



Hospital Building Safety Board  
Ad hoc “HCAI Design Guide for Planning and Preparing  
for Disasters” Webinar Development Subcommittee

AGENDA

January 22, 2026  
10:00 a.m. – 4:00 p.m.

The Subcommittee 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: 227 870 982 077 50; Passcode: yo2uD79Z

Call in: (916) 535-0978; Phone Conference ID: 393 772 115#

- Item #1 Call to Order and Welcome  
*Facilitator: Teresa Endres, AIA, ACHA, EDA, AAH; Subcommittee Chair (or designee)*
- Item #2 Roll Call and Meeting Advisories/Expectations  
*Facilitator: Veronica Yuke, HCAI; HBSB Executive Director (or designee)*
- Item #3 [Review and approve the draft November 20, 2025, meeting report/minutes](#)  
*Facilitator: Teresa Endres (or designee)*
- Discussion and public input
- Item #4 Review outline for Topic 1: Power Independence  
*Facilitators: John Griffiths, PE, Electrical Engineer, CONTECH-CA; David Bliss, MD, Faraday Microgrids; and Jamie Schnick, PE, Senior Electrical Engineer, HCAI (or designees)*
- Discussion and public input

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Item #4

Review outline for Topic 1: Power Independence

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Senior Electrical Engineer, HCAI (or designees)*

- Discussion and public input

Item #4

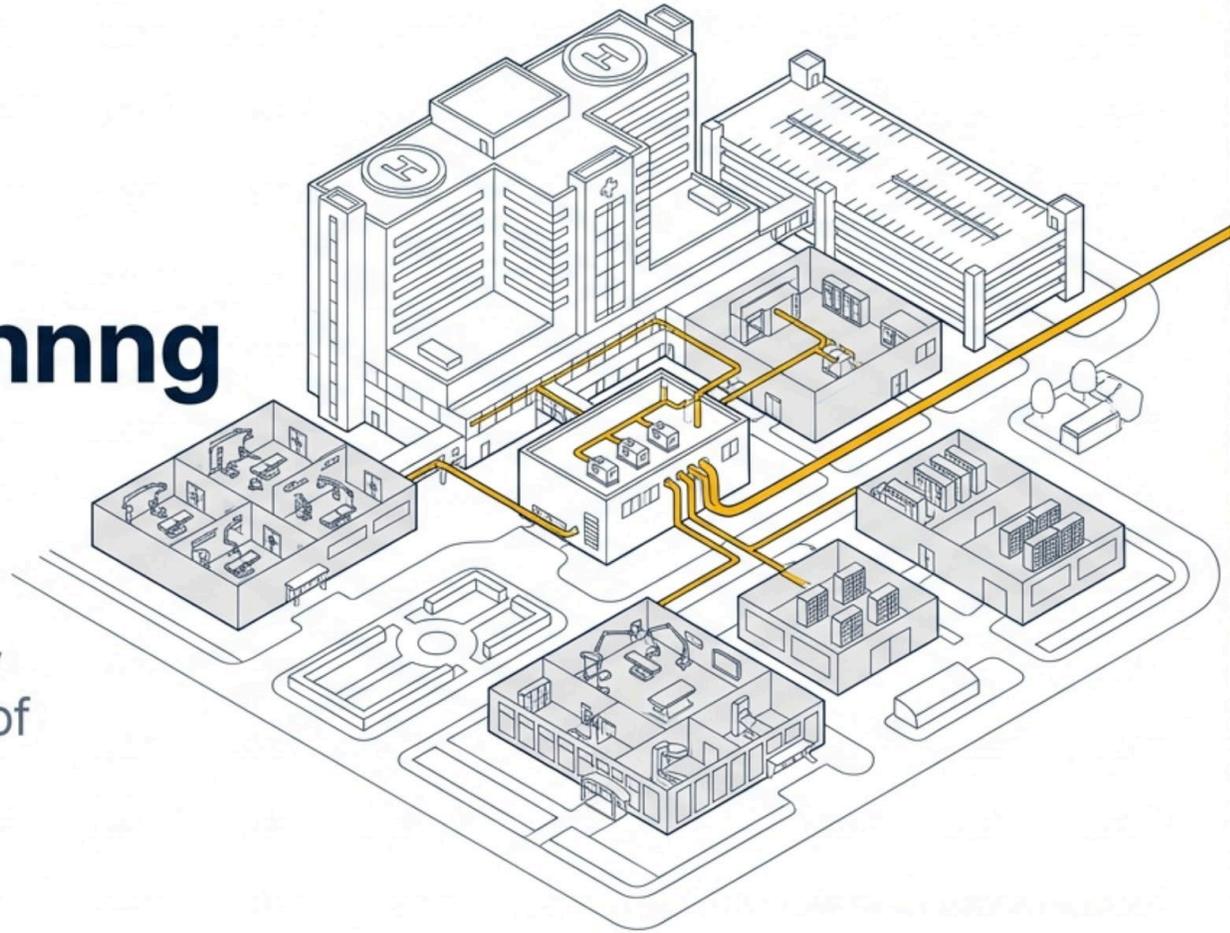
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# HCAI Design Guide for Planning Preparing for Disasters

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

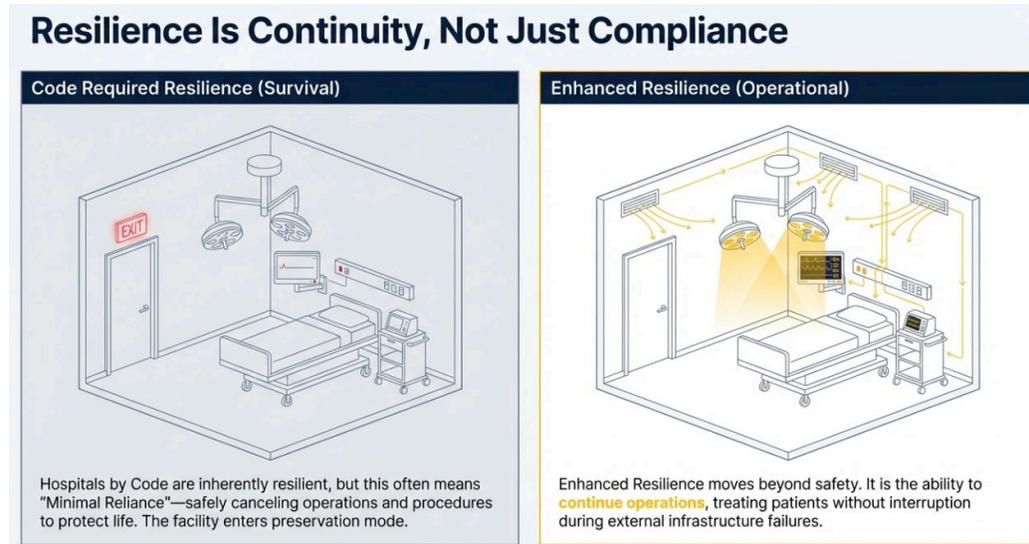


## A. Definition of Resilience?

### A. 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 staff

## 3. External Risk

a. Unreliable utility



# Emerging Threats

## External Risk

Unreliable utility

Increasing extreme climatic events

Supply chain limiting availability of critical components



## C. Constraints & Solutions

### 1. Constraints

- a. Money
- b. Space to install systems
- c. Equipment needs to be seismically certified
- d. ~~"Codes don't allow my solutions"~~
  - i. (call to action for people to engage with HCAI; Code is being updated to allow)
- e. New solutions are not a one-size-fits-all
- f. 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.

