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

Hospital Building Safety Board
Energy Conservation and Management Committee
AGENDA
April 2, 2025
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: 221 454 446 313; Passcode: NWyDXn
Call in: (916) 535-0978; Phone Conference ID: 223 399 956#

Item #1 Call to Order and Welcome
Facilitator: Cody Bartley, DPR Construction; Committee Chair (or designee)

Item #2 Roll Call and Meeting Advisories/Expectations
Facilitator: Veronica Yuke, Manager, HCAI; Executive Director (or designee)

Item #3 Evolution of Microgrid Technologies to Support Healthcare Facilities in California
- Raise awareness to the opportunities and challenges for healthcare facilities
- Discussion and public input

Facilitator: Ryan De La Cruz, CEM, PMP, Vice President, Microgrid Development, Endurant Energy (or designee)

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Evolution of Microgrid Technologies to Support Healthcare Facilities in California

endurant

April 2, 2025

Microgrid Definition

A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. Microgrids can connect and disconnect from the grid to operate in grid-connected or island mode.

- U.S. Dept. of Energy Microgrid Definition

Agenda

- The Origin of Healthcare Resilience
- Microgrids & Distributed Energy Resources
- Hurdles to Microgrids as Emergency Power
- Industry Data & Future Predictions

The Origin of Healthcare Resilience

Many hospitals lacked dedicated emergency power systems through the mid 20th century.

Key Events That Drove Change

1. **1965 Northeast Blackout**
   - Affected +30M people in the U.S. and Canada.
   - Highlighted the national vulnerability of critical infrastructure to widespread grid failure.
2. **1971 San Fernando Earthquake (Sylmar Earthquake)**
   - Magnitude 6.6 earthquake.
   - Significant death tolls and damage to hospitals in the San Fernando Valley.
   - Olive View Medical Center and VA Hospital suffered severe structural damage and loss of power.
   - Emergency response was hampered by the lack of operational facilities.

The Origin of Healthcare Resilience

These crises directly led to a major rethinking of hospital construction, infrastructure resilience, and emergency preparedness in California.

Regulatory Response

1. **SB 519 (1972)**
   - Established regulatory oversight for hospital safety and laid the groundwork for…
2. **Alfred E. Alquist Hospital Facilities Seismic Safety Act (1973)**
   - Codified requirements for hospitals to remain functional after an earthquake, including structural integrity and emergency power.
   - Led to the formation of OSHPD/HCAI, which oversees hospital construction and infrastructure standards.

The Origin of Healthcare Resilience

3. **CA Building Standards Code (Title 24): Part 1 (Administrative Code)** and **Part 2 (CA Building Code)**
   - Contain specific provisions requiring hospitals to:
     - Have onsite emergency power.
     - Support essential functions (lighting, life support, fire safety) post-disaster.
4. **NFPA 99 & NFPA 110**
   - **NFPA 99: Health Care Facilities Code**
     - Requires hospitals to have reliable essential electrical systems.
   - **NFPA 110: Standard for Emergency and Standby Power Systems**
     - Outlines requirements for testing, maintenance, and design of emergency power systems.

Why Diesel Generators?

Regulatory guidelines tend to be performance-based standards that remain technologically neutral.

- Diesel generators have been the go-to because they:
  - Meet NFPA 110's fast-start and fuel storage requirements.
  - Are cost-effective.
  - Are well-understood by inspectors and engineers.
- In CA, emergency power systems must also be seismically certified.
  - Emergency generators, ATS, switchgear, and fuel systems must be shake-table tested or certified by analysis/experience data.
  - Title 24, Part 2 requires equipment to remain anchored and functional during and after seismic events.

***Image Source**: Caterpillar*

What About Microgrid Technologies?

- Over the last +20 years, many commercially viable DERs have been deployed at hospitals in CA.
- These DERs were initially deployed as utility cost savings assets.
- With a growing interest in healthcare sustainability, DERs offered emissions reductions benefits, too.
- Over time, DERs offered modest resiliency by operating as the normal source during grid outages.

The DER Value Proposition

1. **Energy budget certainty / cost savings**
2. **Sustainability**
3. **Resilience**

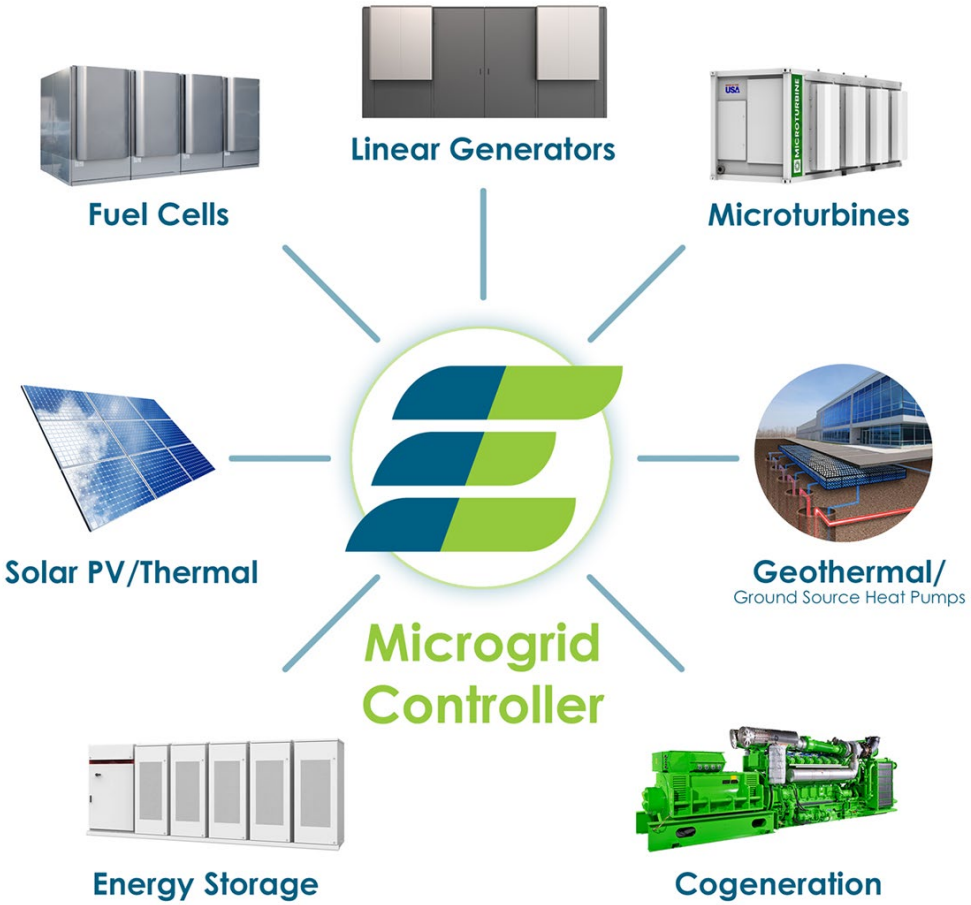


Image Source: Endurant Energy

Hurdles to Microgrids for Emergency Power Support

Despite the prevalence of DERs, they have not been widely adopted for emergency power support in hospitals.

