by your system?
- **Call to action?**
  - Regulatory
  - Financially Viable
  - Is it technically possible

The Path Forward: Actions for Engineers and Administrators

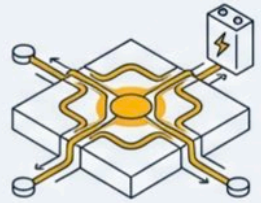
Regulatory

Engage HCAI now. Do not assume 'Code' is a blocker. **Use the Design Guide**.

Financial

Evaluate fiscal viability. Account for the cost of business interruption, not just construction costs.

Technical



Start with a **site-specific analysis** and design for future technology integration.

Resilience is a choice to continue care when the world stops.

Item #4 Continued

- Review draft slides for Topic 2 Webinar: *Wildfire and Wildland Urban Interface Readiness for Healthcare Facilities*
  - Scheduled for May 14, 2026
  - Webinar presenters: Janice Cheung, PE; Gary Dunger; and Nanci Timmins
- Discussion and public input

Wildfire & WUI Readiness for Healthcare Facilities

Design, Code Compliance, and Operational Continuity

HCAi
Department of Health Care Access and Information

Cedars Sinai Health System

Redwood City California Founded 1867

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Session Objectives: Building Code Literacy for Wildfire-Resilient Healthcare Design

Understand WUI Applicability

Learn the scope of Wildland-Urban Interface (WUI) applicability and how FHSZ designation impacts healthcare facility design and operational requirements.

Interpret Title 24 Part 7

Master the interpretation and application of Title 24 Part 7 standards specifically for healthcare facilities to ensure compliance and resilience.

Identify Vulnerabilities

Recognize critical design and operational vulnerabilities that could compromise patient safety and facility continuity during wildfire events.

Align Design Decisions

Coordinate design decisions with operational continuity planning to create integrated, comprehensive resilience strategies for healthcare facilities.

Establish Coordination Protocols

Develop and implement effective coordination protocols across multidisciplinary teams to ensure unified approach to wildfire-resilient design.

Why This Matters Now

Wildfire behavior is evolving — longer seasons, higher intensity, wider impact zones

Ember-driven ignition is the primary failure mechanism—not flame front

Title 24 Part 7 consolidates and elevates expectations

Increasing alignment between code compliance and operational resilience

Hospitals must remain operational under degraded conditions, not simply protected

AGENDA

- Welcome & Framing
- What is WUI? Title 24 and the New Part 7
- Are You in a Fire Hazard Severity Zone?
- The Hazard & The Why
- Operations & Emergency Planning
- Q&A

Wildland-Urban Interface (WUI) Designation Triggers Mandatory Design Requirements

WUI Interface Definition

The interface between the built environment and wildland vegetation where structures and other human development meet or intermingle with undeveloped wildland areas.

Designation by Fire Hazard Severity Zones

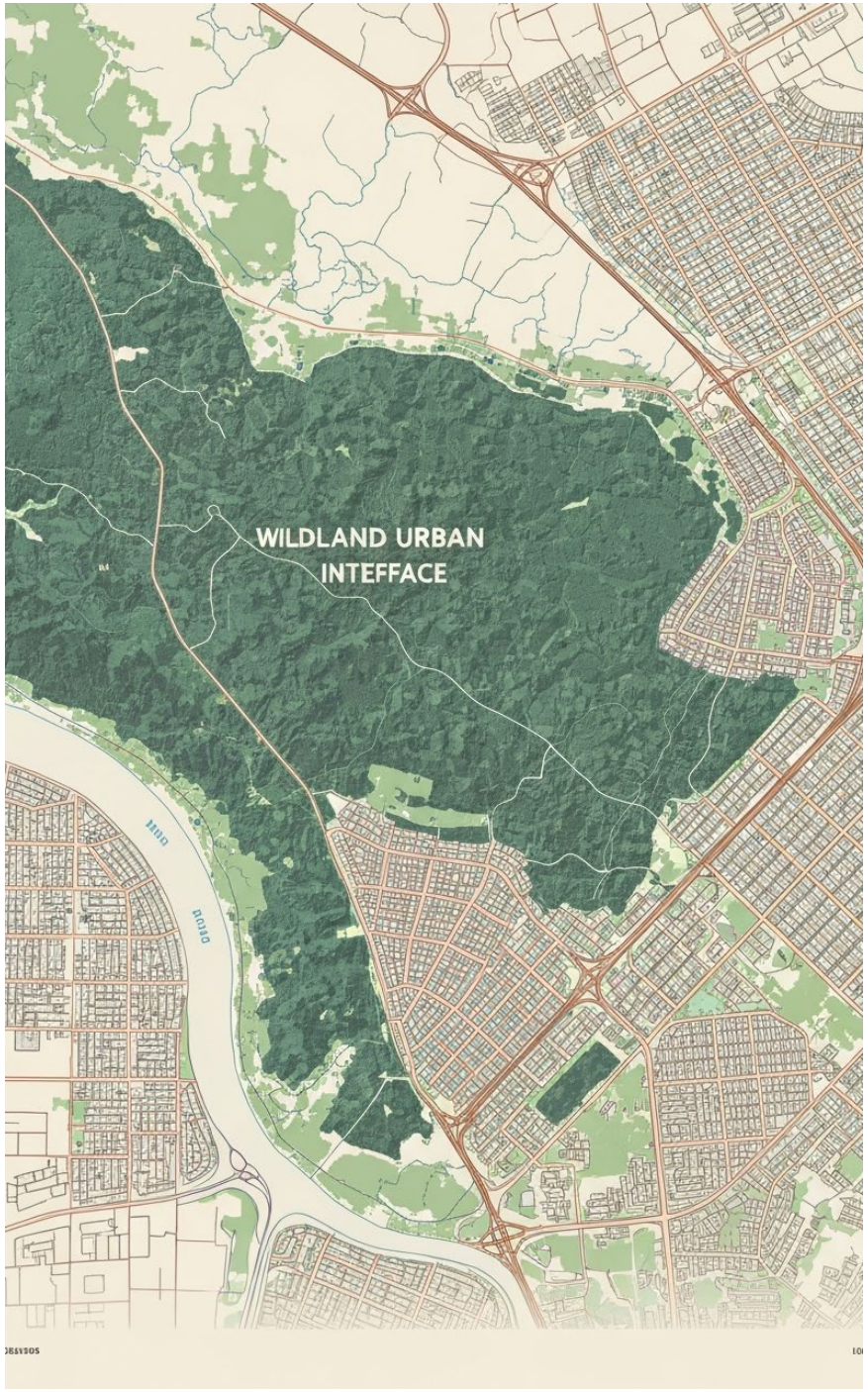
WUI designation is determined by Fire Hazard Severity Zones (FHSZ), which are based on hazard analysis and mapping of wildfire risk areas.

Zone Types and Local Designation

Includes State Responsibility Area (SRA), Local Responsibility Area (LRA), and locally designated zones that reflect regional wildfire risk assessment.

Activation of Mandatory Code Sections

WUI designation automatically activates specific mandatory code sections requiring enhanced design standards for building materials, defensible space, and fire-resistant construction.



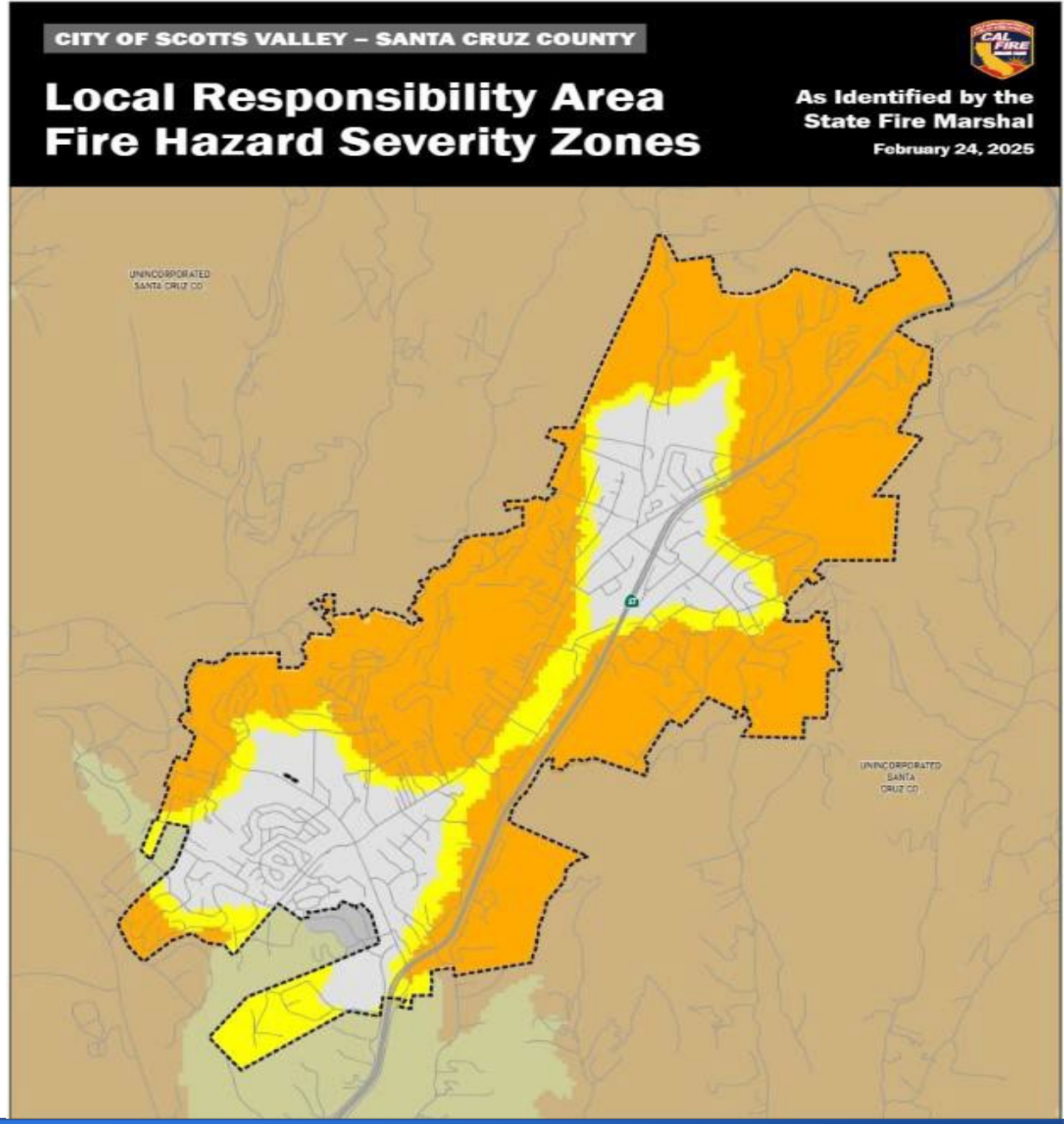
WUI Exposure Risks for Healthcare Facilities

Hospitals located in or near Wildland-Urban Interface (WUI) areas are areas are uniquely vulnerable to several critical hazards during wildfire wildfire events:

- **Ember Exposure:** Embers can travel long distances, igniting structures far from the main fire front. This poses a significant risk to building envelopes, roofs, and outdoor materials.
- **Radiant Heat:** Intense heat radiating from a wildfire can preheat structures and materials, leading to ignition even without direct flame contact. This is a major concern for the integrity of buildings and surrounding infrastructure.
- **Smoke Infiltration:** Dense smoke can compromise air quality within and around facilities, impacting patient and staff health. It can also hinder visibility, affecting emergency response and evacuation efforts.
- **Access Challenges:** Wildfires can lead to road closures, debris, and evacuation orders, severely limiting access for emergency services, staff, patients, and supplies. This can disrupt normal operations and emergency response capabilities.