## C. Solutions

C. Future proofing systems

C. Designed for forward compatibility with emerging systems

D. Distributed generation resources (DER)

a. Many emerging solutions that provide facilities the opportunity for additional revenue, streams, and funding of projects

E. HCAi support

C. HCAi have a significant amount of knowledge and expertise supporting the delivery of these projects

F. Supportive codes

C. Codes are being updated to support creative resilience solutions

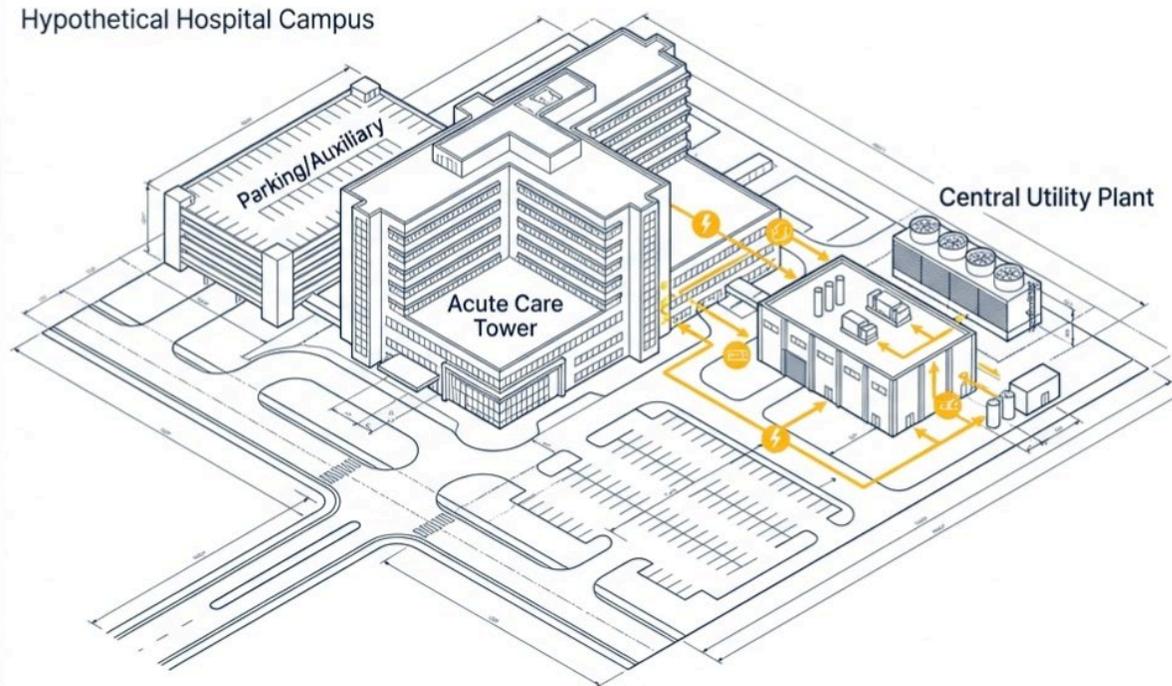
# The Design Strategy: A Site-Specific Approach

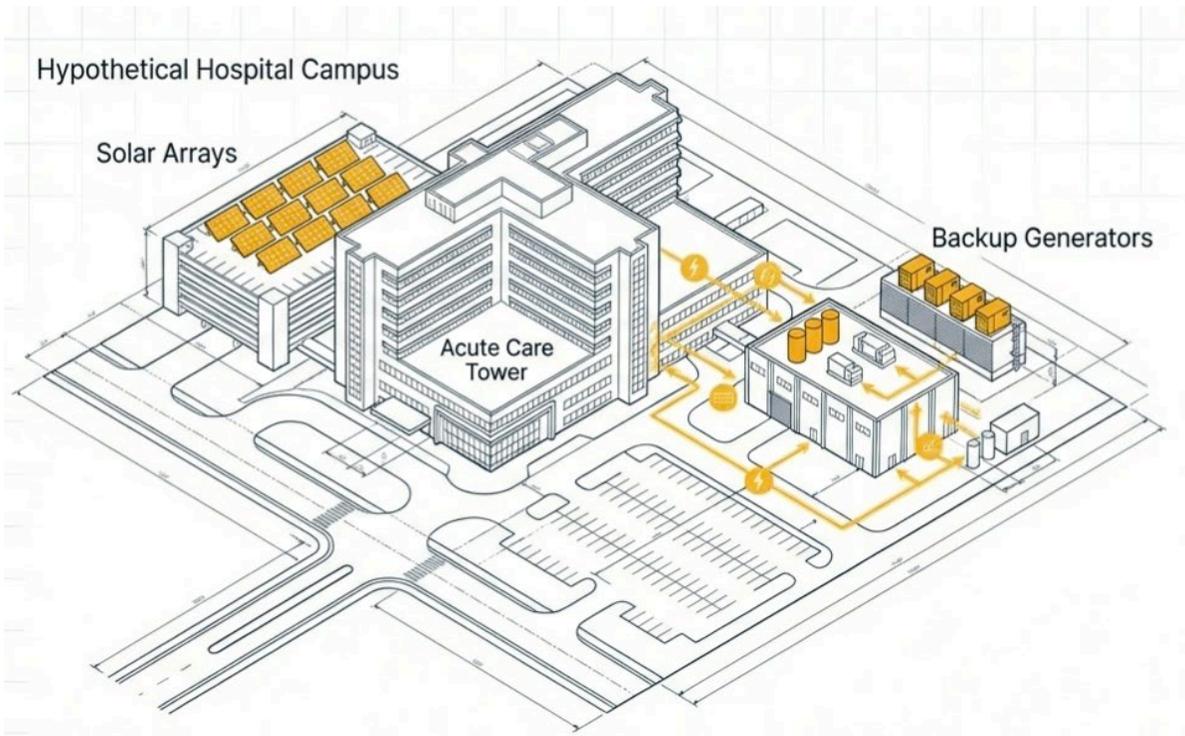
## Core Principle:

There is no one-size-fits-all solution.