The Challenges

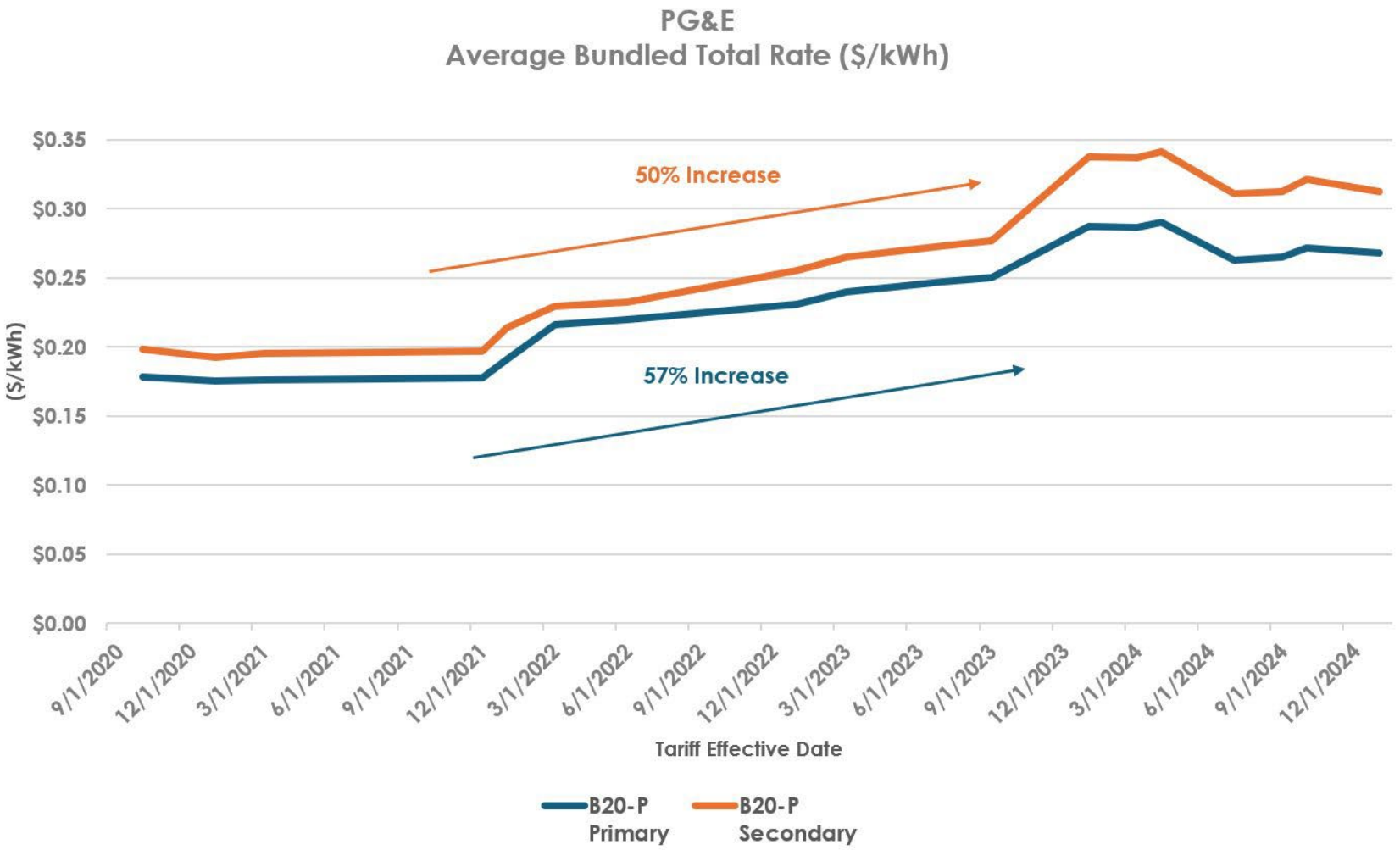
1. **Seismic certification**
    - The time/cost associated with seismically certified DER manufacturing has limited market offerings.
2. **Perception**
    - Diesel generators have decades of proven operating history.
    - Despite robust uptime data supporting today's DERs, few hospitals want to be first movers.

Microgrid Case Studies in California

Numerous microgrids have been deployed as pilot projects/proofs of concepts at hospitals.

- Valley Children's Healthcare (Madera, CA)
- Kaiser Permanente Richmond Medical Center (Richmond, CA)
- Adventist Health Feather River Health Center Microgrid (Paradise, CA)
- San Benito Health Foundation Clinic Microgrid (Hollister, CA)
- **Kaiser Permanente Ontario Medical Center (Ontario, CA)**

Geopolitical Events Are Driving Microgrid Adoption

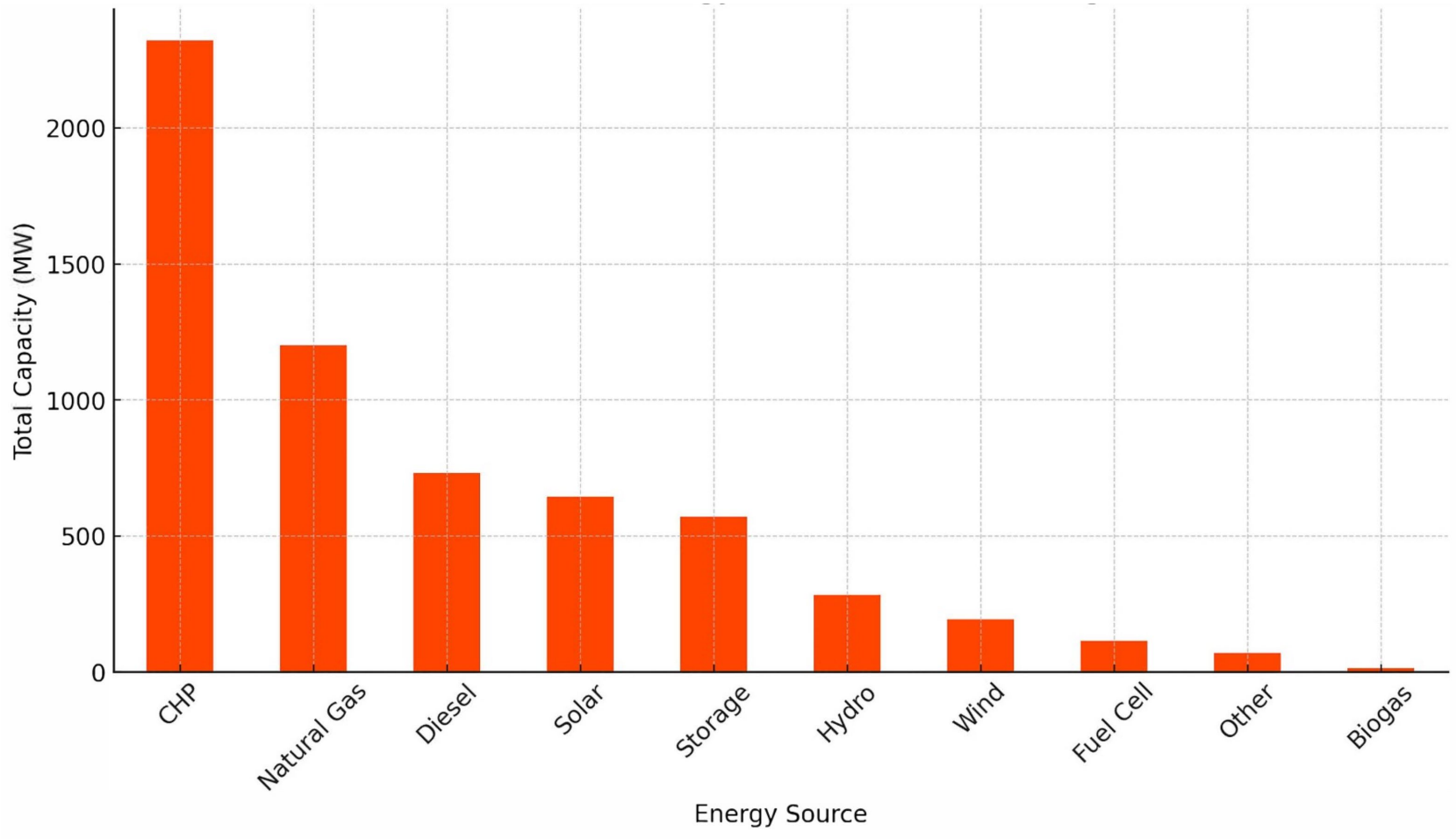


Half of CA's inpatient capacity is less than a mile from a high fire threat zone.