Fire Hazard Severity Zones (FHSZ)

- Designated as: Moderate, High, or Very High
  - Mapped by CAL FIRE (SRA)
  - Local agencies designate LRA zones
  - FHSZ designation triggers regulatory requirements
  - Applies to new construction and certain site conditions



Fire Hazard Severity Zones Directly Impact Design Cost, Material Selection, and Approval Timeline

Moderate Severity Zone

- **Classification:** Low-to-moderate fire risk
- **Code Applicability:** Standard building codes apply
- **Material Restrictions:** Limited material limitations
- **Impact:** Baseline design costs, standard approval timeline (4–6 weeks)

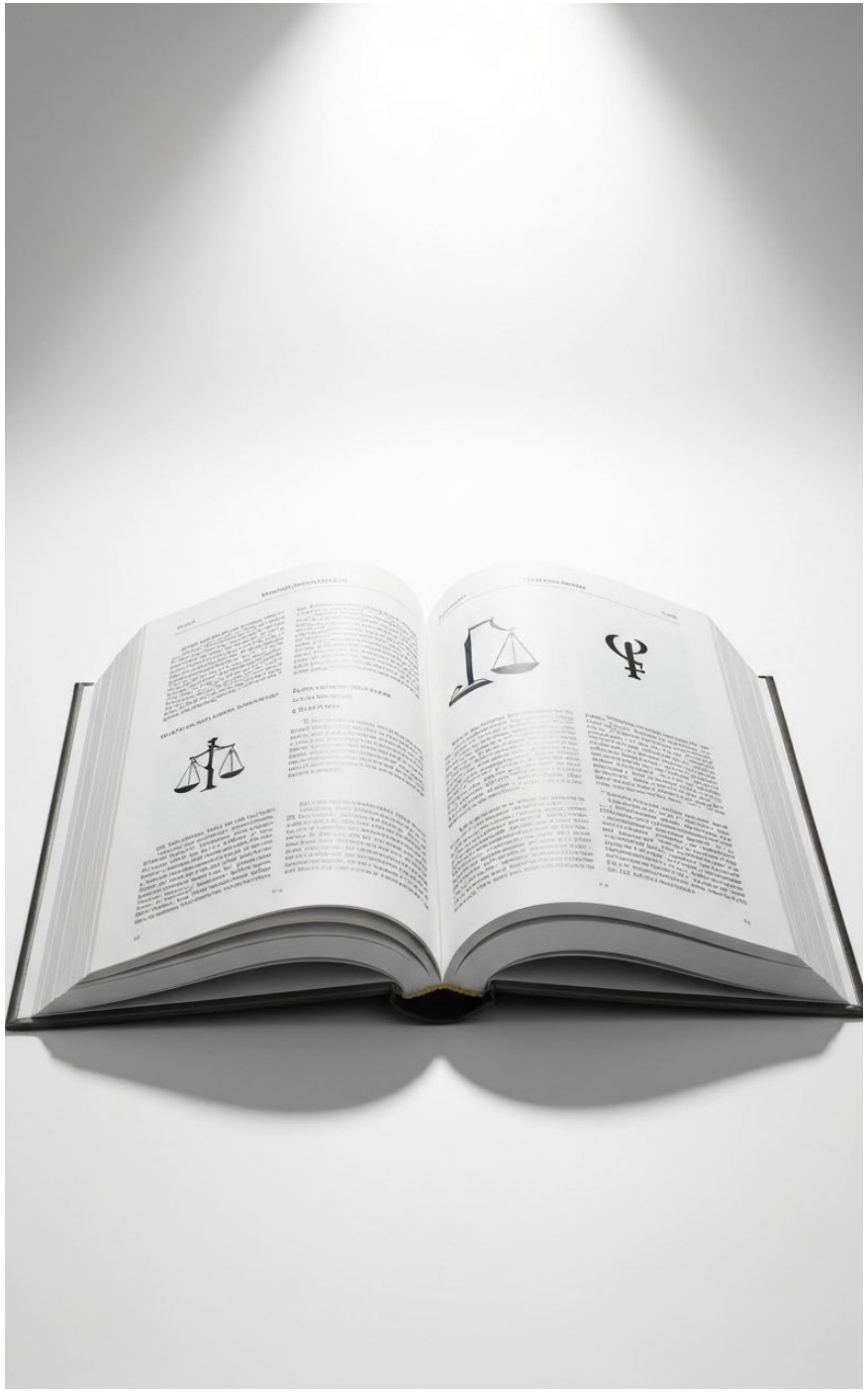
High Severity Zone

- **Classification:** Elevated fire hazard intensity
- **Code Applicability:** Enhanced fire-resistant standards triggered
- **Material Restrictions:** Fire-rated materials required for exterior and structural elements
- **Impact:** 20–30% cost increase, extended approval (8–10 weeks)

Very High Zone

- **Classification:** Extreme fire hazard severity
- **Code Applicability:** Strict defensible-space and hardening requirements
- **Material Restrictions:** Non-combustible materials mandatory; special systems (ember-resistant venting) required
- **Impact:** 40–60% cost premium, extended approval (12–16 weeks) and potential redesign

Key Takeaway: Early FHSZ confirmation prevents costly redesign and ensures optimal material selection from project inception.



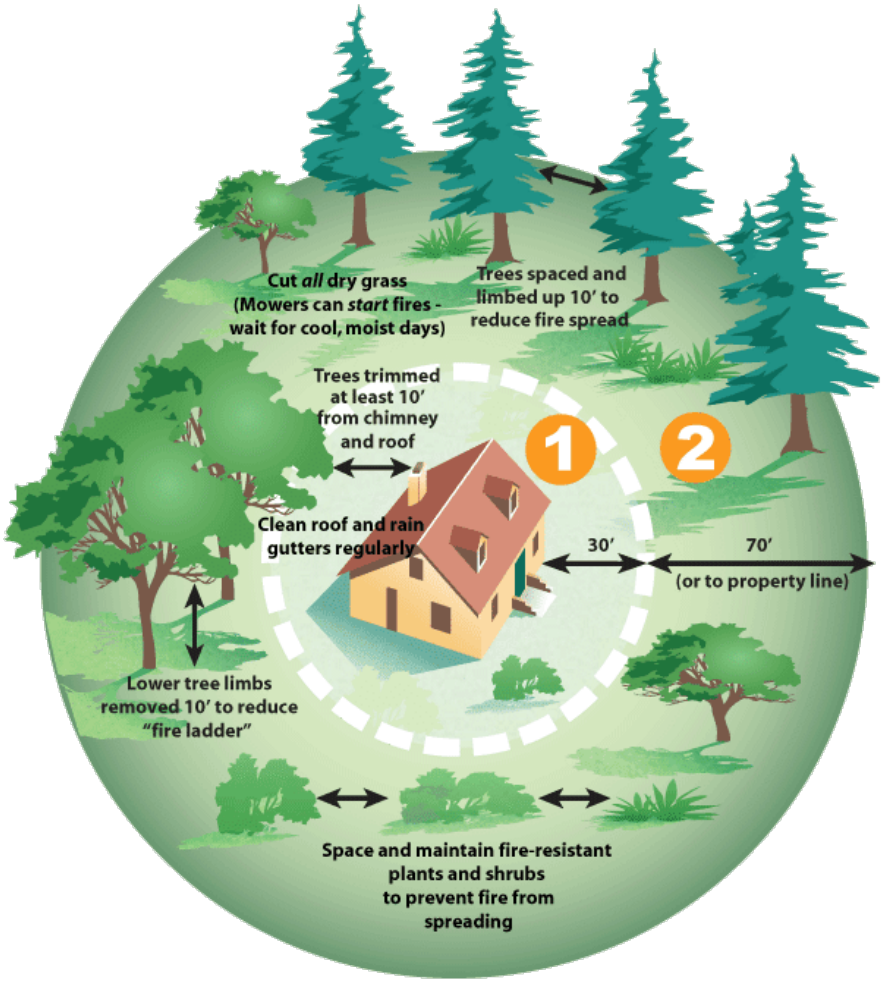
Title 24 Part 7 Overview – What Changed?

- **Consolidation of Codes:** Integrates previous regulations from CBC 7A, CFC 49,and Title 14 into a single, unified WUI overlay code.
- **One-Stop Reference:** Serves as a comprehensive guide for WUI requirements, previously dispersed across multiple codes.
- Key Components Incorporated:
  - **CCR Title 14:** Minimum Fire Safe Regulations
  - **CFC Ch 49:** Defensible Space, Fire Smart Vegetation
  - **IWUIC Model Code:** Exterior design and construction of buildings, Retrofitting of buildings
- **Local Ordinance Integration:** Includes provisions for local ordinances and a reference matrix for cross-references.
- **Triggering Mechanism:** Emphasizes the role of Fire Hazard Severity Zones (FHSZ) in activating these regulatory requirements.

Application to California Hospitals

- Applies to new buildings in FHSZ/WUI areas
- Hospitals classified as essential facilities (Risk Category IV)
- Higher performance expectations
- Enforcement authority: HCAI / OSHPD 1
- Not retroactive for construction, but defensible space, vegetation requirements may apply

Vegetation Management Compliance §106.4



- Prior to the building permit final approval, the property shall be in compliance with the vegetation management requirements prescribed in §603, including PRC §4291 or CA Govt Code §51182
- The enforcing agency can determine the method of documentation
- Local Fire AHJ approval is documented using the HCAI Local AHJ Approval Form

2022 CBC
701A.5

Access & Water Supply Requirements

Fire Apparatus Access Roads
Roads

Mandated for emergency vehicle vehicle maneuverability and response. response.

Approved Water Supply

Must be capable of delivering the delivering the required fire flow for suppression suppression systems.

Emergency Water Storage

May be a requirement, ensuring ensuring water availability during main supply disruptions.

Standby Power

Essential for pumps and water systems to guarantee operation during power outages.

Address and Road Marking

Crucial for clear identification and navigation for emergency services, particularly for existing facilities.

Ignition-Resistant Construction – Key Areas

High-risk exterior components include:

- Roof assemblies
- Eaves and soffits
- Vents
- Exterior walls and wall coverings
- Glazing and doors
- Decks and projections
- Underfloor areas

Goal: Reduce ember intrusion and direct flame spread

Accessory & Miscellaneous Structures in WUI – Scope and Triggers

2025 CWUIC §504.11

- Structures accessory to a primary building on the same lot
  - Includes both attached and detached structures
  - Applies to structures that require a building permit
  - Common Examples:
    - Trellises / Arbors
    - Patio covers
    - Gazebos
    - Similar open or enclosed structures

Accessory buildings are **non-habitable**, but may still trigger WUI construction requirements depending on classification and enclosure.

Accessory Structures in WUI – What Actually Triggers Requirements

Enclosed accessory structure

- Considered buildings under WUI provisions
- Subject to ignition-resistant construction requirements
- May trigger full compliance depending on use and proximity

Miscellaneous structure

- May not meet definition of enclosed structure
- Often treated differently under WUI provisions
- Still may present fuel and exposure risks to primary structures

Misclassification of accessory structures can result in missed code requirements or inconsistent detailing, particularly in WUI-designated areas.

Miscellaneous & Accessory Structures

- Exceptions:
  - Decks complying with CWUIC §504.7.3
  - Awnings and canopies complying with CBC §3105

- These items are **not excluded**; they are **regulated elsewhere**

Four Primary Wildfire Exposure Pathways Require Coordinated Multi-System Protection

Ember Intrusion

Hot embers penetrate through vents, eaves, and underfloor areas, igniting fires within structures and creating interior combustion risks.

Radiant Heat Exposure

Intense thermal radiation from nearby burning vegetation heats building materials and ignites combustible contents without direct flame contact.

Smoke Infiltration

Smoke penetrates indoor spaces, causing elevated PM2.5 levels that degrade indoor air quality and threaten occupant respiratory health.

Infrastructure Disruption

Power loss and water supply interruption compromise cooling systems, water for suppression, and emergency response capabilities during critical moments.

Design implication: Single-system solutions are insufficient. Comprehensive wildfire resilience requires coordinated protection across all four exposure pathways simultaneously.

Roof & Eave Vulnerabilities

- Class A roof coverings required
- Enclosed eaves preferred
- Metal flashing at roof valleys
- Debris accumulation prevention
- Gutter protection to reduce ember ignition

Ventilation Opening Protection Requires ASTM E2886 Compliance and Cross-Discipline Coordination

All Openings Must Comply with ASTM E2886

Ventilation openings require testing per ASTM E2886 standard to ensure adequate protection against ember intrusion and wildfire exposure.

Corrosion-Resistant Mesh with Proper Opening Size

Use mesh materials with 1/16 inch to 1/8-inch opening size to prevent ember penetration while maintaining adequate airflow for ventilation systems.

Use CSFM-Listed Assemblies

All ventilation assemblies must be California State Fire Marshal (CSFM) or U.L. listed to ensure code compliance and documented performance verification.

Common Failure: Specification Mismatch

Architectural specs frequently do not match mechanical equipment submittals. Engineers must verify all HVAC equipment louvers meet Wildland-Urban Interface requirements.

Exterior Walls, Glazing & Doors

- **Ignition Resistance**

  Utilize ignition-resistant or noncombustible exterior materials to prevent ignition from embers and radiant heat.

- **Base Flashing**

  A minimum 6-inch noncombustible base flashing is required where exterior walls meet the foundation to prevent ember intrusion from below.

- **Glazing**

  Employ multilayer tempered glazing or approved fire-rated glazing assemblies to resist heat and prevent breakage.

- **Doors**

  Specify solid-core or fire-rated exterior doors to maintain integrity against fire penetration.

- **Sealing**

  Pay close attention to sealing all gaps at the perimeter and around penetrations to block ember entry.

Why FHSZ Matters

Importance of Fire Hazard Severity Zone (FHSZ) Designation

Determines Building Codes

Triggers specific specific construction standards for wildfire resistance.

Impacts Capital Planning

Crucial for budgeting and prioritizing facility upgrades and new construction.

Influences Insurance & Risk

Affects insurance premiums and the overall risk profile of healthcare facilities.

Affects Defensible Space

Mandatory compliance for mitigating immediate fire threats.

Guides Campus Hardening

Informs strategic planning for infrastructure resilience against wildfire risks.