## Design Inputs:

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





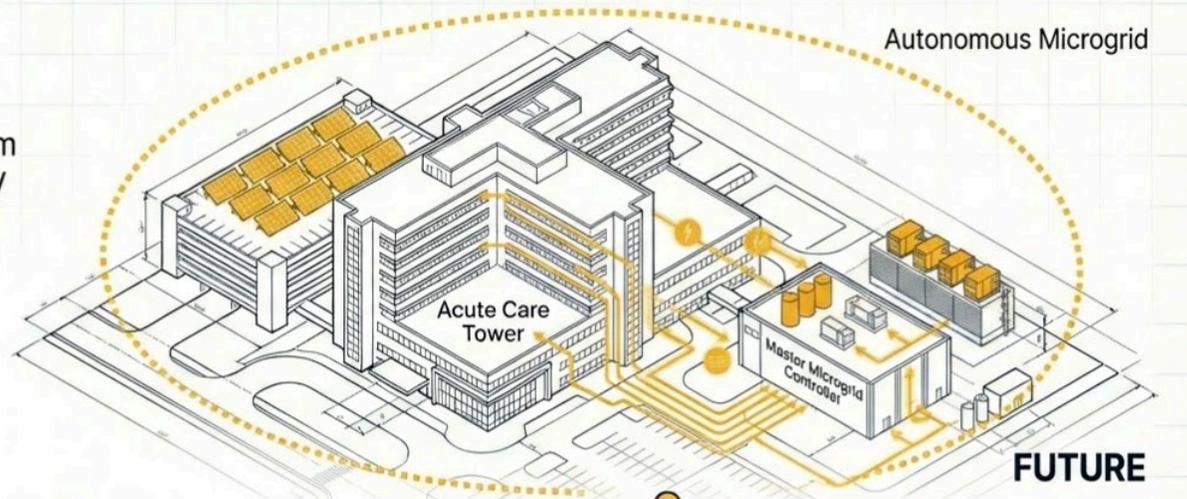
**Generation Mix**

- 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**



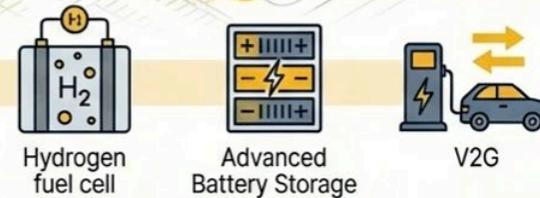
Diesel

Natural Gas

Solar PV



**FUTURE**



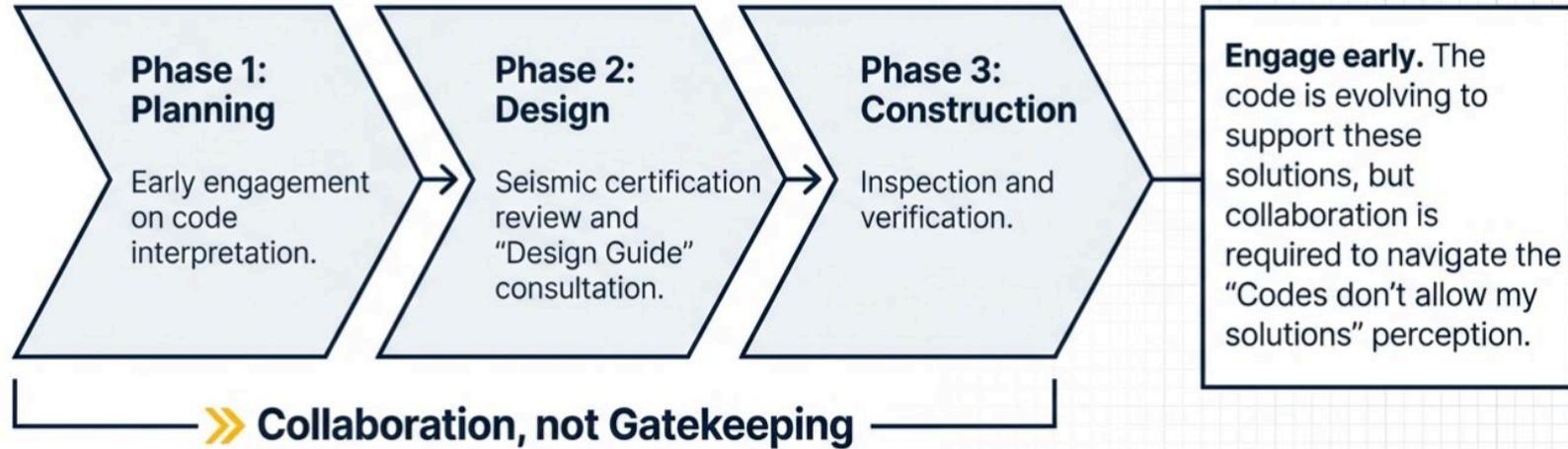
Hydrogen fuel cell

Advanced Battery Storage

V2G

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

# HCAI's Role in the Project Lifecycle



## **C. Solutions – When ?**

C. Immediate

D. Short term

E. Midterm

F. Future

## C. Conclusion

1. Is it allowed by Code
2. Is it fiscally viable
  - a. New construction
  - b. Remodel
3. Is it doable to add these systems?
4. Yes it is ...
  - a. Kaiser Ontario
  - b. Kaiser San Marcos
  - c. Valley Children's
  - d. and ... what about by your system?
5. Call to action?
  - a. Regulatory
  - b. Financially Viable
  - c. Is it technically possible

# The Path Forward: Actions for Engineers and Administrators

## Regulatory



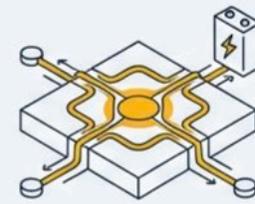
**Engage HCAI now.** Do not assume 'Code' is a blocker.  
**Use the Design Guide.**

## Financial



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

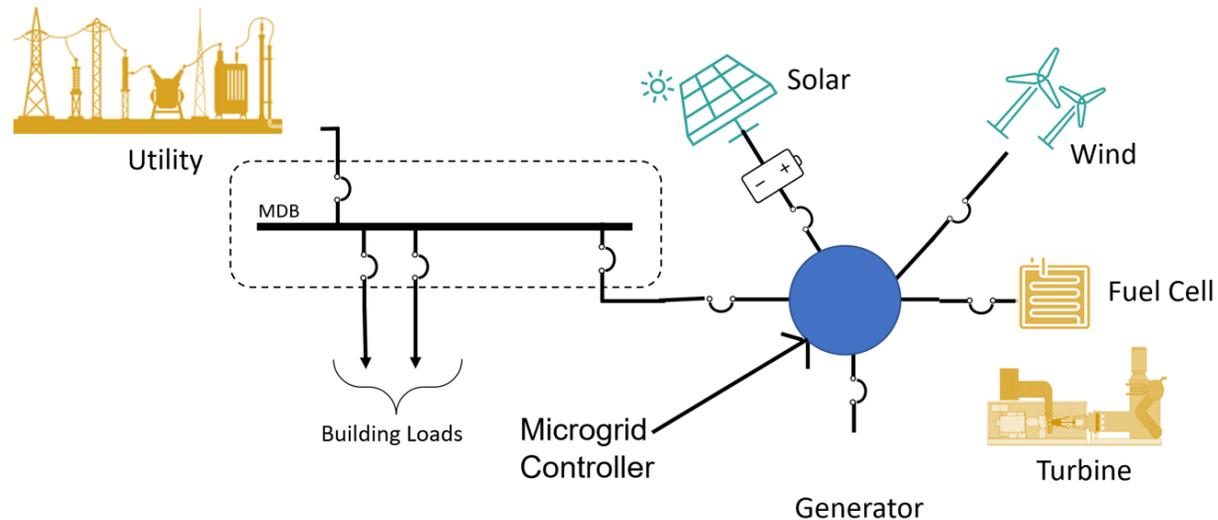
## Technical



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

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

# 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

Microgrids as EPSS added to the code in:

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

2022 CALIFORNIA  
ELECTRICAL CODE

CALIFORNIA CODE OF REGULATIONS | TITLE 24, PART 3

Based on the 2020 National Electrical Code®  
California Building Standards Commission

NFPA

99

Health Care Facilities Code

2021

Electrical Code®

Electrical Code® Series

nec



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**Center for Clinical Standards and Quality**

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**Ref: QSO-23-11-LSC**

**DATE:** March 31, 2023

**TO:** State Survey Agency Directors

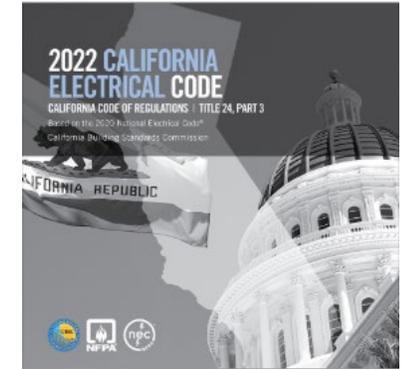
**FROM:** Directors, Quality, Safety & Oversight Group (QSOG) and Survey & Operations Group (SOG)

**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

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

## TABLE OF CONTENTS

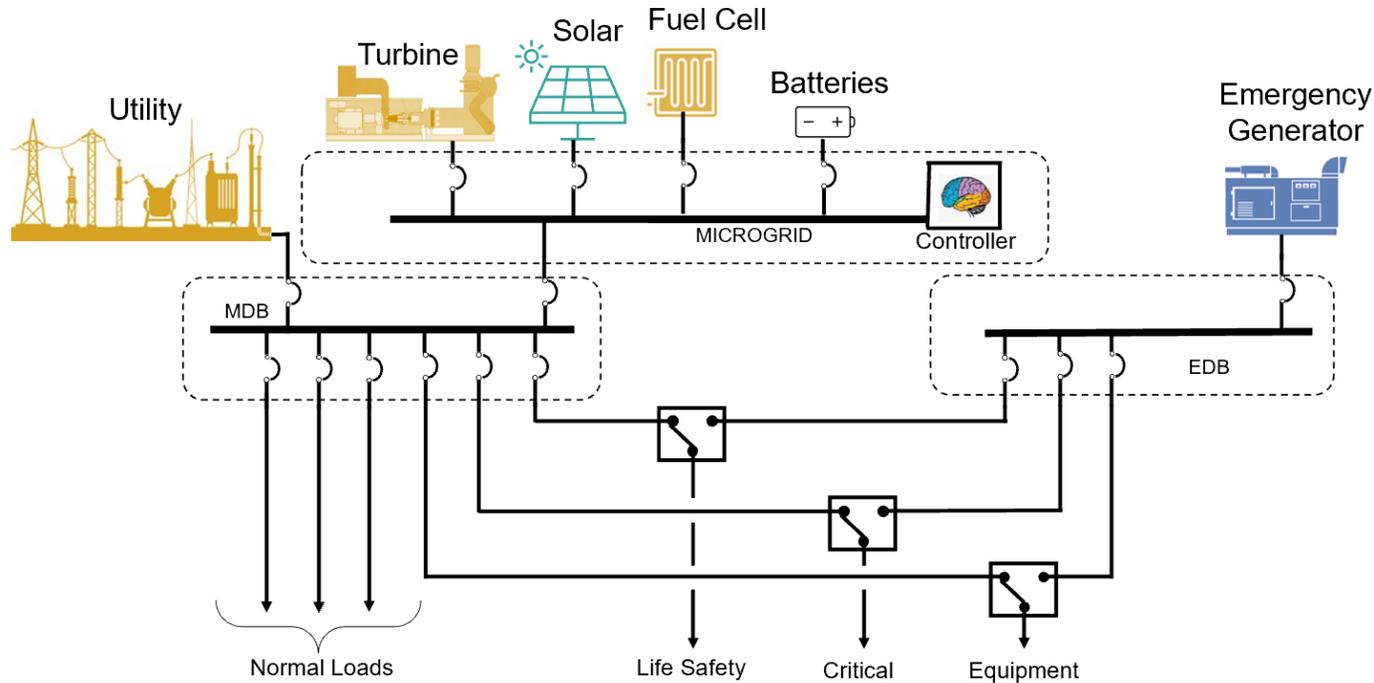
<b>INTRODUCTION</b> .....	<b>i</b>
<b>TABLE OF CONTENTS</b> .....	<b>iii</b>
<b>SECTION 1 Code References</b> .....	<b>1</b>
<b>SECTION 2 Acronyms and Definitions</b> .....	<b>2</b>
<b>SECTION 3 Implementation of Health Care Microgrids</b> .....	<b>3</b>
<b>SECTION 4a Potential OSHPD 1 (Hospital) Normal Power Microgrid Solution Example</b> .....	<b>5</b>
<b>SECTION 4b Potential OSHPD 1 (Hospital) Normal and ESS Power Microgrid Solution Example</b> .....	<b>12</b>
<b>SECTION 5a Potential OSHPD 2 (SNF) Normal Power Microgrid Solution Example</b> .....	<b>15</b>
<b>SECTION 5b Potential OSHPD 2 (SNF) Normal and ESS Power Microgrid Solution Example</b> .....	<b>21</b>
<b>SECTION 6 Potential OSHPD 3 Clinics Microgrid Solution Examples</b> .....	<b>23</b>
<b>Appendix Resources</b> .....	<b>A-1</b>

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 Photovoltaic (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 Liquefied 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

Microgrid as Supplementary Normal Power ( Article 705)