- American Journal of Public Health

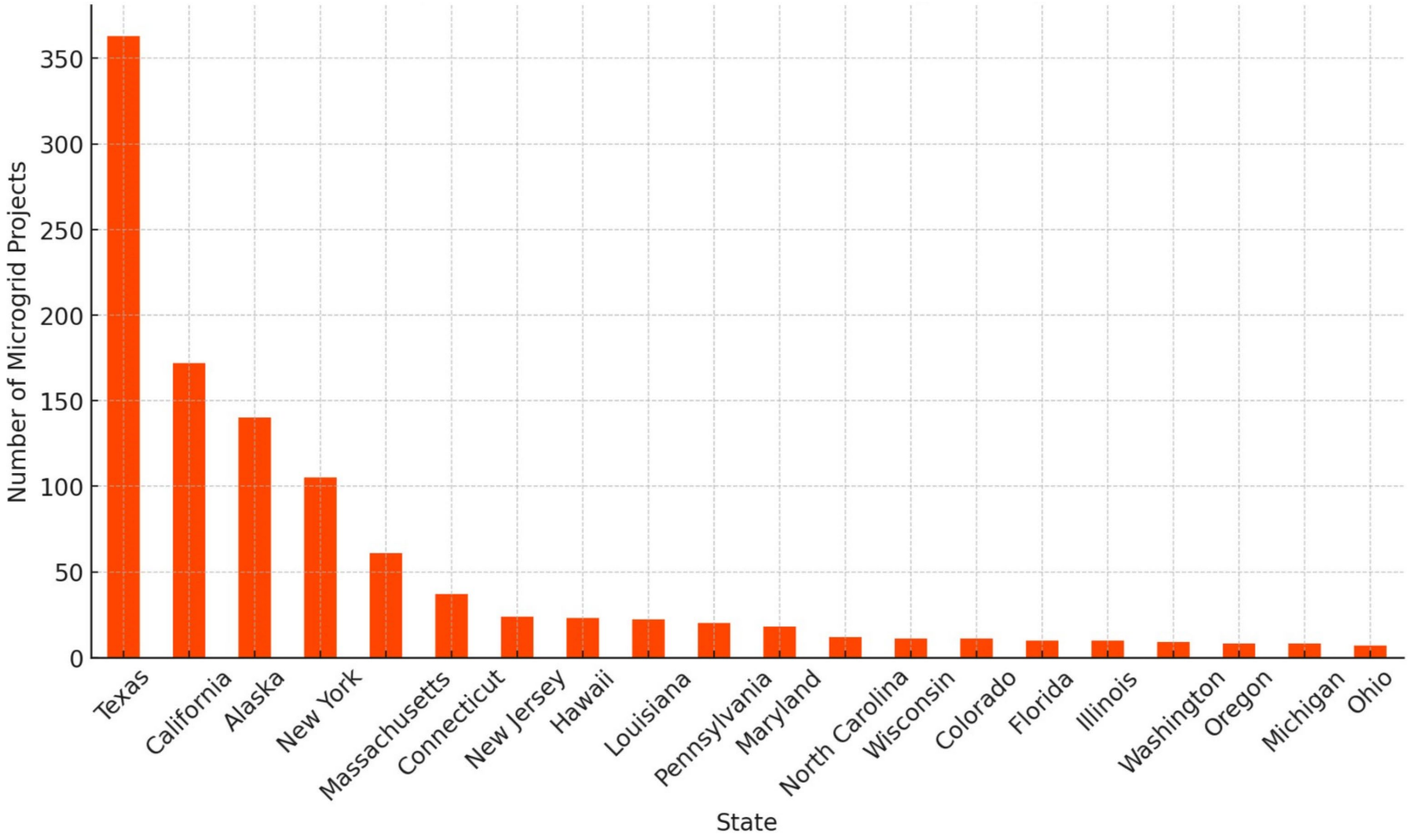
***Date Source**: PG&E Website: Current & Historic Electric Rates*

DOE: Microgrid Energy Sources



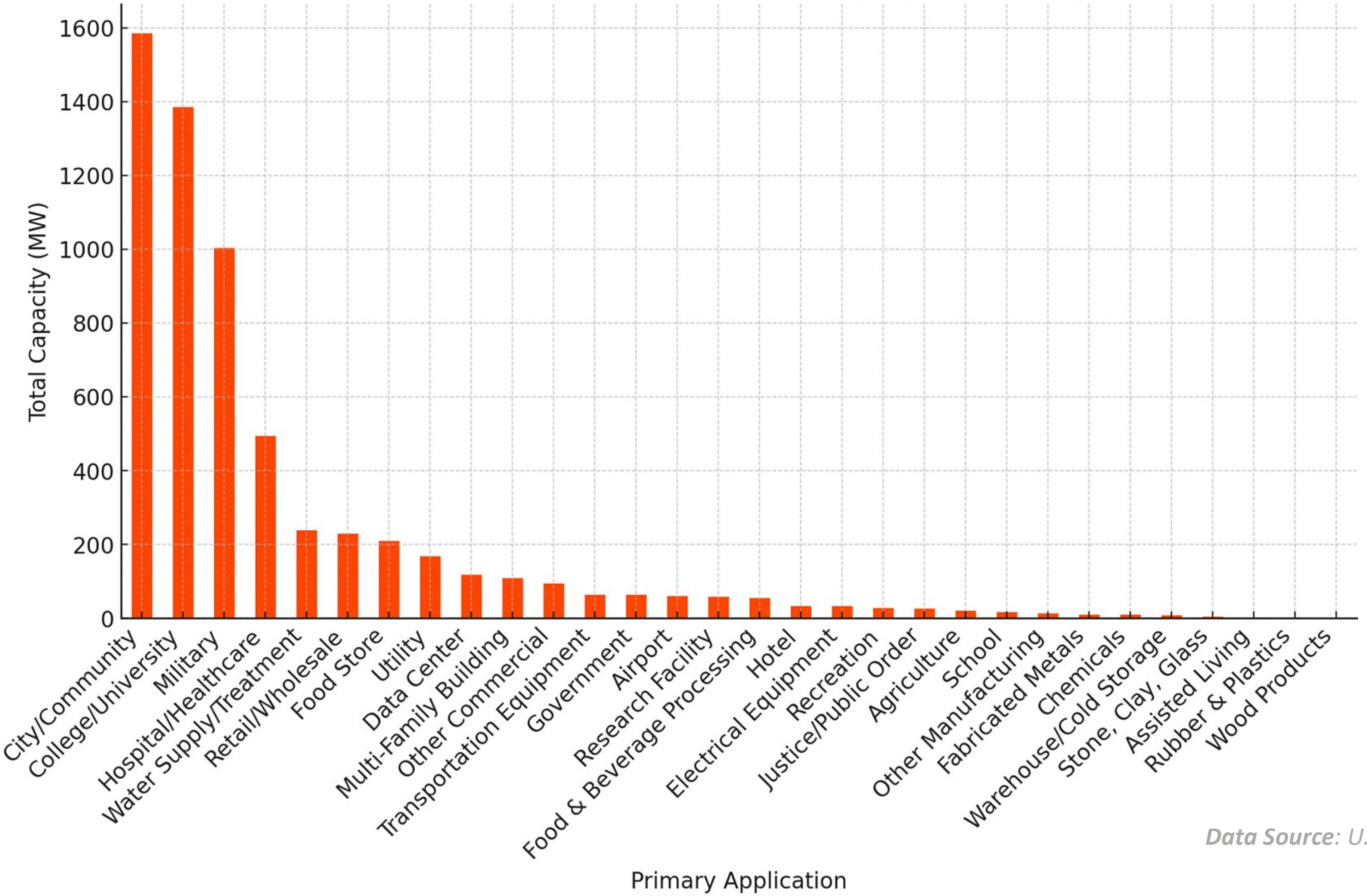
***Data Source**: U.S. DOE Microgrid Database*

DOE: Top 20 States for Microgrid Installations



***Data Source**: U.S. DOE Microgrid Database*

DOE: Total Installed Microgrid Capacity by Industry/Application



***Data Source**: U.S. DOE Microgrid Database*

The Future of Microgrids Technologies

- Reduced costs and more flexible funding options
- Better integration amongst DERs and existing infrastructure
- More regulatory adoption, better OEM offerings
- Multiple value streams and energy markets mature

Image Source: NREL

The Next 10 Years

By 2035, microgrids are envisioned to be essential building blocks of the future electricity delivery system to support resilience, decarbonization, and affordability.

- U.S. Dept. of Energy Microgrid Program Strategy: Overarching Vision

Microgrid Evolution Timeline

Event/Action	Year	Description	Relevance to Emergency Power
Sylmar (San Fernando) Earthquake	1971	Earthquake collapses hospitals; exposes critical weaknesses in power resilience	Sparks statewide push for hospitals to remain operational during disasters
SB 519	1972	First law to regulate hospital construction	Introduces idea of structural and operational resilience
Alfred E. Alquist Seismic Safety Act	1973	Mandates post-earthquake hospital functionality	Emergency power systems become a legal requirement
California Title 24 Established	1978	Creates comprehensive building code structure	Codifies emergency power and seismic safety for hospitals
NFPA 99 First Edition	1984	Introduces essential electrical system categories	Sets baseline for hospital power system design nationally
NFPA 110 First Edition	1985	Introduces standby/emergency power system requirements	Popularizes diesel generators for compliance
First Commercial Microgrid Projects (CA & US)	Late 1990s–2000s	Early use at universities, military bases, some critical infrastructure	Conceptual proof of distributed energy for resilience
Seismic Certification via Title 24 & HCAI (OSP)	2000s–present	Equipment (e.g., generators, ATS) must be shake-table tested or certified	California adds seismic resilience requirement to emergency power components
Modern NFPA 99/110 Editions Adopted in CA Codes	2016–present	California integrates modern NFPA standards (e.g., 2012 NFPA 99)	Allows for fuel-flexible and performance-based emergency power solutions
Increased Wildfires & PSPS Events	2017–present	PG&E and others conduct Public Safety Power Shutoffs (PSPS) during fire seasons	Healthcare facilities face grid outages unrelated to earthquakes → drives interest in microgrids
Microgrids for Hospitals Gain Momentum	2019–present	Battery storage, solar, fuel cells, and hybrid genset microgrids deployed at medical campuses	New pathway to meet emergency power requirements with cleaner, more resilient solutions
HCAI Exploring Microgrid Guidelines for Hospitals	Ongoing	HCAI and HBSB reviewing how to evaluate microgrid systems for emergency power compliance	Microgrids emerging as NFPA-compliant alternatives to traditional diesel-only systems


endurant
THANK YOU
QUESTIONS?