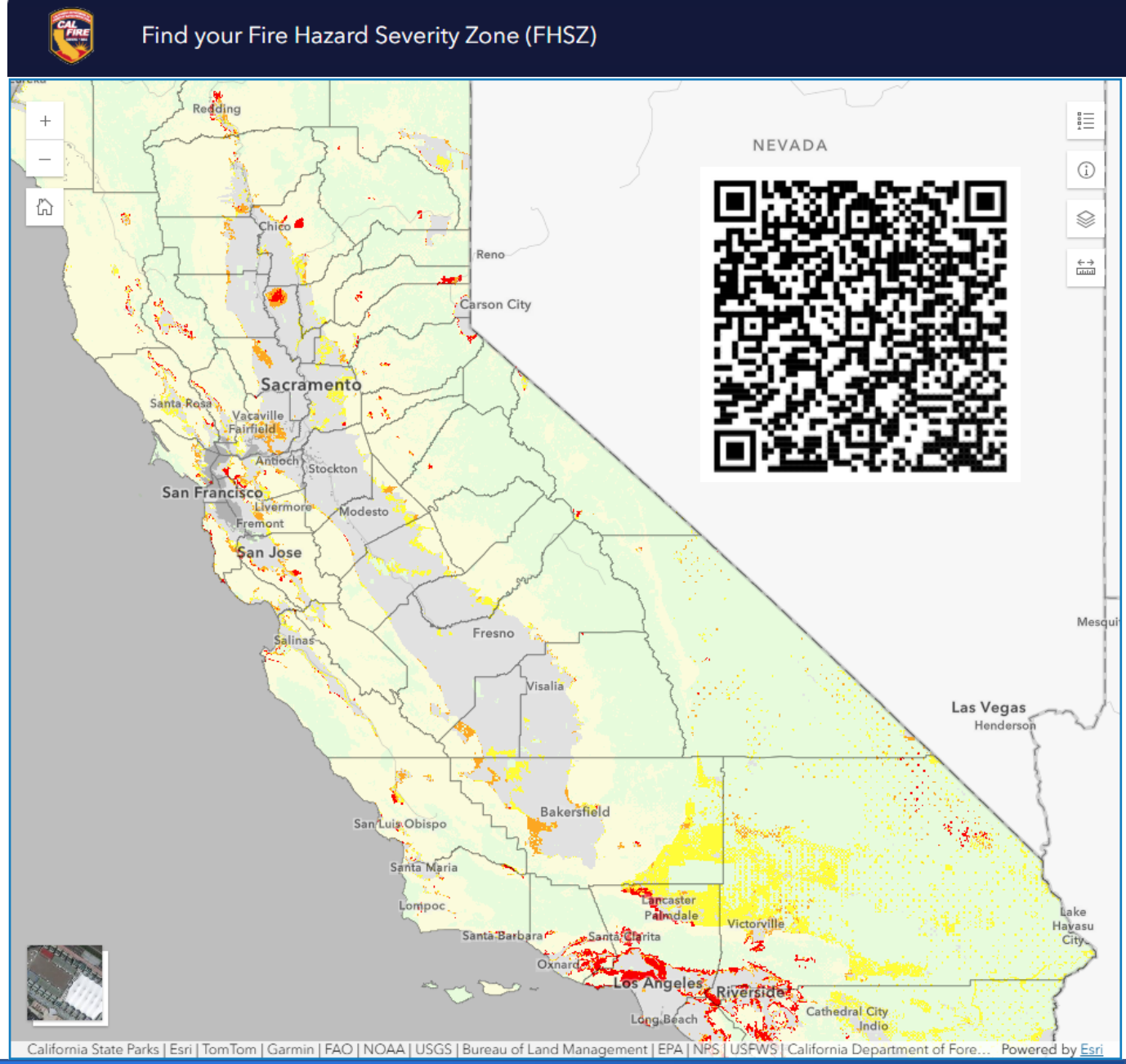
How to Determine Your Facility's FHSZ

Use CAL FIRE FHSZ maps

- Access the official maps provided by CAL FIRE to identify the designated Fire Hazard Severity Zones within your area.

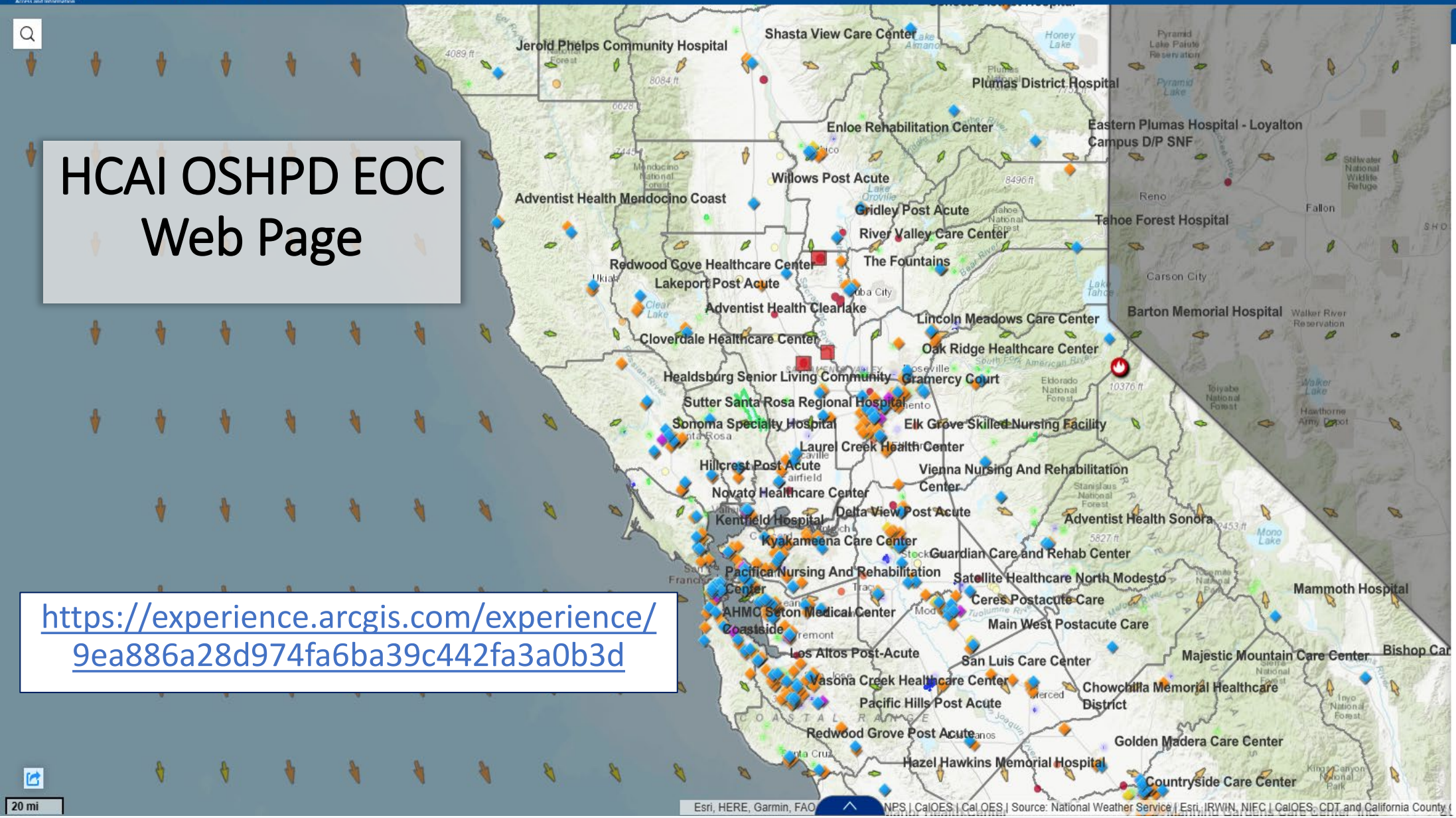
Review HCAI GIS layers

- Review the Geographic Information System (GIS) layers available through HCAI, which often integrate FHSZ data relevant to healthcare facilities.



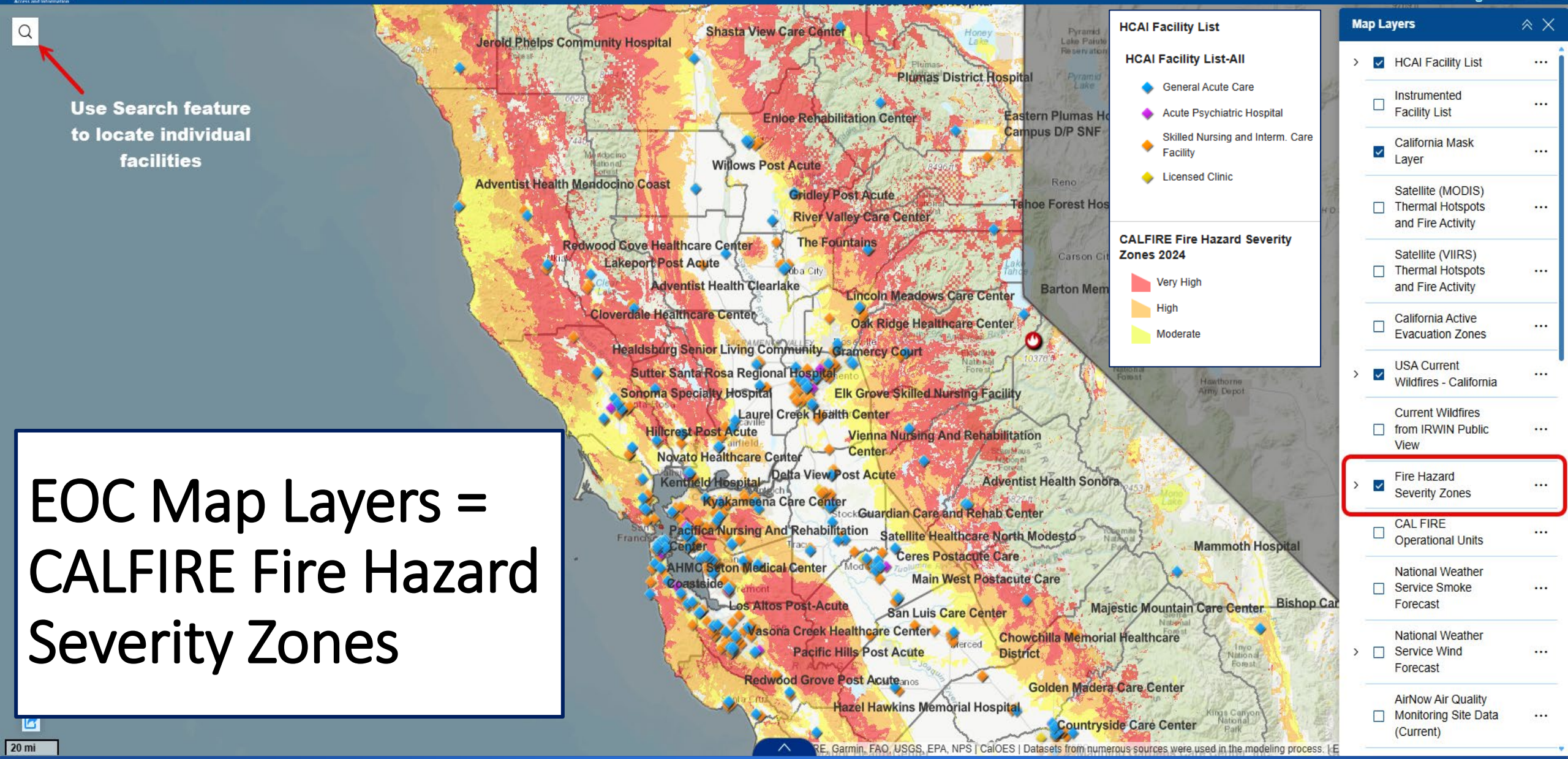
HCAI OSHPD EOC Web Page

https://experience.arcgis.com/experience/9ea886a28d974fa6ba39c442fa3a0b3d



Map Layers

- [x] HCAI Facility List
- [ ] Instrumented Facility List
- [x] California Mask Layer
- [x] Satellite (MODIS) Thermal Hotspots and Fire Activity
- [x] Satellite (VIIRS) Thermal Hotspots and Fire Activity
- [x] California Active Evacuation Zones
- [x] USA Current Wildfires - California
- [ ] Current Wildfires from IRWIN Public View
- [ ] Fire Hazard Severity Zones
- [ ] CAL FIRE Operational Units
- [x] National Weather Service Smoke Forecast
- [x] National Weather Service Wind Forecast
- [ ] AirNow Air Quality Monitoring Site Data (Current)



EOC Map Layers = CALFIRE Fire Hazard Severity Zones

Wildfire Exposure Pathways for Hospitals

- **Ember Cast**

  Embers traveling miles ahead of the flame front can ignite structures and vegetation far from the main fire.

- **Radiant Heat Exposure**

  Intense heat radiating from the fire can cause structural damage and compromise building integrity without direct flame contact.

- **Smoke Infiltration and PM2.5 Accumulation**

  Smoke can infiltrate buildings, impacting air quality, posing health risks, and reducing visibility.

- **Blocked Road Access**

  Wildfires can lead to road closures, hindering emergency services, patient transport, and staff access.

- **Electrical Grid Failure**

  Overburdened or damaged power infrastructure can lead to power outages, critically impacting essential hospital services.

Hospital Operational Characteristics Amplify Wildfire Vulnerability Beyond Typical Buildings

24/7 Operations with Critical Care Populations

Hospitals operate continuously with vulnerable patients requiring uninterrupted medical support and care

Limited or No Evacuation Capability for Ventilator-Dependent Patients

Many patients cannot be safely evacuated due to dependence on life-support systems and critical medical equipment

Regional Healthcare System Dependency—Failures Cascade

Hospital failures create cascading impacts across the healthcare system, affecting emergency response and patient care across entire regions

Design Failures Have Community-Wide Public Health Consequences

Critical infrastructure vulnerabilities directly endanger public health and safety across entire communities

Wildfire Events Impose Simultaneous Operational Stressors Across All Hospital Systems

HVAC System Strain

Continuous 100% outside air exclusion and increased filtration load straining mechanical systems beyond design capacity

Smoke Infiltration

Smoke infiltration degrading indoor air quality despite closed dampers, compromising patient and staff safety

Power Disruption

Power disruptions requiring extended generator operation beyond typical design parameters and fuel reserves

Staff Shortages

Staff absences due to evacuation orders and road closures reducing operational capacity during peak demand

Facility Access Limitations

Supply delivery delays and staff commuting challenges due to road closures affecting inventory and staffing levels

Smoke Readiness Requires Filtration Upgrades and Indoor Air Quality Monitoring

MERV 13 Minimum Filtration

Upgrade all air handling systems to MERV 13 minimum. HEPA filtration recommended for critical care areas, isolation rooms, and surgical suites to achieve highest particulate removal.