**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:

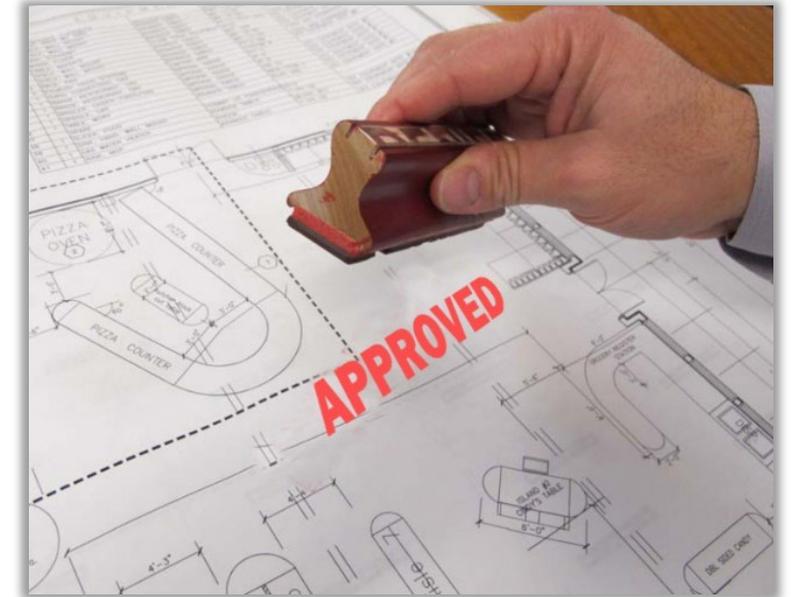
Lower  
energy bills

Reduce  
carbon  
footprint

Protect  
facilities  
from power  
grid  
outages

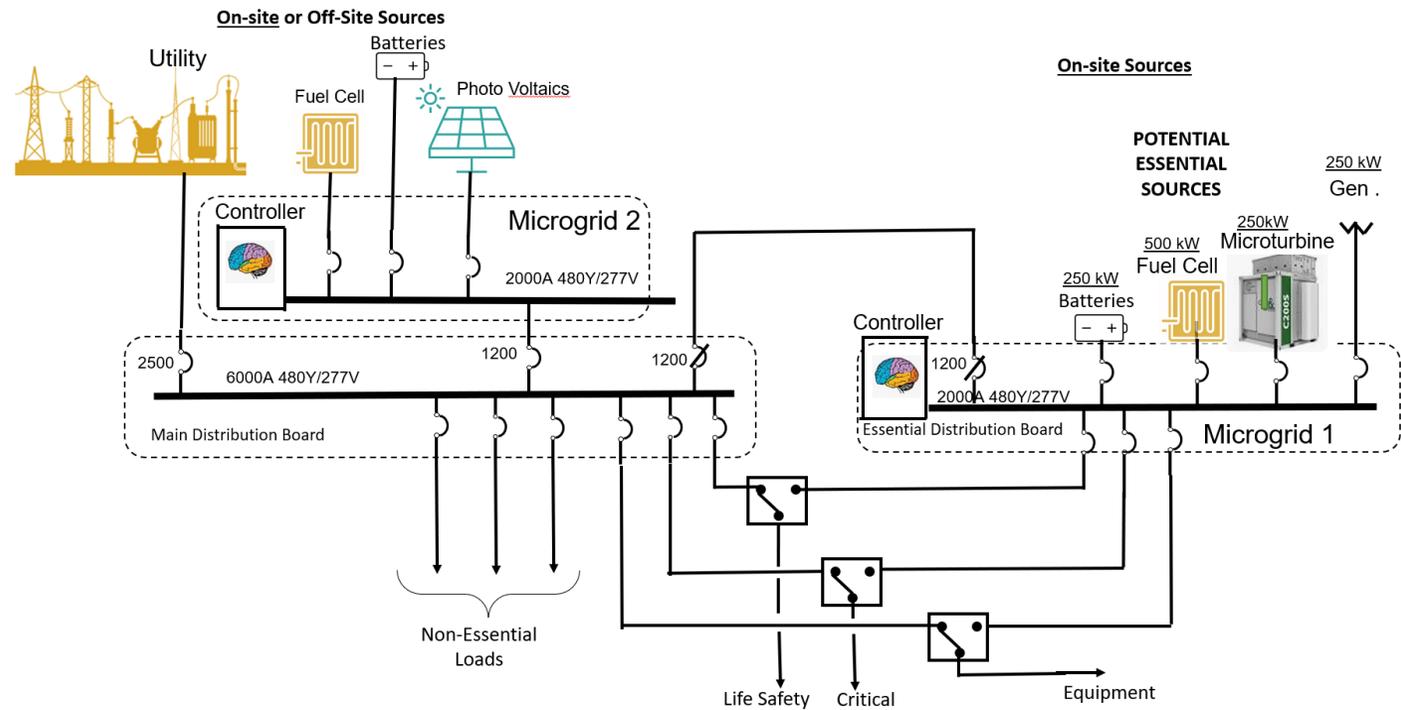
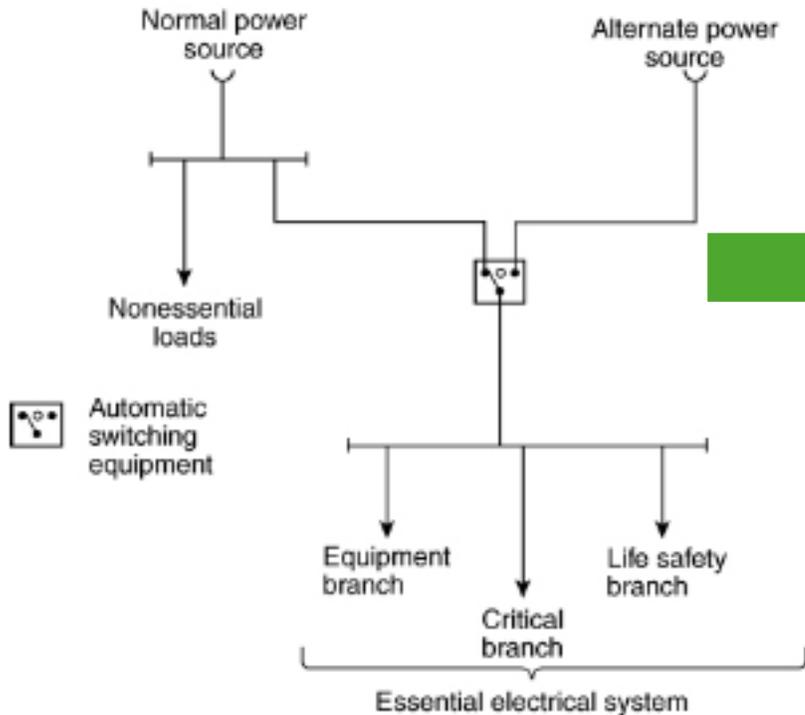
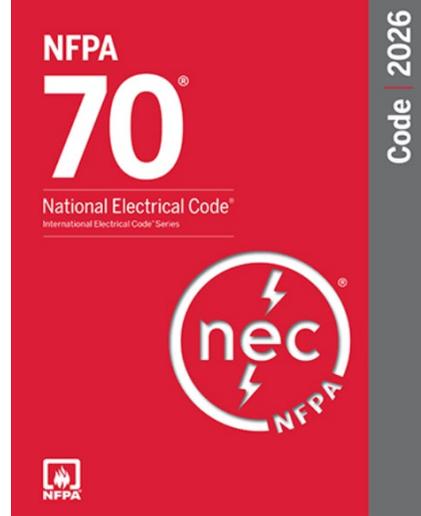
# Permitting of Microgrids as EESS is Allowed by current codes

- 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**





HEALTHCARE  
FACILITIES  
symposium and expo

# Microgrid Demonstration projects



**Kaiser Ontario**



**Valley Childrens Hospital**

**Artist Rendering**

# KAISER PERMANENTE SAN MARCOS CAMPUS

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



- Item #5      Review outline for Topic 2: Wildland Urban Interface - 2025 Title 24, Part 5
- Facilitators: Gary Dunger, Executive Director, Design and Construction, Cedars-Sinai Health System; and Janice Cheung, PE, CSP, Fire Marshal, Redwood City (or designees)*
- Discussion and public input

## **Webinar Outline: Wildfire & WUI Readiness for Healthcare Facilities (60 min)**

**Purpose:** Help healthcare facilities understand WUI exposure, new Title 24 requirements, and operational planning to reduce downtime during wildfire events.