Item #4 Impact and opportunity of Assembly Bill (AB) 2208 ban of fluorescent lamp sales in California

- HCAI FREER manual as it applies to lighting retrofits
  - Presenter: Jamie Schnick, Senior Electrical Engineer, HCAI
- Overview on availability of utility rebates
  - Presenter: Sean Eyler, BEP, Program Lead, Healthcare Energy Fitness Initiative, Resource Innovations
- Discussion and public input

Facilitator: John Griffiths, PE, Electrical Engineer, CONTECH-CA; Committee Vice-Chair (or designee)

Healthcare Energy Fitness Initiative (HEFI)

resource innovations

HEFI Implementation Team

Resource Innovations

Program Implementer

Expert Program Delivery Team

- Marketing & Outreach
- Project Development
- Engineering & Quality Control
- Project Coordination
- Incentive Processing
- Partner Network Coordination
- PG&E Account Rep Coordination

Partner Network

Outreach

Project Development

OSHPD Support

Turnkey Solutions

Financing Solutions

VEREGY

EVERWATT

ERI ENERGY RESOURCES INTEGRATION, LLC

AECOM

EcoCosm ENERGY REINVENTED

Additional Specialists

Program Benefits & Flexible Solutions

- **Energy cost savings** and **GHG reductions**
- **No-Cost technical assistance:** energy audit, savings analysis, reporting, M&V
- **Financial incentives**: $0.10/kWh + $1/therm for approved NET savings.
- **Non-Energy Benefits:** health, safety, comfort, productivity, maintenance, etc.

Optional services include:

- Portfolio-level strategic energy planning
- Financing solutions (including off-balance sheet options)
- Implementation support
- Turnkey project implementation options
- OSHPD support

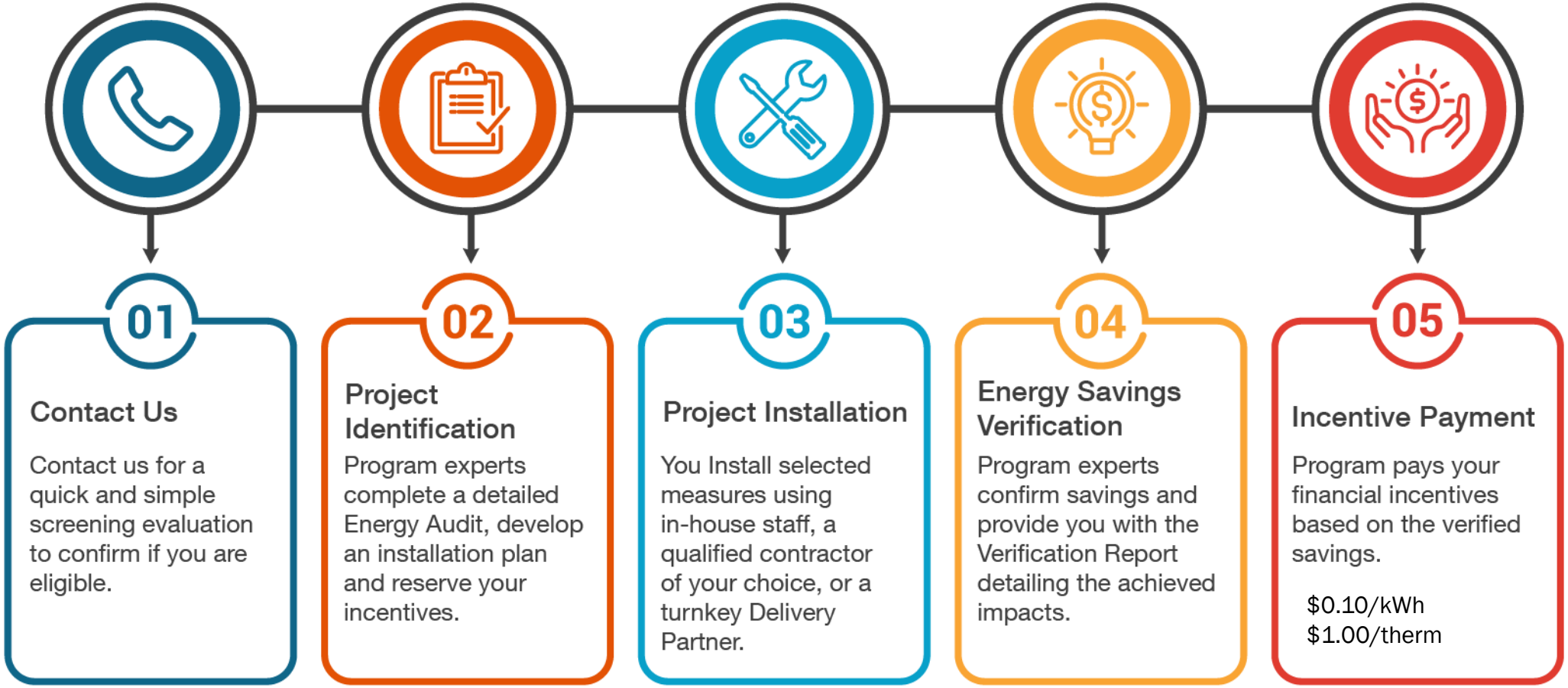
We Accept ALL Healthcare Facility Types

Segment	Example Customers
Hospitals	• General • Surgical • Psychiatric • Substance Abuse • Specialty
Outpatient	• Medical Office Buildings (MOBs) • Clinics • Urgent Care • Mental Health & Addiction • Medical & Diagnostic Labs • Surgical Centers • Birth Centers • Blood Banks • Dialysis & Diabetes Education • Imaging and Radiology • Telehealth • Orthopedic Rehabilitation

Segment	Example Customers
Residential Care	• Nursing Homes • Hospice • Assisted Living
Social Assistance	• Family Services • Community Food & Housing • Vocational Rehabilitation • Emergency Relief

Offering **flexibility** and **comprehensiveness**, while focusing on the **largest opportunities.**

How it Works



01

Contact Us

Contact us for a quick and simple screening evaluation to confirm if you are eligible.

02

Project Identification

Program experts complete a detailed Energy Audit, develop an installation plan and reserve your incentives.

03

Project Installation

You Install selected measures using in-house staff, a qualified contractor of your choice, or a turnkey Delivery Partner.

04

Energy Savings Verification

Program experts confirm savings and provide you with the Verification Report detailing the achieved impacts.

05

Incentive Payment

Program pays your financial incentives based on the verified savings.

$0.10/kWh
$1.00/therm

Common EE Measure for Healthcare Facilities

HVAC Retrofit

Central Plant

- Controls Optimization
- Chiller & Boiler Upgrades
- Reconfigurations & Re-piping

Standalone Equipment

- Boilers, Chillers, Packaged Units
- Add Small Dedicated Units

Variable Speed Drives (VSD)

Controls Optimization & RCx

General HVAC

- Schedule HVAC equipment (AHU/Fan/Pump/VAV/FPB)
- Space Temperature Setbacks & Optimal Start/Stop
- Simultaneous Heating and Cooling

Air Distribution

- Duct Static Pressure Reset
- Supply Air Temperature Reset
- Economizer & Outside Air Optimization
- Fan & VSD Optimization
- Air Balancing, Air Filter Optimization

Chilled Water System

- Chilled Water Temperature Reset
- Sequencing, Controls, & Pump Optimization
- Condenser Water Temperature Reset

Hot Water / Steam System

- Hot Water Temperature Reset
- Sequencing, Controls, & Pump Optimization

Lighting

Interior Lighting (LEDs)

Exterior Lighting (LEDs)

Advanced Lighting Controls

Other Solutions

Data Center Optimization

Laboratory Optimization

Compressed Air Optimization

Piping Insulation & Heat Loss

Domestic Hot Water

Electrification

Ideal Project Characteristics

High Energy Savings Potential

- High baseline energy usage/EUI
- Large facility size (sq ft)
- Comprehensive project scope
- Large HVAC systems or central plants (AHUs, chillers, boilers)
- Centralized controls (EMS/BAS)
- No recent comprehensive EE projects completed
- Not brand-new construction

Motivated & Supportive Customers

- Project champion
- Supportive facility/site staff
- Supportive C-suite/leadership
- Clear project approval criteria and processes, and signers
- Access to financial resources or willingness to utilize financing
- Focused on completing projects to realize energy & cost savings

Long-Term, Persistent Savings

- Measures will stay installed for the full measure life
- Includes capital upgrades + retrofits + low-cost optimizations
- No major planned post-project retrofits or facility changes
- No planned sale or lease termination

Our screening survey will help confirm if customers and projects are a good fit for the Program.
Projects will be evaluated on case-by-case basis based on multiple criteria.