Continuous PM2.5 Monitoring

Deploy real-time indoor PM2.5 monitoring sensors throughout facility. Use continuous data to inform operational decisions during smoke events and optimize filtration system performance.

Clean Air Zones Designation

Designate specific clean air zones where patients can be consolidated during smoke events. Ensure these areas maintain negative or neutral pressure and prioritize their air supply.

Pre-Filter Replacement Strategy

Establish proactive pre-filter replacement protocols to maintain optimal airflow during multi-day smoke events. Stock adequate filter inventory and train staff on replacement procedures.

HVAC Systems Optimized for Infection Control May Underperform During Smoke Events

Reduce Outside Air Intake

Override economizer controls while maintaining code-minimum ventilation to limit smoke-laden outside air entry into the building.

Increase Recirculation

Enhance recirculation where code allows to reduce the proportion of contaminated outside air in the overall ventilation mix.

Evaluate Pressure Relationships

Maintain and monitor pressure differentials throughout the building to prevent smoke migration into critical zones and occupied spaces.

Add Carbon Filtration

Integrate carbon filtration systems where feasible to enhance particulate removal and improve indoor air quality during smoke events.

Critical Insight: Systems designed for biological contamination operate under fundamentally different assumptions than smoke protection. Effective response requires operational flexibility to adapt control strategies as conditions change.

Portable Filtration & Cleaner Air Spaces

- **Portable HEPA Units**

  Utilize portable HEPA filtration units for critical areas to maintain air quality.

- **Designate Clean Air Rooms**

  Establish specific rooms as designated "clean air" spaces.

- **Operational Protocols**

  Develop and implement written protocols for the operation of filtration systems.

- **Redundancy for Critical Areas**

  Consider implementing redundant systems for high-risk areas such as ICU and ED.

Testing Before Wildfire Season

- Test HVAC in smoke-ready mode
  - Verify damper control functionality
  - Confirm filter seating and sealing integrity
  - Evaluate pressure relationships within the system
- Identify failure points before emergency

Smoke Readiness Planning

Ensuring Operational Continuity and Patient Safety

Evaluate HVAC systems for vulnerabilities to smoke and assess capacity for enhanced filtration and air exchange.

Implement higher-efficiency filters (MERV 13 or higher, or HEPA) for critical areas to reduce particulate matter.

Establish real-time time monitoring of of indoor air quality quality (PM2.5) for for informed decision making.

Explore and implement portable air filtration units for high-risk or sensitive areas.

Create a detailed checklist for staff covering HVAC adjustments, monitoring, communication, and safety measures during smoke events.

Standby Power Systems Face Duration and Load Assumptions That Underestimate Wildfire Events

Generator Runtime Capacity

Generator runtime capacity typically 48–96 hours; wildfire events can disrupt power for 7–14 days.

Fuel Resupply Logistics

Fuel resupply logistics compromised by road closures and regional demand surge, limiting generator runtime extension.

HVAC Electrical Load

Increased HVAC electrical load during smoke events due to continuous fan operation strains backup power capacity.

Load Shedding Conflicts

Load shedding strategies may conflict with patient care requirements, limiting operational flexibility.

Design Gap

Review generator sizing and load prioritization with realistic wildfire duration scenarios.

Fire Access and Water Supply Infrastructure Often Designed for Normal Operations, Not Wildfire Conditions

Fire Access Roads

Width, grade, turning radius, and surface requirements must be engineered specifically for wildfire response conditions, not standard traffic assumptions

Required Fire Flow Calculations

Standard calculations must account for multiple simultaneous ignition points across the facility and surrounding areas during extreme wildfire scenarios

Emergency Water Storage

Dedicated storage capacity essential for power outage scenarios when grid-supplied systems become unavailable during extended wildfire events

Backup Power for Fire Pumps

Reliable backup power systems must ensure water delivery continues during grid failure, with sufficient fuel reserves and automated failover mechanisms

Surge Capacity Considerations During Wildfire Events

Community Displacement

Evacuations lead to an influx of displaced individuals seeking shelter and medical attention.

Respiratory Illness Spikes

Poor air quality increases respiratory conditions, requiring urgent care.

Regional Facility Closures

Nearby facilities may close, diverting patients to unaffected hospitals.

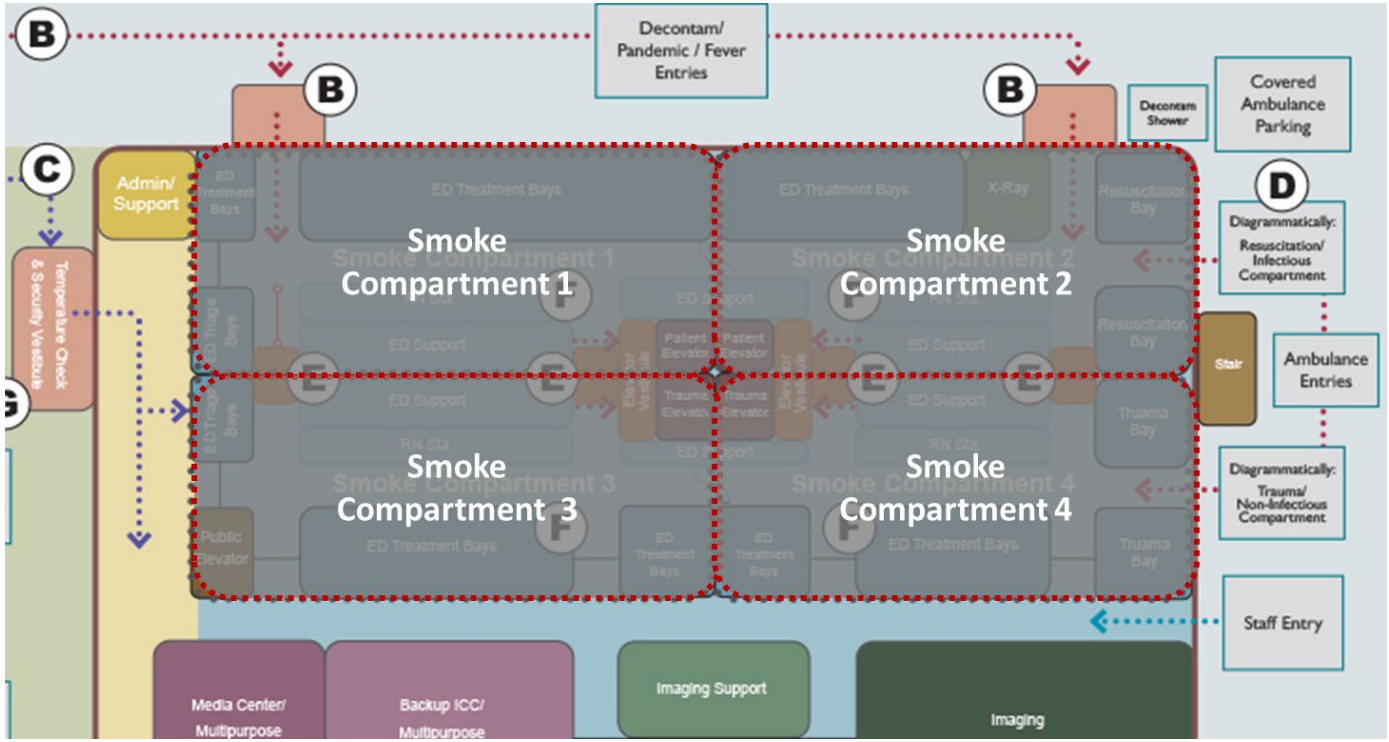
Hospitals must proactively plan for increased patient volume and ensure the continuity and protection of their internal operations.

Exterior Triage & Patient Arrival

- Separate ambulance and walk-in access
- Exterior screening capability
- Weather-protected triage areas
- Clear signage and traffic flow
- Prevent cross-contamination

Compartmentation Strategy

- Smoke compartments in ED
- Separate infectious and non-infectious zones
- Redundant HVAC per compartment
- Supports relocation without full evacuation



Shelter-in-Place Is the Default Strategy—Evacuation Is Reserved for Structural Threat Scenarios

Decision Factors

Indoor vs outdoor air quality, structural fire risk, power status, road access

Shelter-in-Place Supported By

Envelope integrity, HVAC smoke protection, adequate power, defendable space

Evacuation Considered Only When

Direct flame threat, complete power loss, loss of water supply, confirmed road access

Key Message

Design must prioritize in-place protection over evacuation reliance. Evacuation of ventilator-dependent patients is medically hazardous.

Alternate Care Sites

- Identify off-site surge locations in advance
- Evaluate utilities and ventilation capacity
- Coordinate with local jurisdictions
- Remote sites are resource-intensive — not first choice

What Can You Do Now? Immediate Next Steps

- **Confirm FHSZ designation**

  Verify the facility's designation within the Fire Hazard Severity Zones.

- **Conduct exterior vulnerability assessment**

  Evaluate the external environment for potential hazards and vulnerabilities.

- **Test HVAC smoke mode**

  Ensure the Heating, Ventilation, and Air Conditioning system's smoke detection and operational mode are functioning correctly.

- **Review generator and fuel capacity**

  Assess the backup generator's capabilities and the available fuel supply.

- **Update Hazard Vulnerability Assessment (HVA)**

  Revise the HVA to incorporate current risks and emerging threats.

- **Align capital projects with WUI requirements**

  Ensure that planned capital investments comply with Wildland-Urban Interface regulations.

Aligning Design & Operations for Wildfire Resilience

Foundational Pillars for Wildfire Resilience

Building Envelope Design

Focus on ignition-resistant materials and construction to withstand ember intrusion and radiant heat.

Mechanical Systems Flexibility

Ensure HVAC systems can adapt to smoke, maintain air quality, and operate reliably.

Emergency Management Planning

Develop robust protocols for smoke events, power outages, access, and evacuations.

Code Compliance

Adhere to updated regulations (e.g., Title 24 Part 7 for WUI areas).

Long-Term Capital Investment

Strategically allocate resources for facility hardening, system upgrades, and maintenance.

DESIGN DECISIONS MUST ACTIVELY SUPPORT OPERATIONAL CONTINUITY DURING WILDFIRE EVENTS.

Five Essential Actions for Design Professionals to Ensure WUI Compliance and Operational Resilience

1

Confirm WUI Applicability and FHSZ Classification

Determine WUI applicability and FHSZ classification during site selection or programming phase—before schematic design begins.

2

Integrate WUI Requirements into Basis of Design

Integrate WUI requirements into the Basis of Design document and distribute to all consultant team members to ensure alignment.

3

Establish Coordination Protocols

Establish coordination protocols across architectural, structural, MEP, civil, and landscape disciplines to ensure comprehensive WUI integration.

4

Align Design Decisions with Operational Goals

Align design decisions with the owner's operational continuity goals and emergency response capabilities to support resilience objectives.

5

Engage Facility Leadership on Resilience Strategy

Engage facility leadership on resilience strategy beyond minimum code requirements—discuss duration, surge capacity, and system flexibility.

WUI readiness is a team responsibility requiring proactive coordination from project inception.


Q&A

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Item #4 Continued

- Review draft slides for Topic 3 Webinar: *Wildland Interface – HVAC*
  - Scheduled for June 10, 2026
  - Webinar presenters: Abdel Darwich, PE, LEED AP, HFDP; and Mikhail Fuks, PE, HFDP, DBIA
- Discussion and public input

HCAI Design Guide for Planning and Preparing for Disasters Wildfire-Urban Interface-HVAC