### **1. Welcome & Framing (5 min)**

- Introductions
- Why wildfire resilience matters for hospitals now
- Agenda overview

## **2. What Is WUI? Title 24 & New Part 7 (15 min)**

- Definition of WUI and wildfire exposure types (embers, smoke, access)
- Title 24 overview and consolidation into new Part 7
- Key WUI code concepts relevant to hospitals:
  - Ignition-resistant construction
  - Openings, roofs, and exterior vulnerabilities
  - Access, water supply, defensible space
  - Hospitals as essential (Risk Category IV) facilities

### **3. Are You in a Fire Hazard Severity Zone? (5 min)**

- Why FHSZ matters
- How to determine facility location using CAL FIRE maps
- Note on local overlays and campus mapping (KML)

### **4. The Hazard & the Why (10 min)**

- Wildfire impacts on hospital operations:
  - Smoke, power loss, access limits, water disruption
- Why hospitals must plan for continuity, not closure

## **5. Operations & Emergency Planning (20 min)**

- Coordinating design and operations for wildfire readiness
- Power outage scenarios and HVAC/smoke management
- Evacuation vs. shelter-in-place decision considerations
- Practical next steps:
  - Assess exposure
  - Improve envelope and smoke readiness
  - Update Hazard Vulnerability Assessment (HVA) and emergency plans

## **6. Q&A (5 min)**

- Item #6      Review outline for Topic 3: Wildland Urban Interface - HVAC  
(including ASHRAE Guideline 44)  
*Facilitators: Abdel Darwich, PE, LEED AP, HFDP, Principal,  
Guttmann and Blaevoet Consulting Engineers; and Mikhail Fuks,  
PE, HFDP, DBIA (or designees)*
- Discussion and public input

## **Terminology:**

DG = HCAI Design Guide for Preparing and Planning for Disasters

G44 = ASHRAE Guideline 44

S241 = ASHRAE Standard 241

## **Wildland Urban Interface – HVAC (Protecting from Smoke)**

**Estimated presentation time : 45-60 minutes**

### **1. Background**

- a. Why this presentation?
- b. What is wildfire smoke composed of? (DG Sections 7.0 and 7.1)
- c. What happens during a wildfire? (DG Sections 7.0 and 7.1)
- d. How was HCAI DGPPD Section 7 developed?
- e. ASHRAE Guideline 44 development afterward (Augmentation to the DG)
- f. Types of Filters

## **2. Concepts to protect buildings from wildfire smoke**

- a. Knowing
- b. Planning
- c. Preventing smoke from getting indoors
- d. Removing smoke contaminants that get indoors

## **3. Knowing first**

- a. PM2.5 Sensors (DG Section 7.3H plus G44)

## **4. Planning second**

- a. Develop a Smoke Readiness Plan (SRP) ( DG Sections 7.3 A 7.9, 7.10, 7.11, 13 and 14)

## **5. How does wildfire smoke enter a building (DG Section 7.3 G and G44)**

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

## **6. Measures to mitigate wildfire smoke**

- a. Particle Filtration
  - i. Prescriptive Method ( DG Section 7.3 B)
  - ii. Performance Method (Augmentation form G44)
- b. Gas Filtration – DG Section 7.3 E and G44
- c. Other Filtration consideration
- d. Portable Air cleaners – DG Section 7.8 and G44
- e. Precautions for extra filtration – DG Section 8 and G44

**7. How easy/Difficult it is to implement each measure? (G44)**

**8. Healthcare Facilities Extra Precautions**

**9. Non-HVAC filters in Healthcare Facilities (g44)**

**10. Multiple Occurring disasters: Pandemic + Wildfire**

**11. The future**

Item #7

Review outline for Topic 4: Infection Control - HVAC

*Facilitators: Abdel Darwich and Mikhail Fuks (or designees)*

- Discussion and public input

# **Infection Control – HVAC**

**Estimated presentation time: 30 minutes**

## **1. Background (DG Section 3.0)**

- a. Airborne infection control hierarchy of measures
- b. HVAC as environment control
- c. Lessons Learned through Pandemic

## **2. System Recommendation (DG Section 3.1)**

- a. Outside Air - Economizers
- b. UV
- c. Backup Cooling Considerations

## **3. Filtration (DG Section 3.2)**

#### **4. Return and Exhaust Air recommendations (DG Section 3.3)**

- a. Negative Pressure space
- b. Switchable pressure (Flex) spaces
- c. Operating Rooms

#### **5. ASHRAE 241 – Control of Infections Aerosols**

Note: Present key takeaways from each audience's perspectives : owner, engineer...etc

- a. History of Development
- b. Purpose
- c. Risk Model overview
- d. Clean airflow concept
- e. IRMM (Infection Risk Management Model) concept
- f. Clean airflow requirement for healthcare facilities
- g. Example of using the S241 calculator for an ED waiting room
- h. Energy use from the various measures (recent PNNL research)

Item #8

Review outline for Topic 5: Infection Control - Operations

*Facilitators: Jennifer Cox, MHA, BSN, RN, PHN, CIC, System Director, Epidemiology and Infection Prevention, University of California Irvine Health; and Kelly Martinez, RN, MBA, FACHE, EDAC, Co-founder, Hallsta, Inc. (or designees)*

- Discussion and public input

## Infection Control – Operations

Discussion at planning meeting:

Island hospital

Embedding preparedness into building design

Post pandemic realization about the need to proactively design buildings with built-in flexibility for air handling and infection control

DORSCON matrix from Singapore as model of institutional preparedness

Strategies for ED, triage, compartmentalization, including diagrams for acuity-adjustable patient units and respite areas for staff to mitigate burnout

Look at ASHE resources: 241,

IC operations to include HVAC and Facility layout

Hierarchy of control measures: administrative, environmental, PPE – pg 16 of the Guide

Pg 20 – CMC requires exhaust registers to be located on the wall behind the patient's head in AIRs. Designers should consider a similar configuration for med-surg rooms, but that doesn't work for immunocompromised patients. Consider 2 return air grilles, one by the door and one by the bed, and adjust what is used according to the risks

<b>DORSCON ALERT LEVELS</b> (Disease Outbreak Response System Condition)				
	<b>GREEN</b>	<b>YELLOW</b>	<b>ORANGE</b>	<b>RED</b>
<b>Nature of Disease</b>	<p>Disease is mild <b>OE</b></p> <p>Disease is serious but does not spread easily from person to person e.g. MERS, HIV/AIDS</p>	<p>Disease is serious and spreads easily from person to person but is containing outside Singapore <b>OE</b></p> <p>Disease is spreading in Singapore but is not typically life-threatening and does not spread easily to vulnerable groups. Local or external is vulnerable group e.g. 2019 pandemic OE (if being contained)</p>	<p>Disease is serious <b>AND</b> spreads easily from person to person and does not spread easily to immunocompromised individuals e.g. SARS, ebola virus, dengue</p>	<p>Disease is serious <b>AND</b> is spreading widely</p>
<b>Impact on Daily Life</b>	Minimal disruption e.g. limited screening, travel advice	Minimal disruption e.g. additional screenings at border and/or facilities outside Singapore, faster work and school disruption rates	Minimal disruption e.g. screening, temperature checking, visitor restrictions at border etc.	Major disruption e.g. other closures, work from home advice, limits on number of people
<b>Advice to Public</b>	<ul style="list-style-type: none"> <li>Be socially responsible: if you are sick, stay at home</li> <li>Maintain good personal hygiene</li> <li>Look out for health advisories</li> </ul>	<ul style="list-style-type: none"> <li>Be socially responsible: if you are sick, stay at home</li> <li>Maintain good personal hygiene</li> <li>Look out for health advisories</li> </ul>	<ul style="list-style-type: none"> <li>Be socially responsible: if you are sick, stay at home</li> <li>Maintain good personal hygiene</li> <li>Look out for health advisories</li> <li>Limit work, school, religious activities</li> </ul>	<ul style="list-style-type: none"> <li>Be socially responsible: if you are sick, stay at home</li> <li>Maintain good personal hygiene</li> <li>Look out for health advisories</li> <li>Comply with control measures</li> <li>Practice social distancing, avoid crowded areas</li> </ul>