Quick Guide to On-Bill Financing

OBF Loans

- Loan repayment is based on energy cost savings per month to make the loan repayment bill-neutral.
- **$5,000-$4,000,000** in total loans per site premise.
  - Can have multiple loans per site.
  - Can have multiple sites with loans.
- **10 year** max loan term.
- Customer can buy-down the loan up to 30% of project cost.
- Expected useful life (EUL) of measures must exceed the loan term.
  - E.g. Lighting EUL is 12 years.
- Loans under $250k do not require an exception request.
- Loans over $250k require an exception request. Loans over $1,000,000 must meet a program administrator cost ratio of 1.0 (PAC). Exceptions can be granted for healthcare customers that are slightly under.
- Loans are paid in full after the post-install review is completed.

Project Types/Pathway

- **Deemed** measures not allowed, must be processed separately.
- **Custom**
  - Incentives allowed for loans under $250k, but are about half of Site-NMEC.
  - Not ideal for lighting, baseline is T24 (lower claimable savings).
- **Population-NMEC**
  - No incentives allowed.
  - Low rigor of documentation and technical review.
- **Site Specific – NMEC**
  - Accounts with annual usages of 5,000,000 kWh and 56,398 therms or more, must take this (or custom) pathway.
  - Incentives allowed only for loans under $250k.
  - 10% savings minimum.
  - High rigor of technical review. Technical report and calculations/modeling required.
  - Incentives are paid 60% at post install, 40% at 12 month verification.

HEFI Project Examples

East Bay Area Hospital – LED Lighting

- Energy Savings: **1,469,415 kWh**
- OBF Loan: **$1,292,408**
- Simple Payback: **3.4 years**
- New LED Lamps: **8,001**
- Completion year: **2024**

Central Coast Hospital – LED Lighting

- Energy Savings: **661,116 kWh**
- Project Cost: **$515,293**
- Incentives: **$79,311.79**
- New LED Lamps: **5,444**
- Completion year: **2024**

Central Valley Large Hospital – Central Plant & LED Lighting

- Energy Savings: **853,795 kWh**
- OBF Loan: **$1,497,810**
- Simple Payback: **8.8 years**
- Completion year: **2024**

Central Valley Hospital – LED Lighting

- Energy Savings: **2,291,113 kWh**
- OBF Loan: **$1,420,555**
- Simple Payback: **2.7 years**
- New LED Fixtures: **5,574**
- Completion year: **2025 (in progress)**

resource innovations
Reimagining tomorrow with Nexant today

THANK YOU!

Eric Bornstein

HEFI Program Manager

Cell: 917.528.1820

ebornstein@resource-innovations.com

Sean Eyler

HEFI Program Lead

Cell: 415.914.1151

seyler@resource-innovations.com

Item #5 Microgrids Update

- Recent California healthcare microgrid projects
- National conference presentations
- NFPA 99 and NEC healthcare microgrid focus groups
- Summary from island hospital focus group
- Discussion and public input

Facilitator: Jamie Schnick, Senior Electrical Engineer, HCAI (or designee)

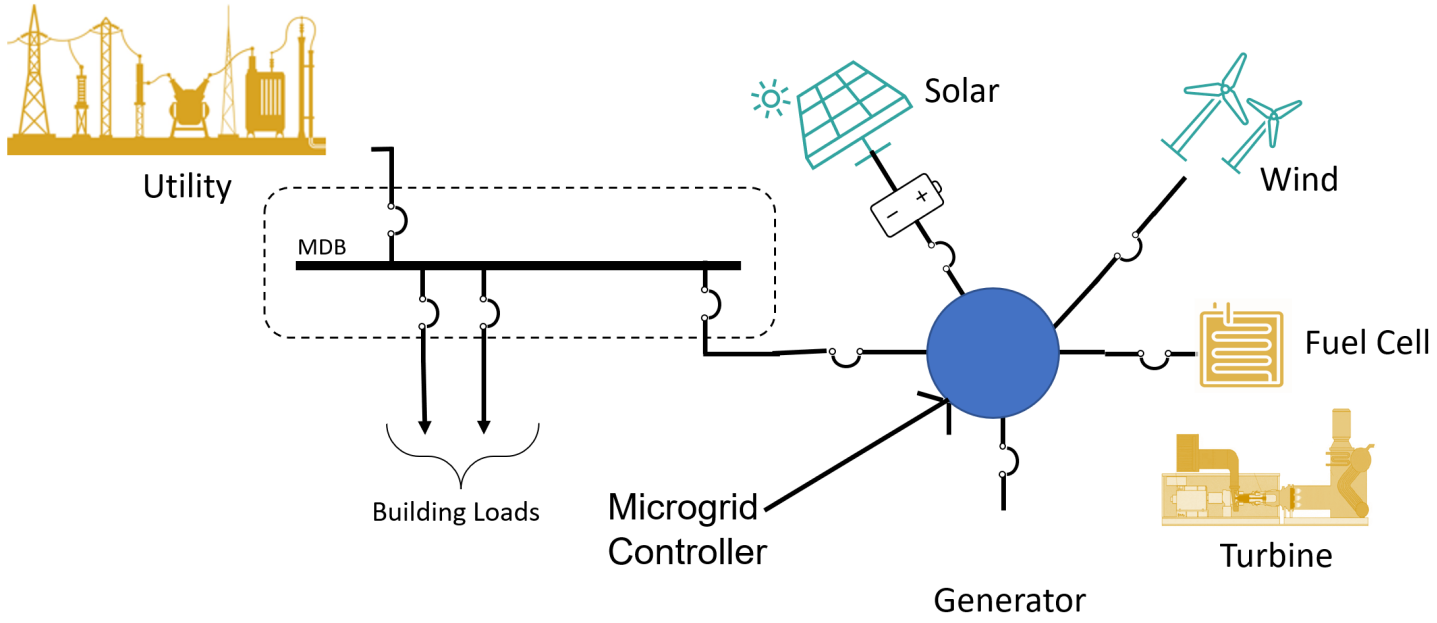
Updates:

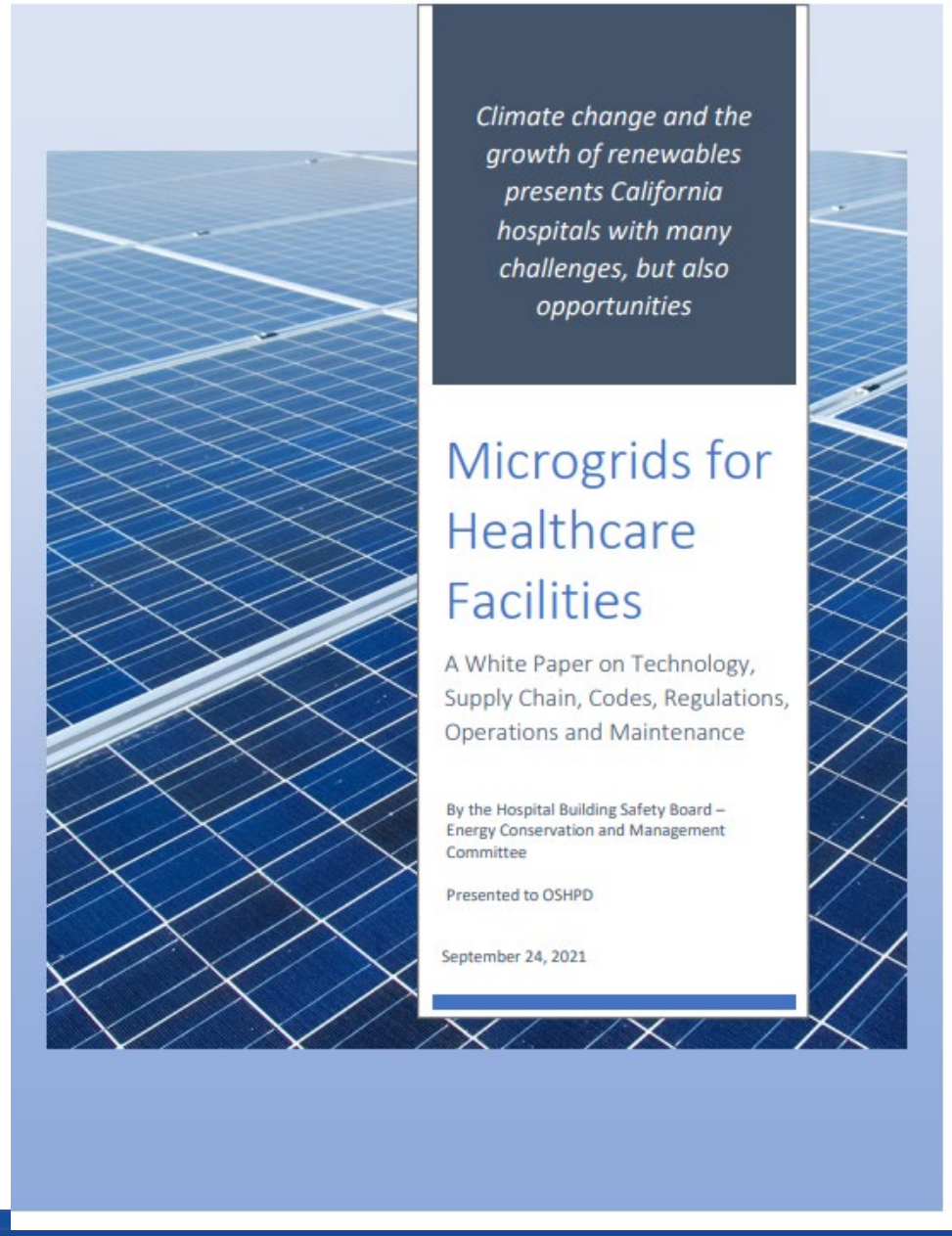
Healthcare Microgrids

By Jamie Schnick
Jamie.Schnick@hcai.ca.gov
(213) 807-7651

HEALTHCARE MICROGRIDS

1. CA Health Care Microgrid Projects On-line
2. National Conference Presentations.
3. NFPA 99 and NFPA 70 Microgrid Focus group's
4. Island Hospital focus group recap





Normal Power

- No issues

Essential Power

- CMS requires Generators
- OSP for Green DER's
- 96 hrs of on-site fuel storage
- Codes allow for normal disallow for EPS
- Proof of concept

THE MISSION

OSHPD microgrid task force

To get the word out that Microgrids can be implemented NOW.

To help speed up and simplify the processing of Microgrid projects.

- Early discussions
- Consistent team/approach to review
- Sharing knowledge

To help with the process of delivering Microgrids as Emergency Power Sources (EPS's) for California Healthcare Facilities that are:

- Code compliant
- At least as reliable as the current go to EPS's - Diesel Generators.

Demonstration Projects

5 SNF's in Northern California.

Kaiser San Marcos

Kaiser Ontario

Valley Childrens Healthcare

100% Alternate Power source at SNF to back up entire facility to meet AB2511 requirements

Existing generators to remain

Tanner Engineering NOW PART OF rtm

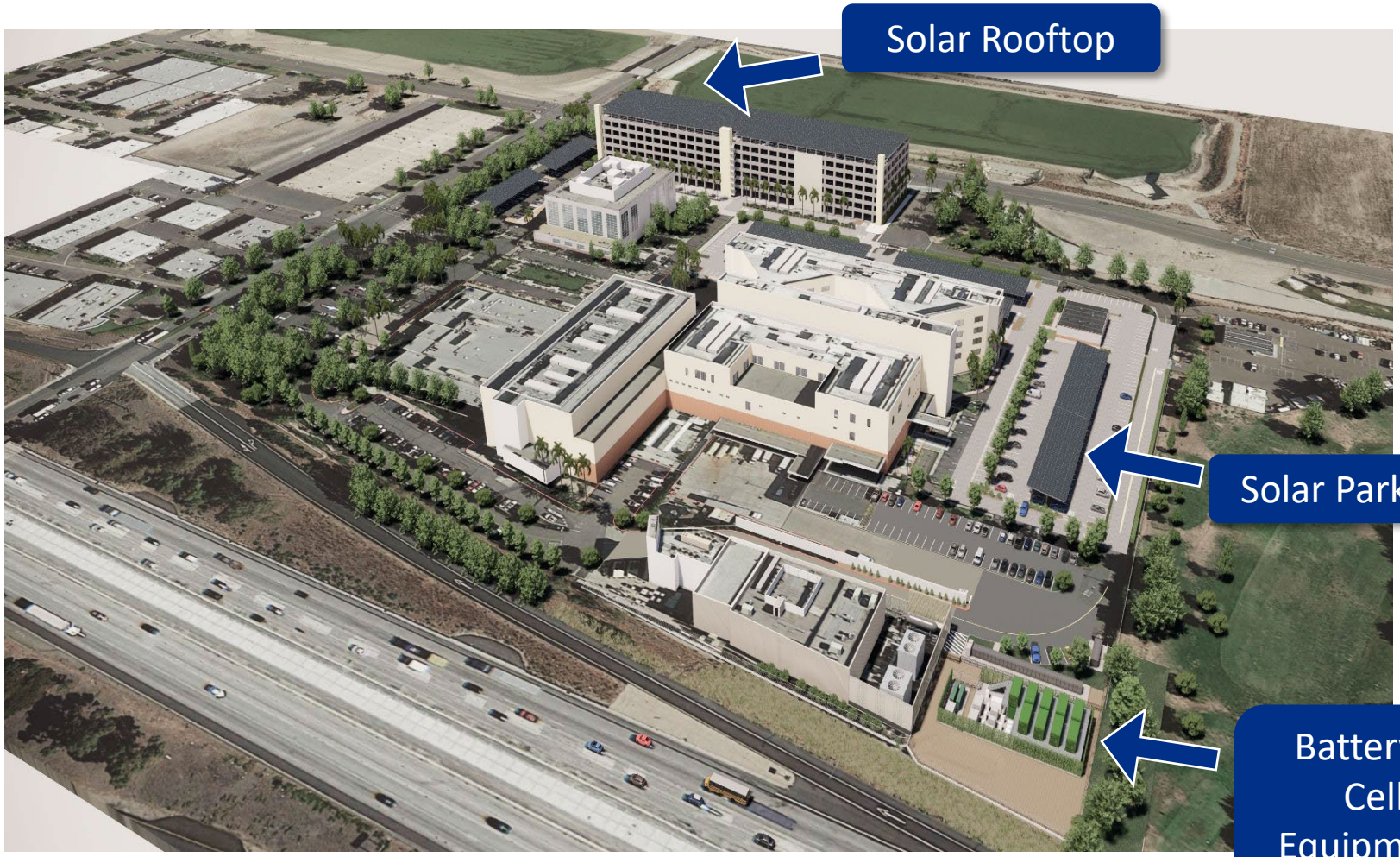
KAISER PERMANENTE
SAN MARCOS CAMPUS

Salas O'Brien

- New Hospital/CP
- 1.7 MW Fuel Cell
  - 100% back up power
- Emergency Generators

U.S. GREEN BUILDING COUNCIL
LEED PLATINUM
USGBC

Demonstration Project: Kaiser Ontario



- Kaiser Ontario – 224 Bed Facility Project: 2 MW Solar, 9 MWH Battery, 1 MW Fuel Cell, 6 MW Diesel Generators

IMPLEMENTING ONE OF THE LARGEST RENEWAL ENERGY MICROGRID

- Solar PV - 1.32MW
- Fuel Cell - 2.2 MW
- Battery - 1.4 MWH

HEALTHCARE PROJECT DELIVERY CONFERENCE

Healthcare Microgrids to the Rescue

Jamie Schnick/Duc Bui/Rocky Tanner (January 31st)

PDC SUMMIT San Diego March 17-20

How California is Making Microgrids Work

Walt Vernon/Ratan Milevej/Jamie Schnick

HEALTHCARE FACILITIES symposium and expo

Health Care Microgrids offer the opportunity to simultaneously lower utility costs, reduce facilities' carbon footprints and provide much needed resilience.