By

Abdel K Darwich, PE, ASHRAE Fellow, LEEP AP, HFDP

Mikhail Fuks, PE, HFDP, DBIA

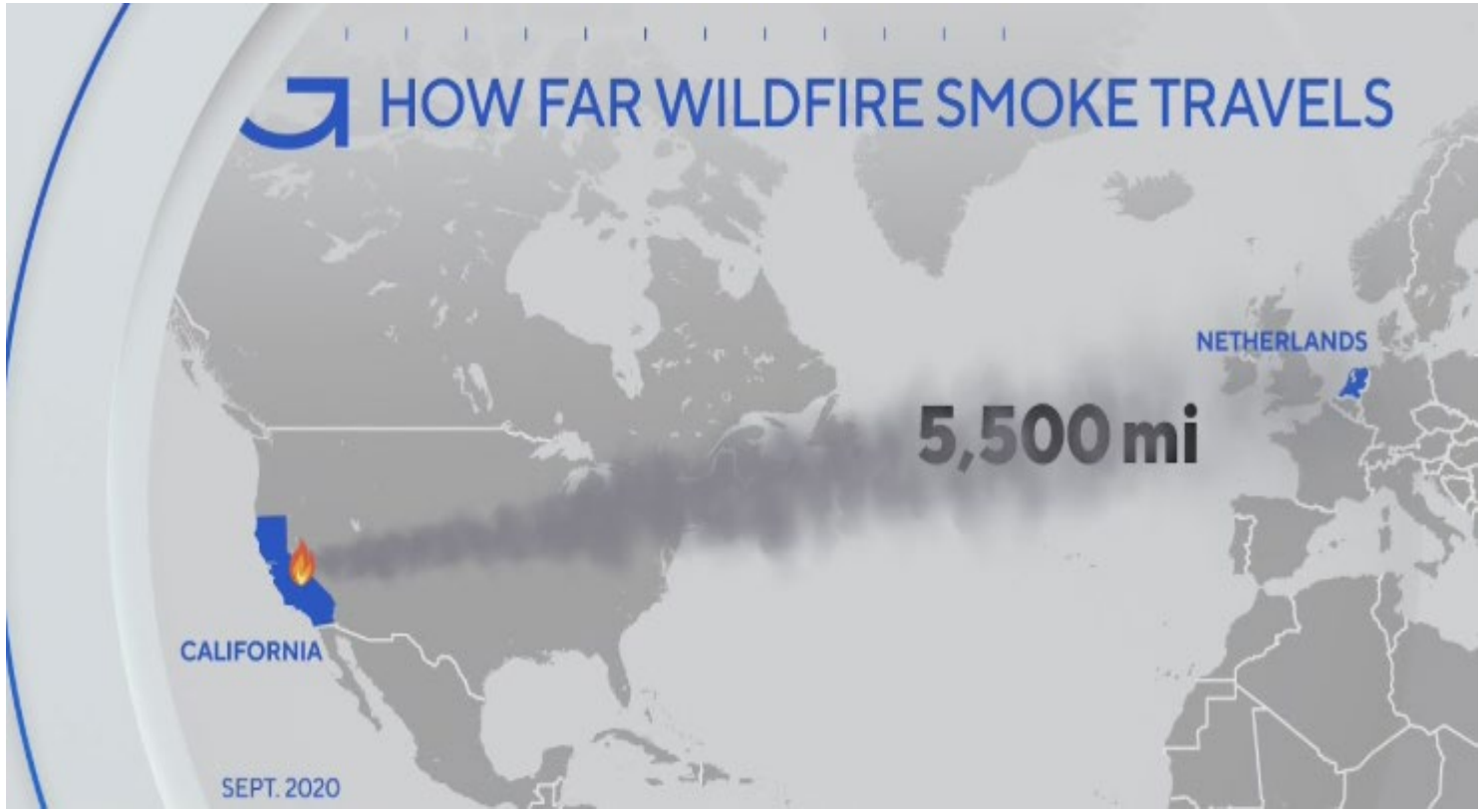
Agenda

- Background
  - Why this presentation?
  - What is wildfire smoke composed of?
  - What happens during a wildfire?
  - Types of Filters
  - Sources : HCAI DGPPD and ASHRAE Guideline 44
- Concepts to protect buildings from wildfire smoke
- Knowing first
- Planning second
- How does wildfire smoke enter a building
- Measures to mitigate wildfire smoke
- Healthcare Facilities Extra Precautions
- Triple Murphy's Law
- The future

Wildfire Smoke is a hazard !

Smoke for Wildfires is also a hazard in addition to the fire itself

It can travel hundreds and thousands of miles !

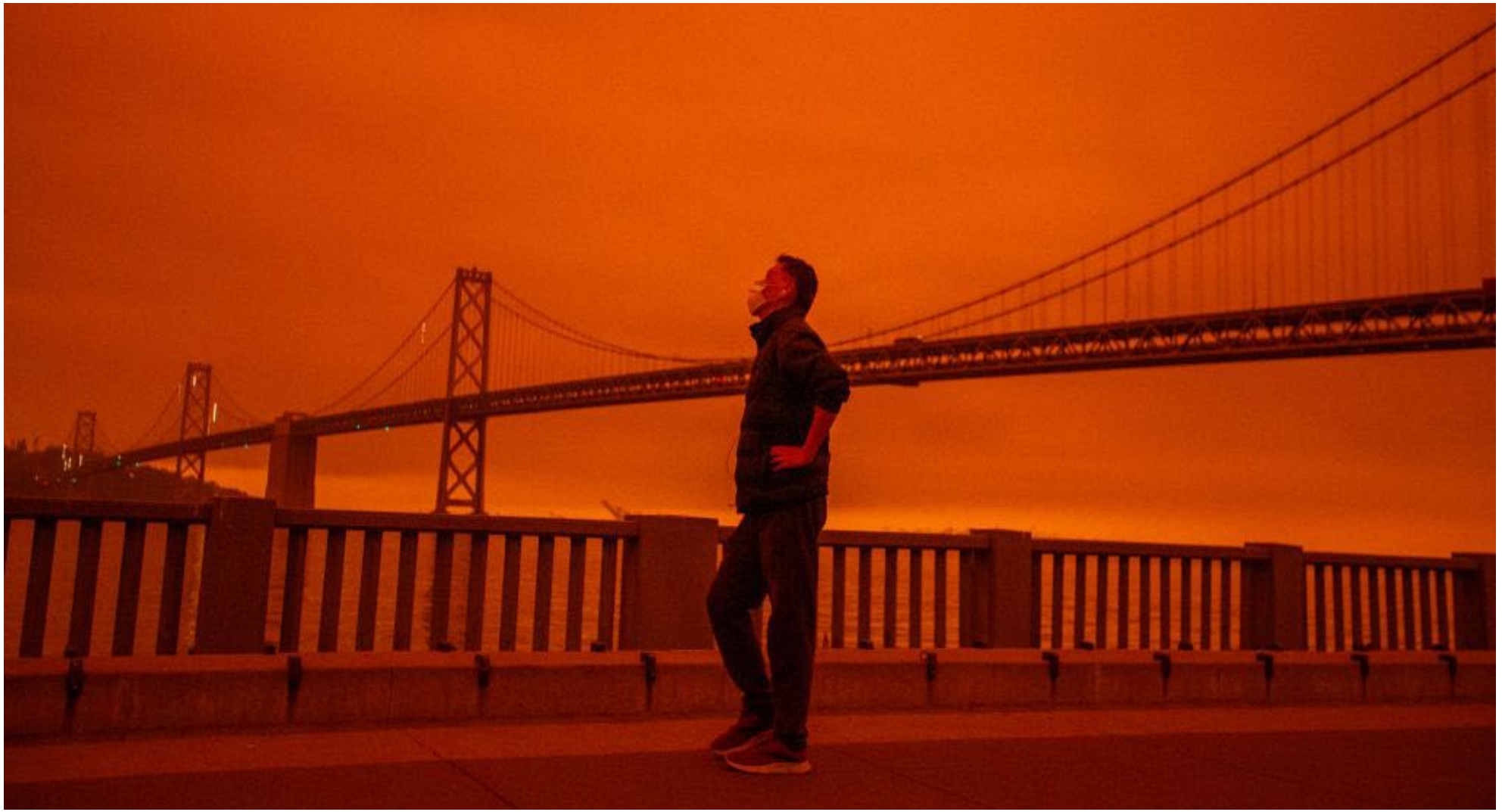


Sacramento

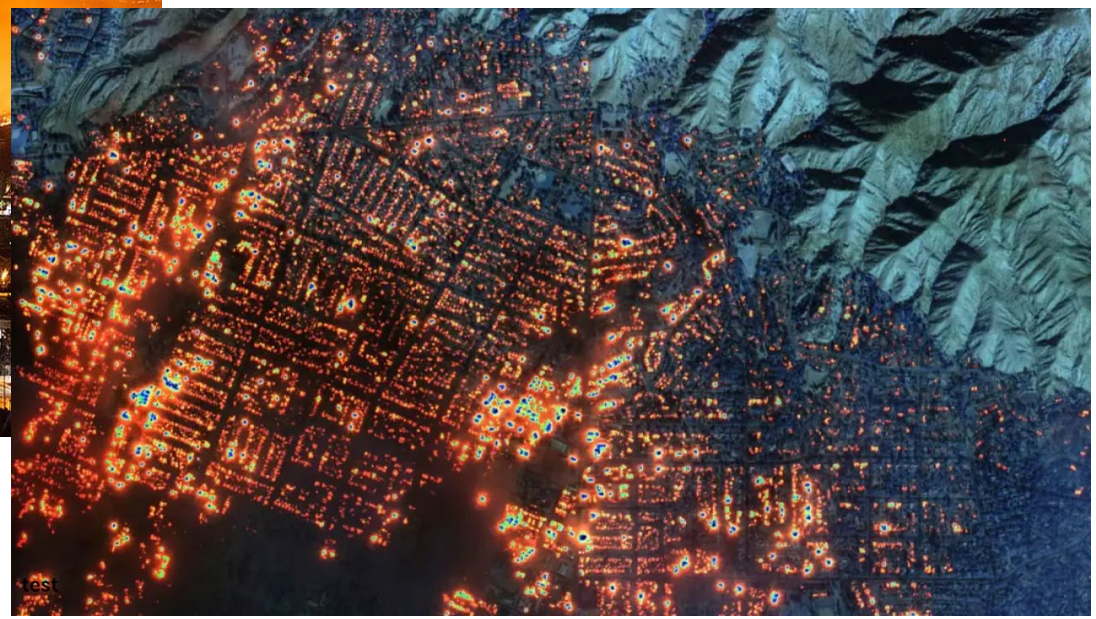
October 2018

Sacramento

November 2018



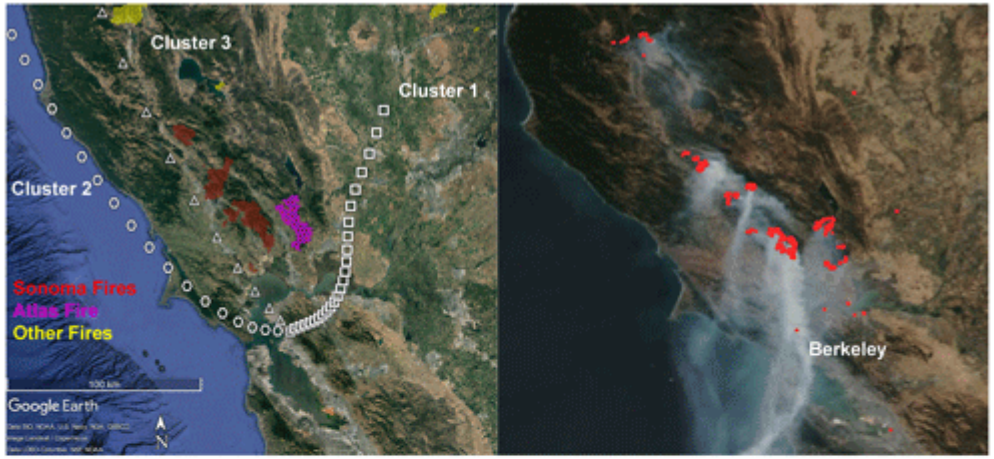
San Francisco September 2020

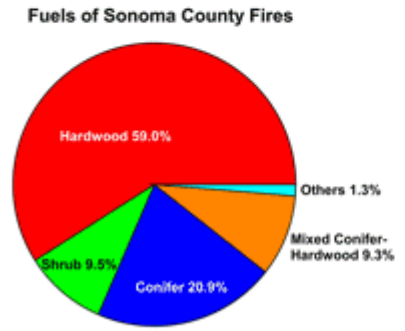


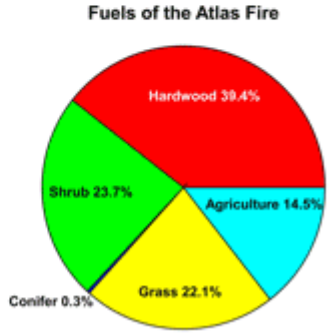
Los Angeles 2025

What is wildfire smoke composed of?

- Wildfire smoke composition depends upon multiple factors
  - the types of wood and vegetation burning
  - the moisture content
  - the fire temperature
  - wind conditions
  - other weather-related influences
- Getting more complicated with Wildfires/Urban fires





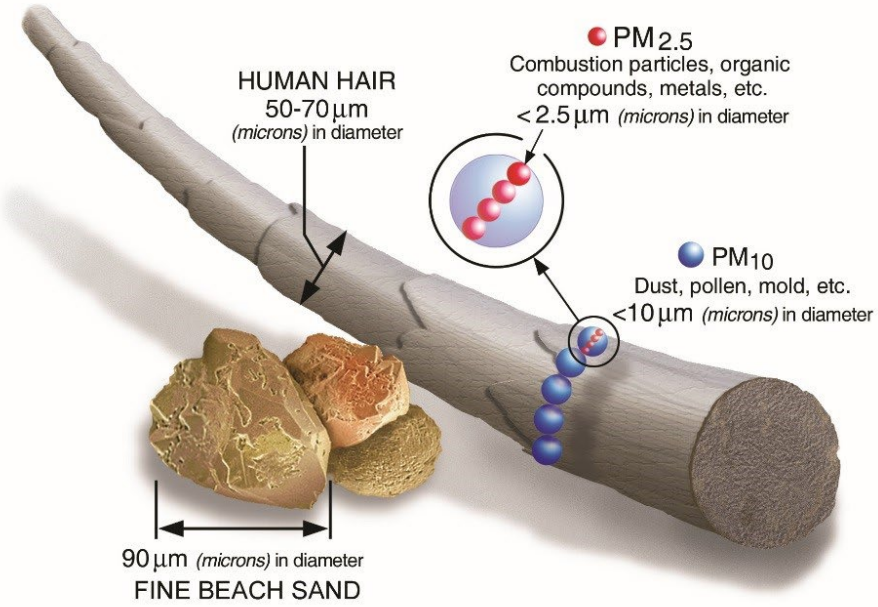


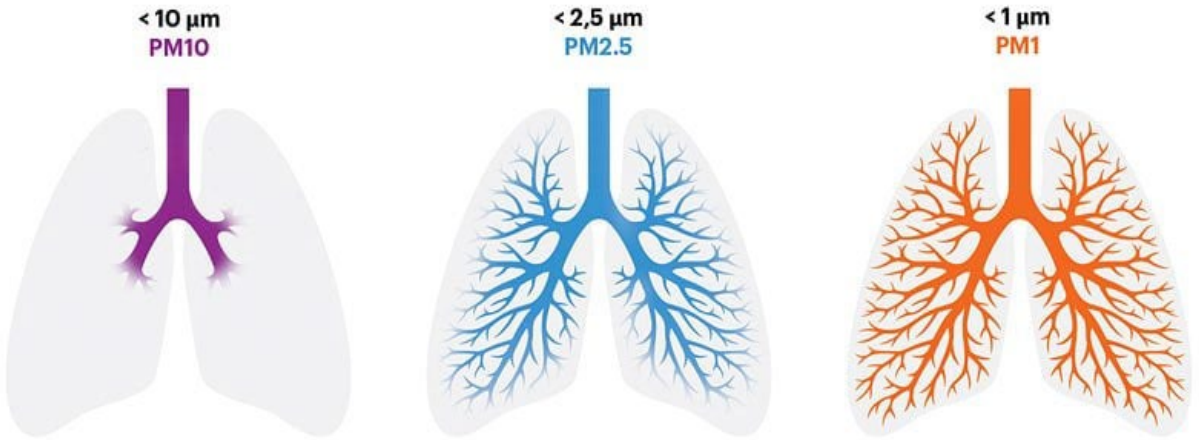
What is wildlife fire composed of ?