<https://blog.bcm-institute.org/pandemic-infectious-diseases/what-is-dorscon-to-pandemic-response-in-singapore>

## 1. Foundational Principles

- **Definition of “Designing for Preparedness”**  
(All-hazards approach, surge-ready infrastructure, flexibility, redundancy)
- **Role of Infection Prevention & Hospital Epidemiology in Design**
- **Infection Control Risk Assessment (ICRA) built into design stage**  
(HCAI encourages early IP involvement)
  - **Clear workflows for design decisions impacting infection prevention**
  - **Early identification of pandemic / emergency operational modes**
  - **Preparedness-driven room standardization for flexibility**

- **Regulatory & Guideline Framework**

- FGI Guidelines
- ASHRAE 170/188
- California Mechanical Code
- California Plumbing Code
- Cal/OSHA Aerosol Transmissible Disease Standard (ATD)
- ASHE 241
- CDC, OSHA, CMS, state regulations
- Local building & plumbing codes
- Relevant HCAI Documents
- PINs related to HVAC emergency modes, AIR, anterooms, pandemic design considerations
- CANs for plumbing, water safety, medical gas, and finishes
- HCAI requirements for commissioning, functional testing, and post-occupancy validation

## **Built Environment Factors That Influence Infection Prevention**

- **Airflow, Pressurization & Ventilation Principles**
  - Normal operations vs. emergency modes
  - Airborne isolation strategies
  - Convertible rooms (med/surg → AIR)
  - Convert space into isolation ward (ward level, not room level)
  - Webinar guide idea about two exhausts for versatility
- **Materials & Finishes for Cleanability and Durability**
- **HCAI-compliant product selection**
  - Cleanable, durable materials compatible with hospital-grade disinfectants

- **Seams, joints, and transitions designed for easy disinfection**
- **Resilience during surge cleaning or enhanced environmental disinfection protocols**
- **Hand Hygiene Infrastructure**
  - Placement strategy
  - Supply redundancy
  - Water outages / alternative stations
- **Environmental Services Workflow Integration**
  - Storage, staging, waste collection points
  - Access to utility rooms, cleaning equipment, and dilution systems

### 3. Planning for Flexibility & Surge Capacity

- **Design of Units to Convert to Higher Acuity**  
(e.g., standard rooms → AIR; PACU → critical care)
- **Universal/Standardized Room Designs**
- **Space for Temporary Isolation Areas**
  - Donning/doffing zones
  - Ante/transition spaces secured during outbreaks
- **Traffic Flow Flexibility**
  - Segregation of clean/dirty pathways during outbreaks
  - Ability to reconfigure entrances/exits
  - Controlled access points
- Morgue space/planned outdoor space for refrigerator trailers as needed

#### **4. Emergency-Mode Ventilation & Pressurization**

- **Convertible Air Pressure Modes (positive ↔ negative) – can't do?**
- **Safeguards for Maintaining Pressurization During Power Loss**
- **Monitoring Systems**
  - Real-time room pressure and ACH monitoring
  - Alerts and integration with BMS
  - Remote dashboards for IP/FMS visibility

#### **5. Preparedness in Water Systems**

- **Designing for Low-Use Zones & Stagnation Prevention**
- **Design Requirements Under the California Plumbing Code**
  - Recirculation design
  - Prevention of stagnation/dead legs
  - Fixture selection (aerosolizing / non-aerosolizing)

- **Integration with Water Management Plan**
  - ASHRAE 188 alignment
  - California Legionella prevention guidance (CDPH + HCAI expectations)
- **Emergency/Low-use Conditions**
  - Design features that support flushing
  - Automated flow or temperature monitoring
  - Access points for sampling required by IPC and water safety programs
- **Sampling Ports & Sensor Infrastructure**
  - Temperature, chlorine residual, flow monitoring
  - Automation for flow

- **Backup Disinfection Approaches Readiness**

- Hyperchlorination access points
- Compatibility with secondary disinfection
- Ensure secondary disinfection is able to continue injecting during loss of power

- **Emergency Response Scenarios**

- Main breaks, contamination events, construction shutdowns

## **6. Clinical Operations & Flow During Outbreaks**

- **Patient Flow During High-Consequence Outbreaks**

- Waiting room segregation
- Dedicated paths for infectious vs. non-infectious patients

- **Staff Workflow & Decontamination Areas**
  - PPE storage and surge stock readiness
  - Reusable PPE processing infrastructure
- **Visitor Management Infrastructure**
  - Screening stations
  - Holding zones
- **Exterior spaces capability to accommodate separated populations**
  - Electricity
  - Space for tents, buses

## **7. Sterile Processing & Perioperative Preparedness**

- Scalable Sterile Processing Capacity
- Scalable OR/procedural capacity
- Support for Contingency/Deferred Sterilization Needs
- Redundancy in HVAC for Procedure Rooms & ORs
- Decentralized and centralized reprocessing options (pros and cons)

## **8. Waste, Hazmat, and Biohazard Readiness**

- Redundant Waste Routing
- Space for Temporary Biohazard Surge
- Decontamination Stations and Dedicated Storage

## 9. Technology & Digital Infrastructure

- **Real-Time Environmental Monitoring**
  - Air pressures, temp/RH, water quality, ACH
  - Automated dashboards
- **Automation & Controls That Support Preparedness**
  - Rapid mode switching (AllR mode, pandemic surge mode)

## 10. Supply Chain & Storage Preparedness

- **Strategic Supply Storage Capacity**
  - PPE
  - Disinfectants
  - High-consequence pathogen kits
- **Decentralized Storage for Critical Supplies**
- **Design for Supply Decontamination / Distribution Flow**

## **11. Facilities Management & Emergency Response Coordination**

- **Designing for Maintainability During Outbreaks**
  - Safe zones for staff to work in mechanical rooms
  - Remote inspections
- **Cross-Training & Access Needs for Building Systems**
- **Documentation & System Maps That Support Preparedness**
  - Airflow schematics
  - Water system zones
  - Pressurization grids

## 12. Commissioning, Recommissioning & Validation

- **Infection Prevention Role in Commissioning**
- **Pre-Occupancy Verification for Preparedness**
  - Pressurization tests
  - Airflow patterns
  - Water system flushing verification
- **Scenario-Based Testing**
  - Simulated surge
  - Outage drills
  - Water disruption exercises

### **13. Construction & Renovation Preparedness**

- **ICRA (Infection Control Risk Assessment) Integration**
- **Phased Construction & Temporary Controls**
  - Maintaining safe airflow during renovations
  - Water stagnation mitigation during partial closures
- **Turnover & Reopening Plans**
  - Water system recommissioning
  - Air balance verification

## **14. Governance & Decision-Making Framework**

- **Including IP Early and Throughout All Phases**
  - Predesign → Schematic → DD → Construction → Activation
- **Preparedness-based Design Review Checklists**
- **Escalation Pathways for Design Decisions That Impact Safety**

Item #9

Review outline for Topic 6: Infection Control - Design

*Facilitators: Teresa Endres and Kelly Martinez (or designees)*

- Discussion and public input

## **Infection Control – Design**

My recommendation is we follow the DGPPD sections on design (the ones with the floor plan diagrams). We have slides from the 2024 ASHE PDC Summit for all of the agenda items below.