Jamie Schnick/Duc Bui/Rocky Tanner/Rame Hemstreet (September 25th)

DISTRIBUTED ENERGY

Healthcare Facilities and Hospitals: Microgrids Can Deliver Mission-Critical Energy

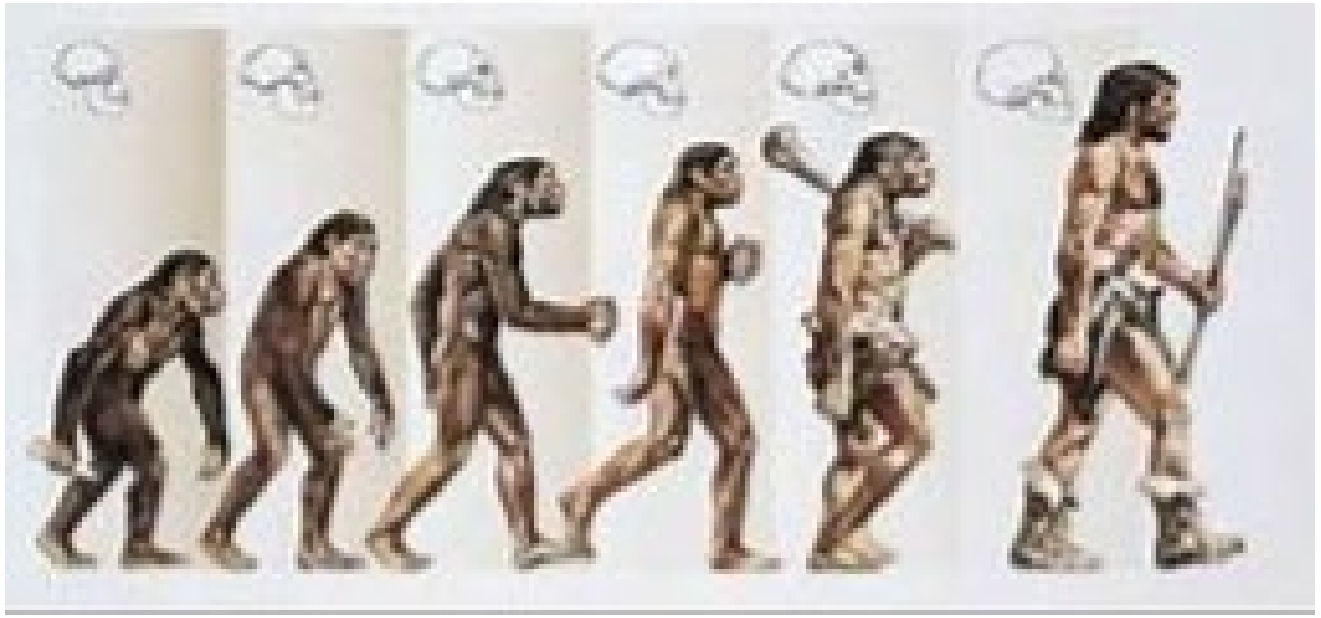
Increasingly, the healthcare sector is exploring controlled on-site power solutions such as microgrids to maintain that mission-critical power resiliency while also aiming for cleaner air through sustainable energy generation.

Rod Walton, EnergyTech Managing Editor

Feb. 14, 2025

Evolution of Healthcare Microgrids in the Codes

1) 2021 NFPA 99 (The term “Health Care Microgrid” 1st introduced)
2) 2023 NEC (Added Healthcare Microgrids as acceptable EPS)
3) 2022 CEC Intervening Code Updates (Pulled content from 2023 NEC into CA code “18 month early – adoption” date July 1, 2024
4) 2026 NEC Public Inputs In process – Task force has taken 1st pass at PI’s
5) 2024 CEC Triennial updates – Have been submitted to the CAC with 1st review
6) 2027 NFPA 99 Public input – Task force developing initial PIs



Healthcare Microgrids in the Codes

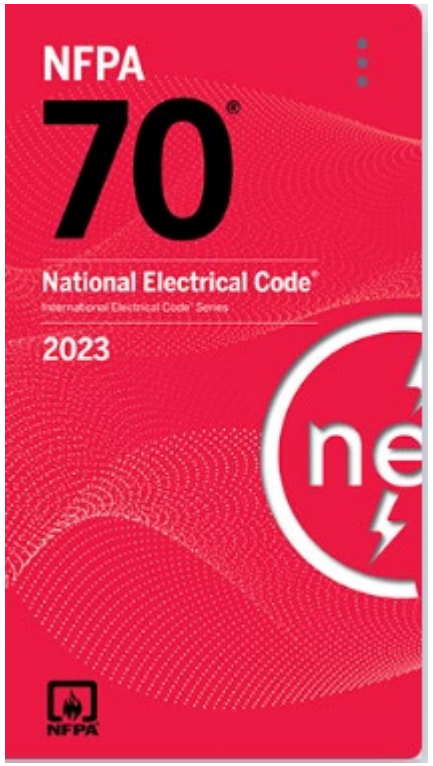
2021 NFPA 99 (The term “Health Care Microgrid” 1st introduced)

6.7.1.6 Health Care Microgrid.
A health care microgrid in accordance with section **6.10** shall be permitted to serve as the EPS for all or part of an essential electrical system

6.10.7 Commissioning Plan.
Health care microgrid systems shall be commissioned in accordance with their sequence of operations.

Healthcare Microgrids in the Codes

2023 NEC (Added Healthcare Microgrids as acceptable EPS)

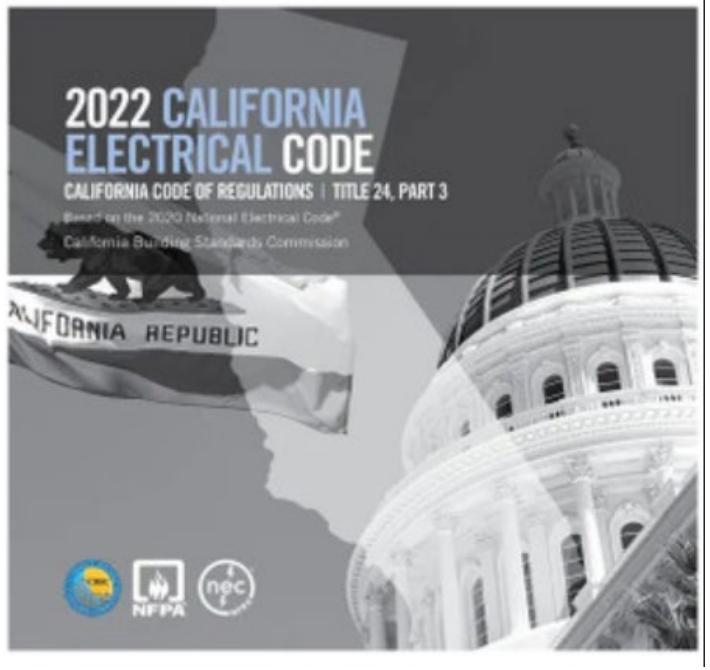


517.30 (A) Two Independent Sources.
Essential electrical systems (EES) shall have (2) or more independent sources or set of sources sized to supply the entire EES…..

517.30 (B) Power sources for EES
…
EES shall be permitted to be supplied by a health care microgrid that also supplies nonessential loads. The health care microgrid shall be permitted to share distributed resources with the normal system. Health care microgrid systems shall be designed with sufficient reliability to provide effective facility operation consistent with the facility emergency operations plan. Health care microgrid system components shall not be compromised by failure of the normal source.

Healthcare Microgrids in the Codes

2022 CEC Intervening Code Updates adoption date July 1, 2024



517.30 & 517.41 Sources of Power.

(B) Types of Power Sources.

(B.1) [OSHPD 1, 3, 4 & 5] Power Sources for the EES. *Power sources for the EES shall be permitted to be any of those specified in 517.30(B)(1) through 517.30(B)(4). One on-site power source (or set of sources) that is sized to supply the entire EES shall meet the on-premises fuel or battery stored energy requirements specified in Article 700.12.*

(4) Health Care Microgrid. *EES shall be permitted to be supplied by a Health Care Microgrid that also supplies nonessential loads. The EES Health Care Microgrid shall be permitted to share distributed resources with the normal source. EES Health Care Microgrid systems shall be designed with sufficient reliability to provide effective facility operation consistent with the facility emergency operations plan. EES Health Care Microgrid system components shall not be compromised by failure of the normal source. EES Health Care Microgrids shall meet the installation and commissioning requirements set forth in NFPA 99 Article 6.10.*

Department of Health Care Access and Information
Office of Statewide Hospital Planning and Development
2020 West El Camino Avenue, Suite 800 • Sacramento, CA 95833 • (916) 440-8300
355 South Grand Avenue, Suite 1900 • Los Angeles, CA 90071 • (213) 897-0166

CODE APPLICATION NOTICE

CAN: 3-517.30(B.1)(4)

Health and Safety Code §129851

SUBJECT

Healthcare Microgrids as Type 1 Essential Electrical System Source (EESS)

Effective: xx/xx/xxxx
Revised: 05/07/2024

CODE SECTIONS

2022 California Electrical Code, Part 3
Chapter 5 Special Occupancies, ARTICLE 517 Health Care Facilities
517.30 Sources of Power.