- Gases
  - Oxides of nitrogen (NOX)
  - Volatile organic compounds (VOCs) – *most "smellable"*
  - Ground-level ozone (O3) formed when NOX and VOCs interact with UV in sunlight
- Particles
  - Composition : Carbon, heavy metals
  - Size : All sizes but PM2.5 *most dangerous*
  - Recent research showing ultra fine particles present

PM2.5

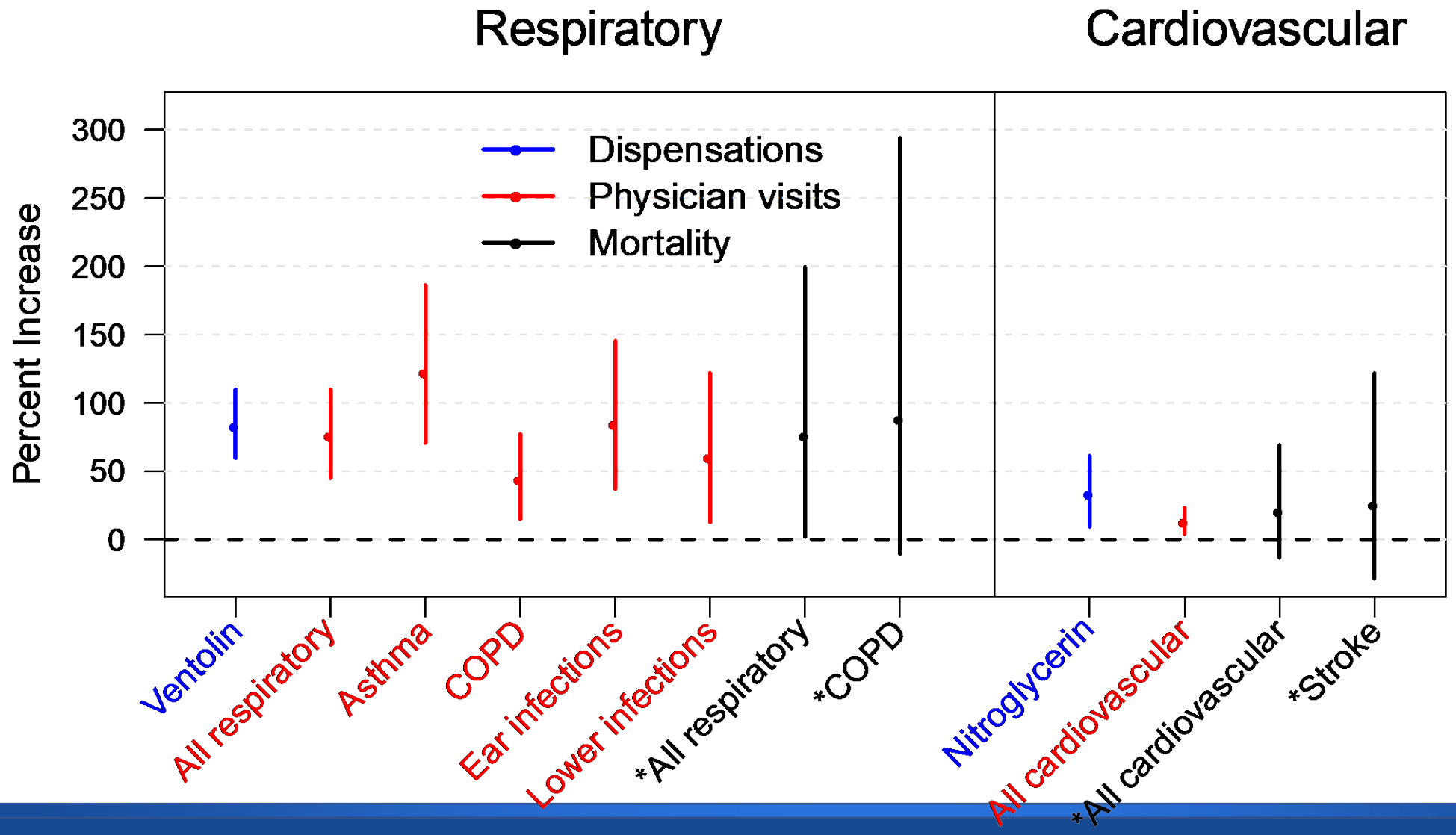
- Particulate Matter with particles that are 2.5 microns or less in diameter (PM2.5).
- Penetrates deep into the human lungs. Documented adverse heat effect.
- Most noticeable increase in wildfires





Acute Effects on a Smoky Day in British Columbia

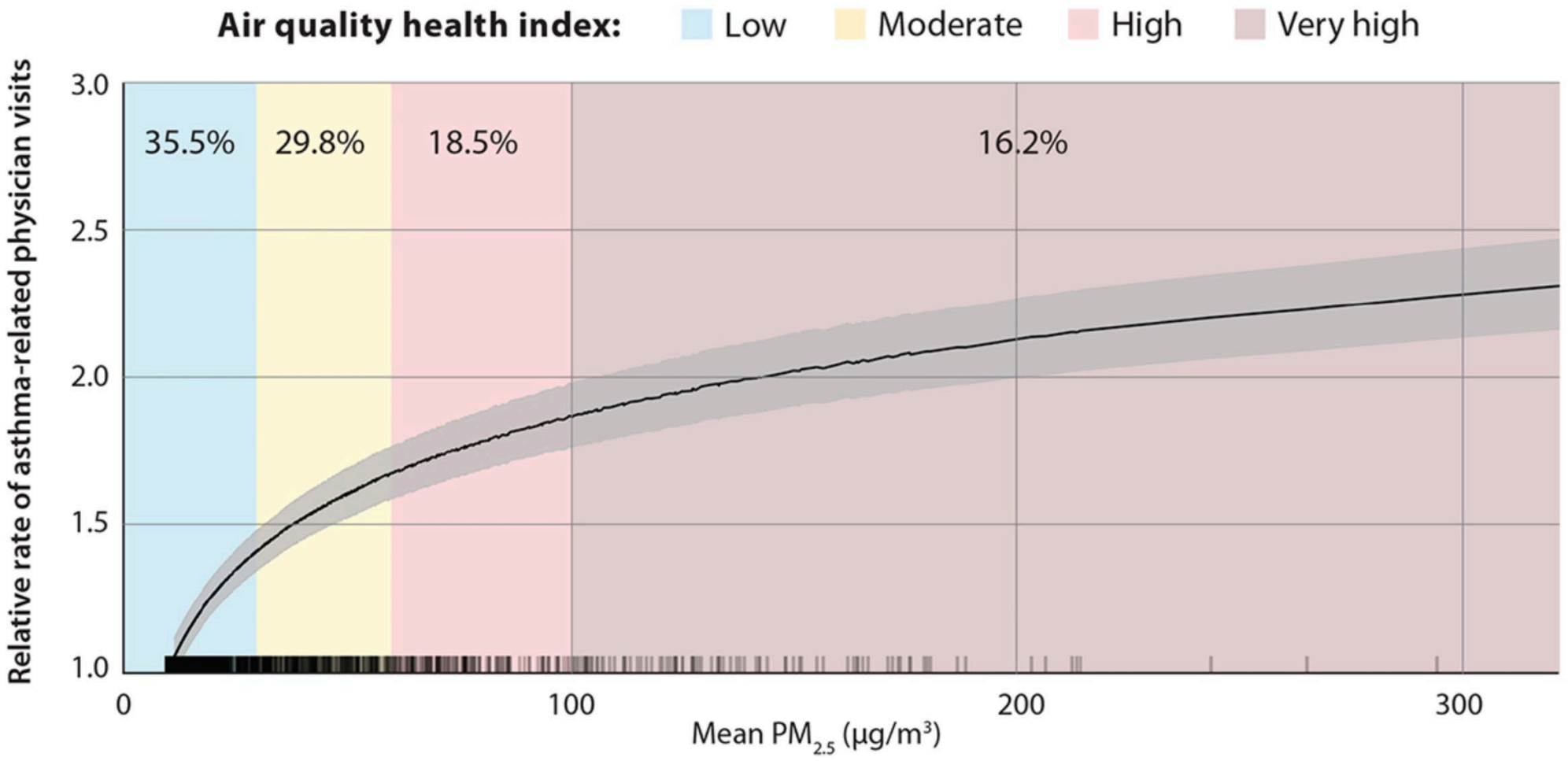
(100 μg/m^3 $PM_{2.5}$)



*Unpublished data

The Acute Effects are NOT Linear

Air Quality Health Index

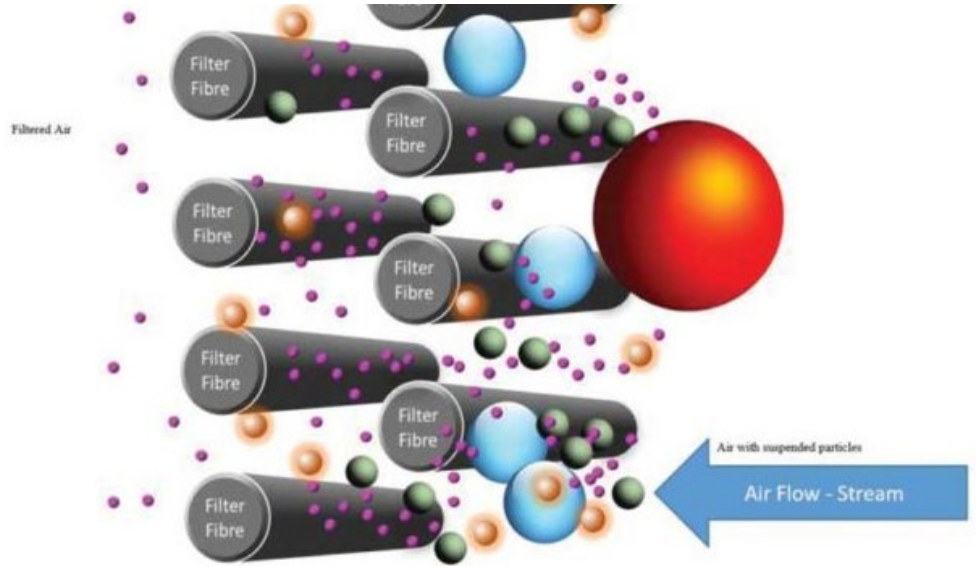


bcmj.org/bc-centre-disease-control/public-health-paradox-wildfire-smoke

Types of filters

- Particulate filters
  - Stops particulate by interception
  - Cannot stop gases
  - MERV/HEPA rated filters

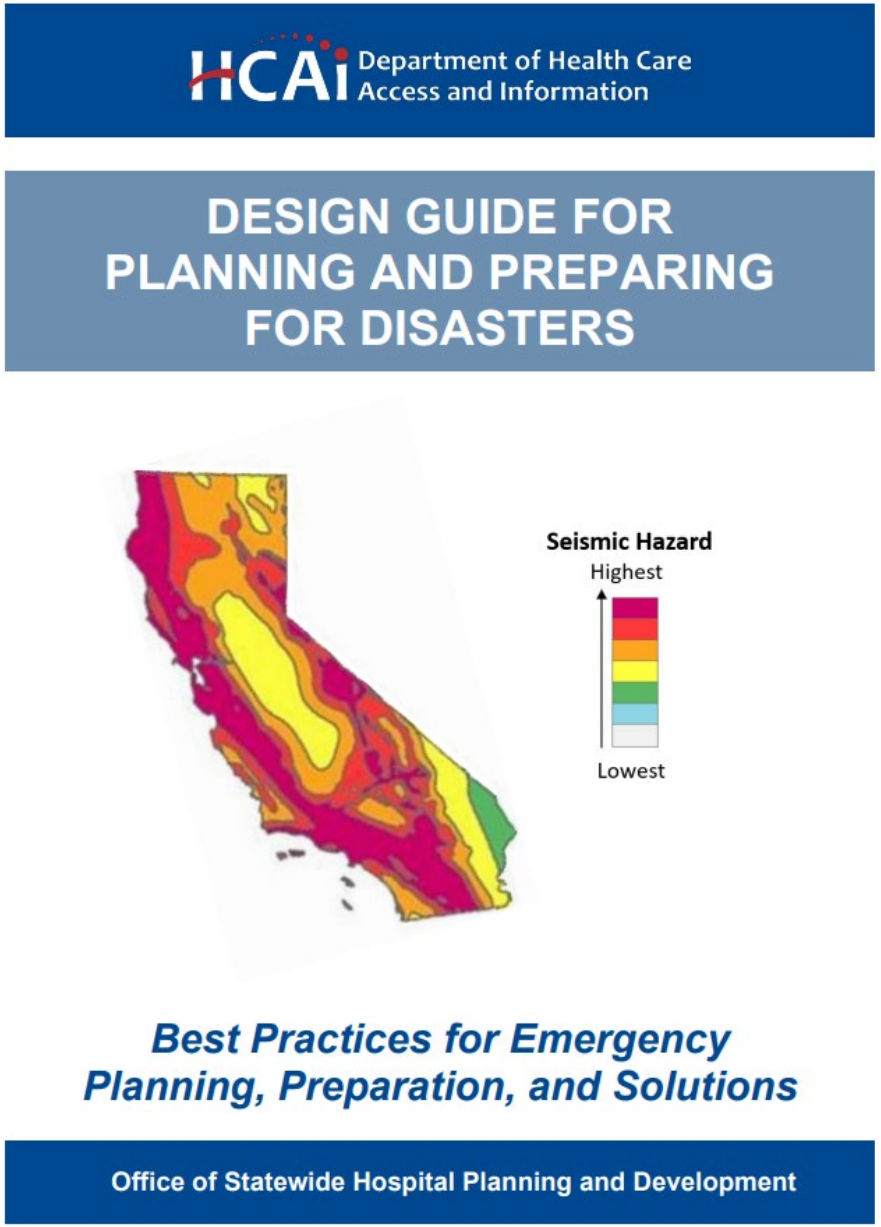
- Gas Phase filters
  - Physical
  - Chemical



Sources of Info

1. HCAI/OSHPD- Design Guide for planning and preparing for Disasters

- Worked on it 2020-2022
- Published in March 2024
- Section 7 is titled “HVAC System Considerations for Handling Smoke During Wildfires



Sources of Info

2. ASHRAE Guideline 44

- Committee started July 2021
- Detour : Published a white paper in 2022. Used as a basis for HCAI DGPPD.
- Published Guideline 44 in January 2025
- Free access after LA and Canadian fires

Protecting a building from a wildfire smoke

- Key concepts
  - Knowing
  - Planning
  - Preventing smoke from getting indoors
  - Removing smoke contaminants that get indoors

Knowing first….