### **Designing Beyond Code Minimum:**

1. Explanation that code is the minimum requirement...
2. Examples of designing beyond code minimum
3. This is choice healthcare facilities can make to be prepared for any type of disaster - seismic event, pandemic, mass casualty event, mass hazardous materials exposure, manmade disaster, etc.

### **Entries:**

- Security & temperature checks
- Option to have isolation entry vestibules to the emergency department non-isolation/pandemic & isolation/pandemic compartments
- Separate ambulance entries for pandemic/resuscitation & trauma

## **Emergency Department:**

1. Separate compartments & redundant HVAC
2. Separate clean & soiled flows
3. Elevators - separate clean & soiled/pandemic + trauma
4. X-ray in resuscitation/pandemic compartment to prevent possible infectious patients from entering deeper into the hospital & possibly spreading infectious pathogen

## **Pandemic-ready patient units:**

### **- Option for separating entries into unit:**

1. Separate clean & soiled flows
2. Separate clean & soiled entries including clean alcove w/PPE & soiled alcove w/handwashing sink & waste receptacles
3. Separate clean & soiled entries using multipurpose rooms that flex into clean & soiled during pandemic

**Pandemic-ready patient units - acuity-adaptable patient units:**

1. Ante room entry vestibule to each room
2. Acuity adjustable patient rooms (CDPH required entire unit to flex)
3. Agnostic to inboard, outboard & midboard patient toilet/shower rooms - guide provides diagrams for each

- Item #10    Review outline for Topic 7: Hazard Vulnerability Assessment  
*Facilitators: Jennifer Cox and Kelly Martinez (or designees)*
- Discussion and public input

## **HBSB: Hazard Vulnerability Analysis (HVA)**

### **Building Resilience Through Risk Identification and Strategic Preparedness**

#### **1. Introduction to Hazard Vulnerability Analysis**

A Hazard Vulnerability Analysis (HVA) is a systematic process used by hospitals to identify, evaluate, and prioritize potential hazards that could disrupt operations, compromise patient care, or threaten life safety. These hazards may be natural, technological, human-caused, or internal facility-related and vary in likelihood and impact depending on geography, infrastructure, and operational complexity.

Within the framework of resilient hospital design and operations, the HVA serves as the foundational risk assessment tool that informs emergency preparedness planning, infrastructure hardening, operational contingencies, and capital prioritization strategies. By clearly understanding which threats pose the greatest risk, hospitals can proactively reduce vulnerability and improve their ability to respond, adapt, and recover from disruptive events.

## **2. Purpose of the HVA in a Resilient Hospital Model**

The primary purpose of an HVA is to ensure that hospital preparedness and resilience efforts are data-driven, prioritized, and aligned with actual risk exposure rather than perceived threats. By integrating the HVA into resilience planning, hospitals move from reactive crisis response to proactive risk mitigation, ensuring continuity of care even under adverse conditions.

For a resilient hospital, the HVA supports:

- Strategic emergency preparedness planning
- Infrastructure resilience and redundancy planning
- Business continuity strategy development
- Disaster response coordination
- Capital investment prioritization
- Regulatory compliance and accreditation readiness
- Community risk alignment and regional disaster coordination

### **3. What an HVA Evaluates**

An HVA assesses a broad spectrum of potential hazards that may impact hospital operations, typically organized into categories such as:

- Natural Hazards
- Earthquakes
- Wildfires
- Flooding
- Extreme heat
- Severe storms
- Drought
- Technological Hazards
- Power outages
- IT system failures
- Cybersecurity breaches
- Medical gas failures

### **3. What an HVA Evaluates (cont'd)**

- HVAC system failures
- Communication outages
- Human-Caused Hazards
- Active shooter events
- Terrorism
- Civil unrest
- Workplace violence
- Mass casualty incidents
- Internal Operational Hazards
- Staffing shortages
- Supply chain disruptions
- Pharmaceutical shortages
- Facility system failures
- Infection control events

#### **4. Methodology of the HVA Process**

The HVA scoring methodology typically evaluates each hazard against a defined set of criteria to establish relative risk. These criteria often include:

- Common Evaluation Factors
- Probability of occurrence
- Human impact (injury/death)
- Property damage
- Business continuity impact
- Operational disruption
- Recovery time required
- Preparedness level
- Internal response capability

Each hazard is assigned weighted scores across these categories, allowing the hospital to generate an overall risk ranking that determines which hazards demand the highest planning focus.

The final output is a prioritized list of hazards based on calculated risk severity, supporting informed decision-making.

## 5. Role of the HVA in Hospital Resilience Planning

The HVA informs key components of resilience strategy, including:

- Infrastructure Design Priorities
- Seismic reinforcement
- Fire-resilient building materials
- Redundant power systems
- Flood mitigation strategies
- Structural hardening
- Operational Preparedness
- Surge capacity planning
- Redundant staffing models
- Emergency communication protocols
- Equipment and supply staging
- Emergency Response Protocols
- Activation thresholds for incident command

## **5. Role of the HVA in Hospital Resilience Planning (cont'd)**

- Departmental response procedures
- Interagency coordination plans
- Recovery and Continuity Planning
- Phased restoration strategies
- Temporary service relocations
- Alternate care site planning

## **6. Integration of HVA Findings into Hospital Resilience Strategy**

A resilient hospital ensures that HVA findings directly inform:

- Capital investment planning
- Facility master planning
- Infrastructure renewal schedules
- Emergency drills and training programs
- Policy and procedure development

This creates a continuous improvement cycle where risk identification leads to mitigation, mitigation enhances resilience, and resilience reduces vulnerability.

## **7. Alignment with Regulatory and Accreditation Requirements**

Conducting a formal, documented HVA demonstrates regulatory compliance and validates an organization's commitment to structured emergency preparedness.

HVAs are required or strongly encouraged by:

- CMS Emergency Preparedness Final Rule
- The Joint Commission (EM.01.01.01)
- California Title 22
- HCAI / OSHPD preparedness standards

## **8. Alignment with Regulatory and Accreditation Requirements**

The Hazard Vulnerability Analysis is a cornerstone of resilient hospital design and operations. It provides the analytical foundation required to anticipate risks, prioritize response strategies, and strengthen infrastructure and operational systems. When implemented effectively, the HVA transforms a hospital from being merely prepared to being genuinely resilient — capable of maintaining safe, continuous care even under extreme conditions.

Item #11      Discuss schedule for the series of HCAI Design Guide for Planning and Preparing for Disasters webinars in 2026

*Facilitator: Teresa Endres (or designee)*

- February 2026: Power Independence
- March 2026
- April 2026
- May 2026
- June 2026
- July 2026
- August 2026
- September 2026
- Discussion and public input

## Item #12

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)*

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Item #13      Adjournment