- PM2.5 sensors
  - Recommendation : install permanent PM2 sensors
    - Outside (not Outside Air intake) OR data can be obtained online from an adjacent regional monitor
    - Entryways: in a hallways, ambulance bays, and loading docks near a building entrance to assess smoke ingress in the building
    - High occupancy areas, or areas occupied by at-risk populations

Knowing

Planning second…

- Extended periods of significant smoke are no longer a surprise.
- There is no longer such a thing as fire season.
- Planning is key. A plan is necessary for the next wildfire.
- **Nothing good happens at the last minute**

Planning

Planning second….

- Develop a Smoke Readiness Plan (SRP) : 4 parts. More details in DGPPD Section 7.2 And Guideline 44 Section 6.
- Questions to get started :
  - Will the building be occupied during a smoke event?
  - If so, for 1 day? Or for the duration?
  - Any specific areas of refuge?

1. Preparation section
   - The What : Specific building elements for controlling smoke
   - The Who : Roles and responsibilities of staff responsible for implementing the plan
   - The how much : Expected costs associated with implementing the plan

Planning

Planning second….

- Develop a Smoke Readiness Plan (SRP) :
  2. Testing section
     - Test all components, sensors and the overall plan
  3. Implementation section
     - When to implement the plan
  4. Return to normal operations
     - When and how to return to normal operations
- Coordinate Smoke Readiness Plan with Infection Control Group in healthcare facilities.

Planning

Communication of the smoke readiness plan (SRP)

- Facilities O&M should know the SRP and be trained on implementing it
- For new project, include in the OPR (Owner Project Requirement) and the BOD (Basis of Design)
- Include in Sequence of Operations and make sure it is commissioned

Planning

How does wildfire smoke enter a building?

- **Intakes** - outdoor air intakes at HVAC systems.
- **Doors** - entrance and egress points into the building.
- **Envelope elements** - windows, skylights, or other penetrations in the opaque envelope.
- **Leakage** through the opaque envelope.
- **Emissions** from contaminated clothing from occupants.

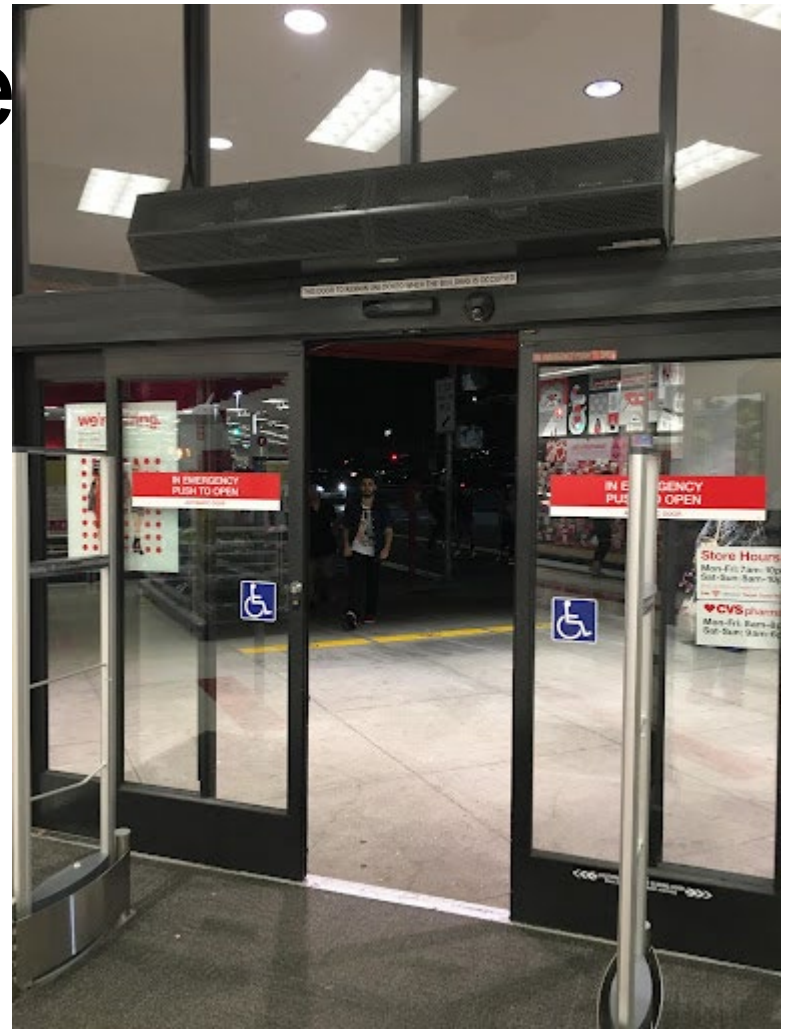
Outdoor air intakes measures

- Minimize outdoor air
- Do not completely shut down outdoor air !
- Disable economizers
- If 100%OA, consider going to recirculation
- Seal any ducts that are outdoor and under negative pressure
- Natural ventilated spaces – switch to mechanical

Preventing

Doors/Entrances measure

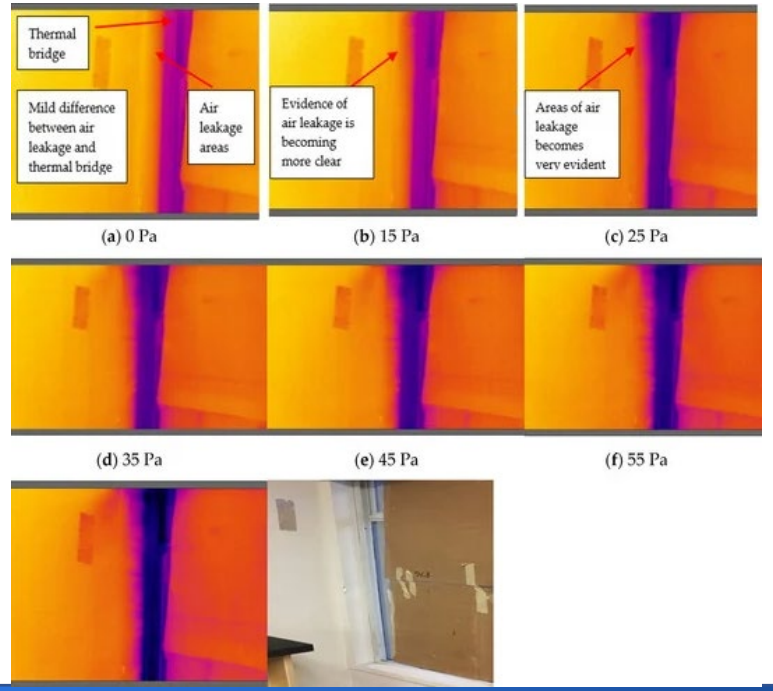
- Positively pressurized vestibules at all entrances
- Air curtains at all frequently used doors like ED, loading docks
- If new building, avoid doors facing prevailing wind direction



Preventing

Envelope measures

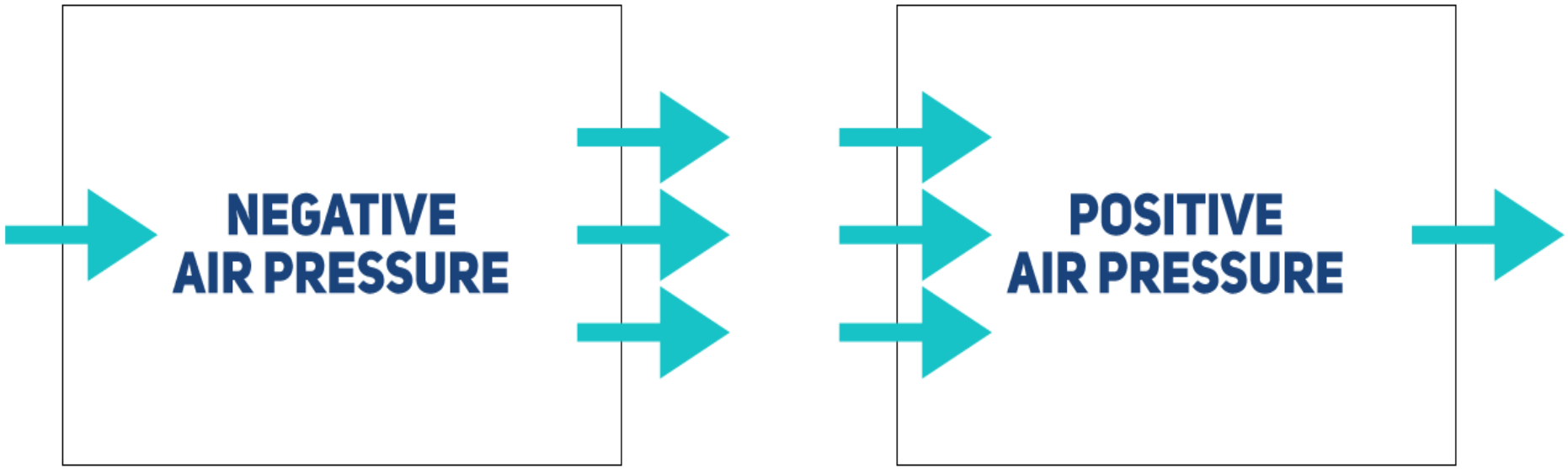
- Weatherize the building envelope, doors, and windows to reduce smoke infiltration by sealing and caulking cracks
- If existing building :
  - Visual inspection
  - Professional inspection
- If new building :
  - Commission the envelop
  - Set air leakage goals



Preventing

KEEP your building positive

- Always keep outside air more than exhaust air
- Use your BMS ! Building Management System
- Install airflow measuring stations if needed



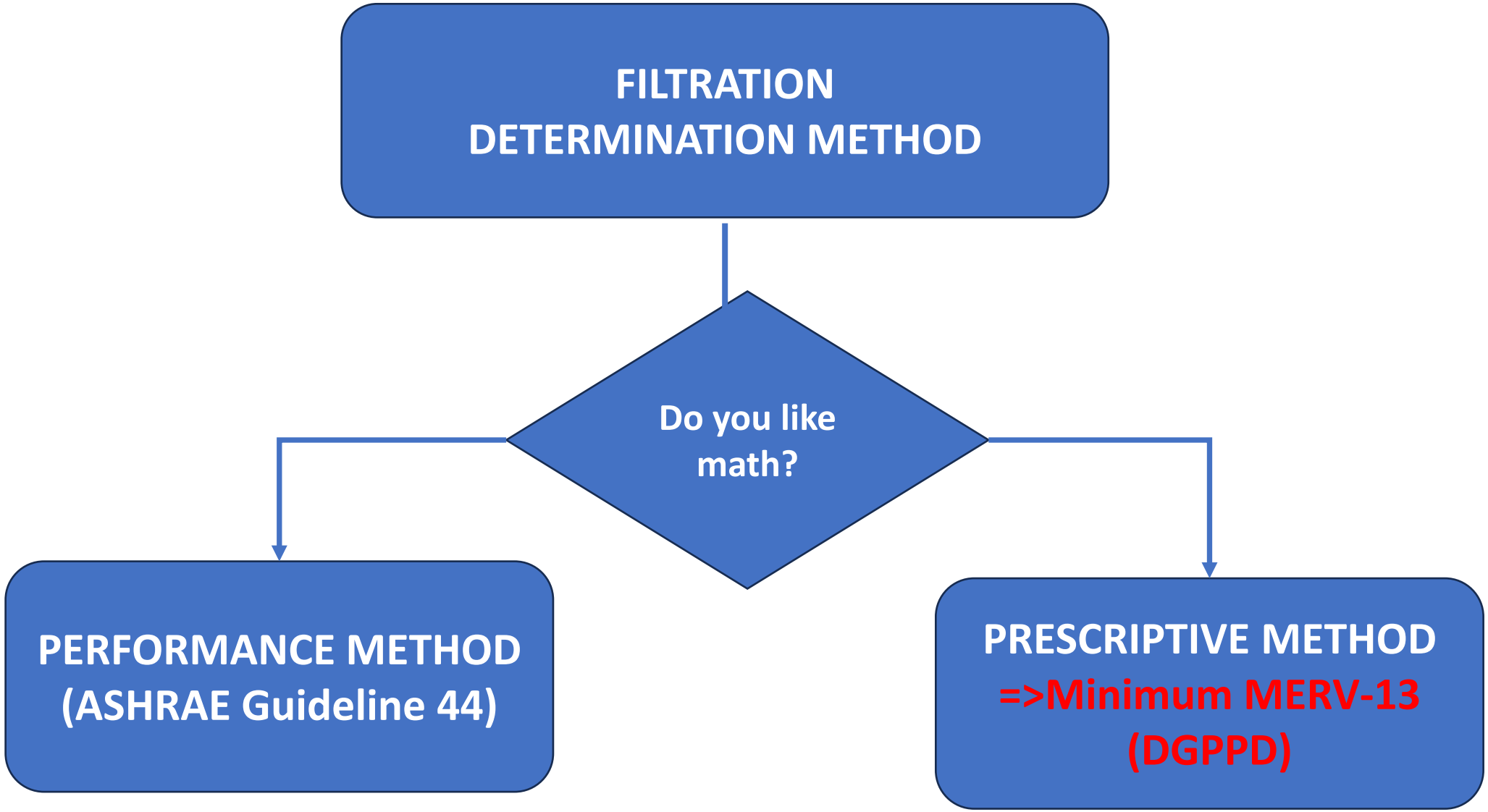
Preventing

Filtering wildfire smoke

- Most important goal : filter PM2.5 → Particulate Filters
- Optional : Filter gases
- What filter efficiency is needed ?

Figure 7.3 – Filter Before and After Load From Wildfire

Removing


FILTRATION
DETERMINATION METHOD
Do you like
math?
PERFORMANCE METHOD
(ASHRAE Guideline 44)
PRESCRIPTIVE METHOD
=>Minimum MERV-13
(DGPPD)

Removing

Prescriptive Method
Filter minimum MERV method

- MERV = Minimum Efficiency Reporting Value
- DGPPD and ASHRAE Guideline 44 → Minimum MERV-13
- MERV-13 will stop 85% of PM2.5 passing through

Removing

Filter efficiency Performance method

- ASHRAE Guideline 44 equation with the following variables:
  - Outdoor PM2.5 concentration
  - Airflow
  - Indoor PM2.5 concentration
  - Filter efficiency

Removing

Other filter considerations

- Frequency of filter change during a wildfire event
  - ASHRAE Guideline 44 gives a method and example
  - Filter loads. When does it fail?
  - Anticipate to change filters very frequently and have them in stock
- Inspect existing filter frames for any leakage !

Removing

Filters-going beyond the minimum

- Have empty racks in AHUs for HEPA and gas phase filters (e.g. carbon filters)
- Need to size the fan and the VFD to account for extra pressure drop
- Extra filtration -> extra energy usage

Removing

Portable air cleaners

- Additional localized filtration
- Purchase in advance and store
- Make sure they do not generate ozone
- Rating is still residential by AHAM. CADR = Clear Air Delivery Rate.
- For wildfire fire smoke, AHAM recommends CADR equal to the size of the room in square feet, e.g., for a room of 120 sq.ft , the CADR should be 120.
- For new projects, plan for more power outlets and storage space
- The deployment of PACs in health care facilities should be reviewed with the facility infection control team. Given the large areas in hospitals, the airflow from PACs may become large enough to compromise infection control.

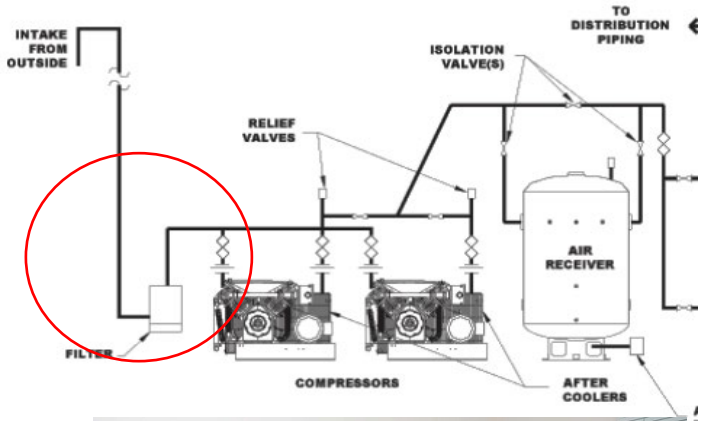
Removing

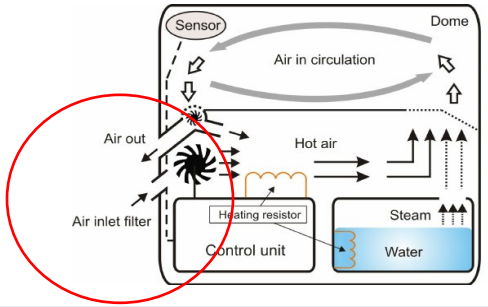
Healthcare facilities

- Continuous operation under even severe wildland fire smoke. Hospital emergency departments near the fire must remain operational to treat firefighters and affected community residents.
- Hospitals may contain clean rooms (e.g., compounding pharmacies). Smoke could rapidly load the filters in these areas.
- Spaces in health care facilities have to maintain a certain pressure (positive or negative). Consult with Infection control before changing OA or changing pressure especially in :
  - Operating room suites
  - Nurseries and pediatric care
  - Patient waiting and outpatient care areas
  - Patients in hematology/oncology units who may have compromised immune systems.

Non-HVAC filters in hospitals

- Non-HVAC filters will also load up from wildfire smoke
- Medical Air Compressor – Filter on air intake
- Filter in medical equipment like NICU incubators
- Have a full inventory and lots of spare



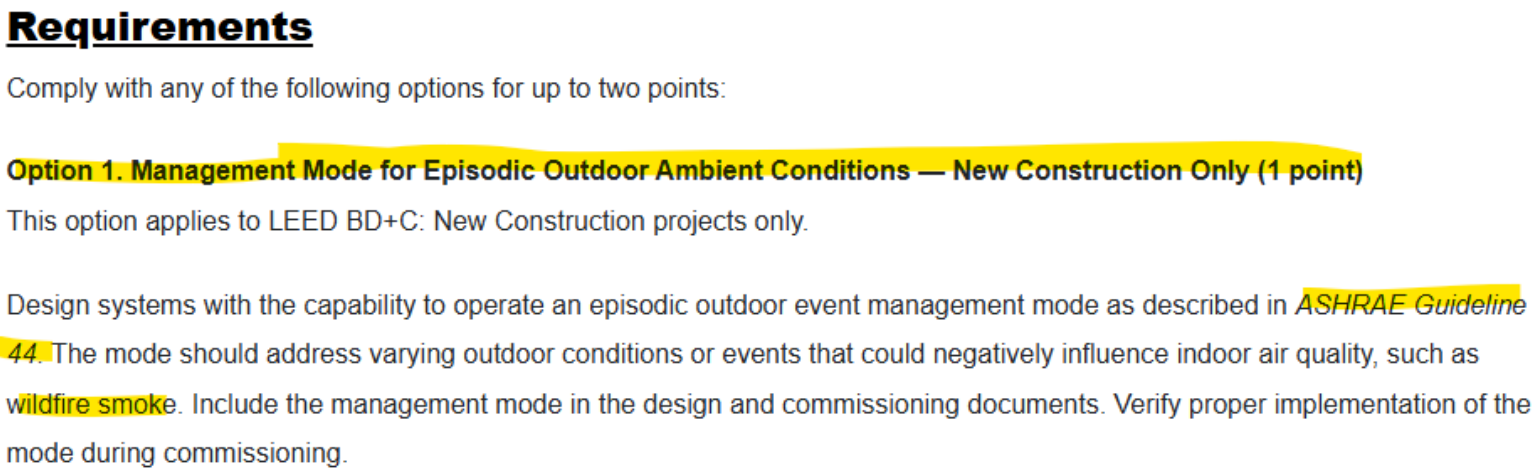


Triple murphy’s law

- EARTHQUAKE + PANDEMIC +WILDFIRE ?
- YES in August to November to 2020 in Northen California
- Wildfire = Minimize Outside Air
- Pandemic = 100%OA (maybe not after ASHRAE 241)
- What to do ?

The future

- Wildfires will be a continuous threat
- Buildings MUST be designed for this disaster
- LEED v5 will have one credit point for applying Guideline 44 to mitigate wildfire smoke.



Requirements

Comply with any of the following options for up to two points:

Option 1. Management Mode for Episodic Outdoor Ambient Conditions — New Construction Only (1 point)

This option applies to LEED BD+C: New Construction projects only.

Design systems with the capability to operate an episodic outdoor event management mode as described in *ASHRAE Guideline 44*. The mode should address varying outdoor conditions or events that could negatively influence indoor air quality, such as wildfire smoke. Include the management mode in the design and commissioning documents. Verify proper implementation of the mode during commissioning.

Thank You

Questions

Item #5 Review Q&A from the January 14, 2026, Collaborative Inspection Approach to Hospital Construction Webinar

- Discussion and public input

Facilitator: Teresa Endres (or designee)

1. Is the IOR expected to be performing inspections on a daily basis while they are walking the project? I've heard IORs say that they are performing inspections only if they receive an Inspection Request submitted by the Contractor.	CAC 7-145(A) requires the IOR to perform continuous inspections during the construction. The IOR shall have personal knowledge, obtained by continuous inspection of all parts of the work of construction in all stages of its progress to ensure that the work is in accordance with the approved construction documents. Continuous inspection means complete inspection of every part of the work. There is no code that requires the IOR to perform inspections on daily basis or only when requested.
2. Why was the NMA form shortened to not include check off boxes for reasons for applying?	Revised CAN 1-7-153(b), in the form had boxes removed because the six (6) items listed under CAC Section 7-153(b) are examples of changes that would qualify as NMAs. This list is not limited to these items.
3. Why does IOR do TIO closure, instead of DPOR who can collect the data and do the TIO sign-off since they are responsible for the TIO anyway?	There is no code that directs who needs to submit the documentation to OSHPD. However, CAC 7-141 explains DPOR responsibility to administer the TIO. And CAC 7-151(g) explains that DPOR is responsible for ensuring all the required VCRs related to the project are submitted to OSHPD.
4. How long until eTIO is released?	We are hoping to start using the eTIO with a small group of projects in two months. We are having to make updates to the application since Accela just moved to the cloud, so there have been some unforeseen setbacks.
5. How long is the CAP certification valid for?	The CAP certification is issued for a code cycle.
6. Should an inspection request be used to ensure the IOR has reviewed the drawings prior to the start of construction to ensure the pre-construction review has been completed?	There is no code mandate, however it is best practice and beneficial for the IOR to be familiar with the project as soon as possible. Inspection requests are for construction, not for assuring IOR's knowledge of the project.

7. In regard to the TIO required tests and inspections; what is a best practice for the DPOR to work with the lab to verify or ask for information (since the labs are hired by the Owner)? Should the DPOR contact the Owner first?	**Per CAC 7-419, approved testing/inspection agency shall be acceptable to the architect or engineer in responsible charge. Although the TIO document is used by many parties, the DPOR is responsible for administering it. There is no code requirement for the DPOR to contact the Owner first, however, it is best practice to gain knowledge on the qualification of the agency to accept it .**
8. From HCAI's perspective, what inspection-related issues most often turn into change orders, and what early coordination steps can CMs take to prevent those issues?	HCAI is not involved in contractual agreements between the Owner and construction or inspection parties, hence does not involve with change orders. Where there are changes to the approved construction documents (Amended Construction Documents or ACD), HCAI must review and concur or approve the changes as NMA or ACD respectively. If there are changes to the testing or inspection requirements, the change must be reviewed and approved by HCAI field staff. Per CAC 7-153(a). If an inspection is performed for construction that doesn't meet the approved construction documents, the IOR needs, per CAC 7-145(b), to notify the contractor for the deviations from the approved construction documents. It is best practice for CM's to be fully engaged and communicate effectively with the design professionals and anticipate possible changes before they turn into a problem. Not coordinating between disciplines and not coordinating drawings before submitting is the largest occurrence of ACDs. CMs must coordinate closer with inspection teams (IORs) and get them involved early. Is the information that is needed in the documents? Conduct constructability reviews with the installers. QC should also be completed during installation process. Complete value engineering during design or definitely before construction. Keep design teams involved in decisions.

9. *How should inspection findings be used to support legitimate compliance change orders without normalizing avoidable rework?*	**HCAI is not involved in contractual agreements between the owner and construction or inspection parties, hence does not involve with change orders. HCAI is focused on enforcing the minimum code requirements. The design professional of the record is responsible to review the non-compliances flagged by inspection team and provide direction.**
10. *Please explain what you mean by the IOR has the responsibility to schedule and manage the special inspection/testing agency.*	CAC 7-145 requires that the IOR is responsible to verify that all required documentation is being maintained on site during the construction of the project, inclusive of the coordination of special inspectors, testing, and project-specific approved testing agencies.

Item #6 Comments from the Public/Subcommittee Members on Issues not on this Agenda

The Subcommittee will receive comments from the Public/Subcommittee Members. Matters raised at this time may be taken under consideration for placement on a subsequent agenda.

Facilitator: Teresa Endres (or designee)

Future Education and Outreach Committee meetings:

- October 7, 2026

Item #7 Adjournment