PURPOSE

This section states that the health care microgrid, if used as an EES power source, is required to be designed with “sufficient reliability”; however, the code does not define what constitutes sufficient reliability.

INTERPRETATION

The requirements to meet "sufficient reliability" status for health care microgrids utilized as EES shall include, but not be limited to, the following:

a) Special seismic certification (SSC) shall be required for EES health care microgrid’s equipment.

b) EES sources shall be located to minimize potential issues due to natural causes.

c) All sources shall meet the installation and maintenance requirements of the applicable NFPA code for the sources that are part of the EES. (i.e. NFPA 3, NFPA 110, NFPA 111, NFPA 853, etc.)

d) Type 1 Essential Electrical System (EES) power sources shall be classified as Type 10, Class X,

e) CEC sections 517.33 (E) & (F) requirements for functions related to emergency generators that are required to be connected to the life safety branch will be enforced for microgrid sources.

f) A sequence of operations shall be submitted and approved during the design phase and included in the contract documents to facilitate the commissioning requirements of NFPA 99 6.10.7.

g) A commissioning plan as described in NFPA 99 6.10.7.2 shall be developed by the healthcare microgrid system installers or commissioning agents and be submitted to OSHPD for review

The requirements for on-site fuel storage found in CEC section 700.12(D) shall apply to healthcare microgrids used as EES power sources.

Healthcare Microgrids in the Codes

2026 NEC Public Inputs In process (mid process)

- Approximately 50 Public Input Comments related to microgrids
- Lots of vocabulary work to get away from normal and emergency (alternate) and instead use off site and on site
- Took a run at capacity of systems
- Lots of fine tuning to address dual function of EPS and 24/7 status of new approach to Essential power requirements

Healthcare Microgrids in the Codes

2024 CEC Triennial updates – Have been submitted and 1st review with CBSC

(A.1) [OSHPD 1, 3 (Surgical Clinics only), 4 & 5] Two Independent Power Sources. *The Essential Electrical System (EES) shall be served by two or more independent sources (or sets of sources). ….*

Clearly indicate all EES components on the design documents.

The two independent sources (or sets of sources) shall be located to reduce the likelihood of simultaneous interruption of EES components and non-EES components.

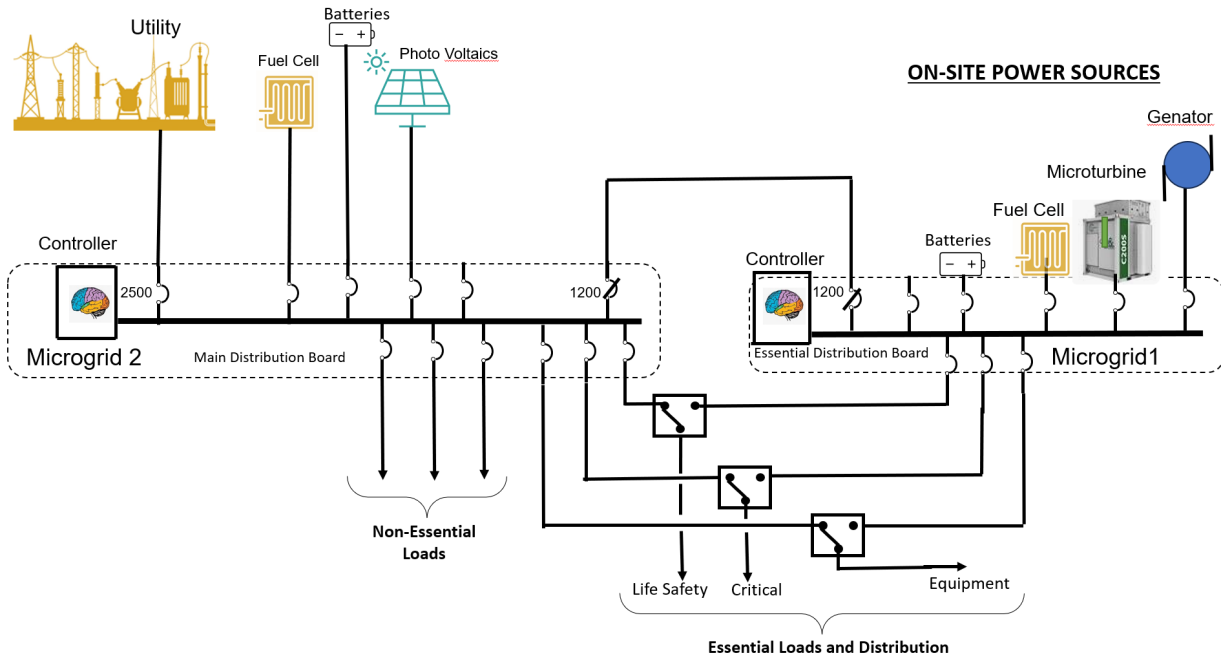
1) ***(D) [OSHPD 1, 4, & 5]: Temporary Source of Power for Maintenance or repair of the Alternate Source of Power****. The Essential Electrical System (EES) shall include permanent switching means to connect temporary or permanent on-site resources*

Healthcare Microgrids in the Codes

2027 NFPA 99 - Public Inputs In process (beginning of process)

Walt Vernon assembled a task force

- Developed sub-committee comments
- More work on language to eliminate normal/alternate/primary power/generators
- In general attempting to modify code to not be so reliant on diesel generators as EPS.
- Considering replacing “sources” with Power production equipment”
- Revisiting some of NEC Public inputs



Normal Power

- No issues

Essential Power

- ~~CMS requires Generators~~
- OSP for Green DER's
- 96 hrs of on-site fuel storage
- ~~Codes allow for normal disallow for EPS~~
- ~~Proof of concept~~ (Design Modeling & CX)
- Listed products (microgrid controllers)

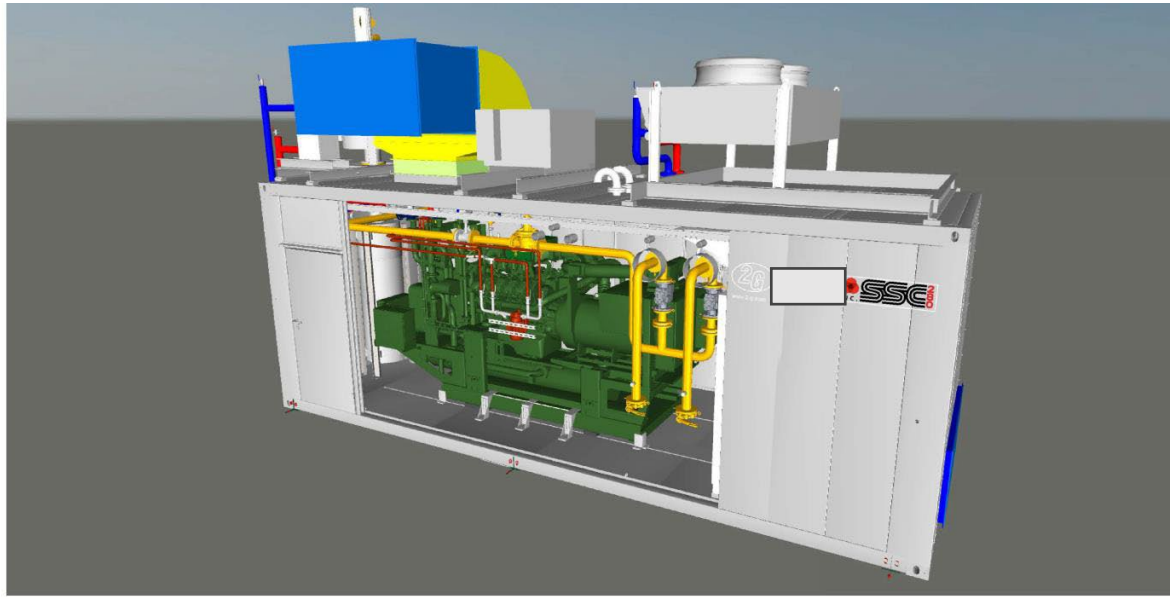
CMS Categorical Waiver for Healthcare Microgrid Systems to be used as EPS for Hospitals and SNFs. (sub-acute SNFs excluded)

Categorical Waiver – Health Care Microgrid Systems (HCMSs)

Title	Categorical Waiver – Health Care Microgrid Systems (HCMSs)
Memo #	QSO-23-11-LSC
Posting Date	2023-03-31
Fiscal Year	2023
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. • The categorical waiver excludes long-term care (LTC) facilities that provide life support as the LTC requirements at 42 CFR 483.90(c)(2) requires these facilities to have an emergency generator without exception.

NEXT GENERATION SYSTEMS

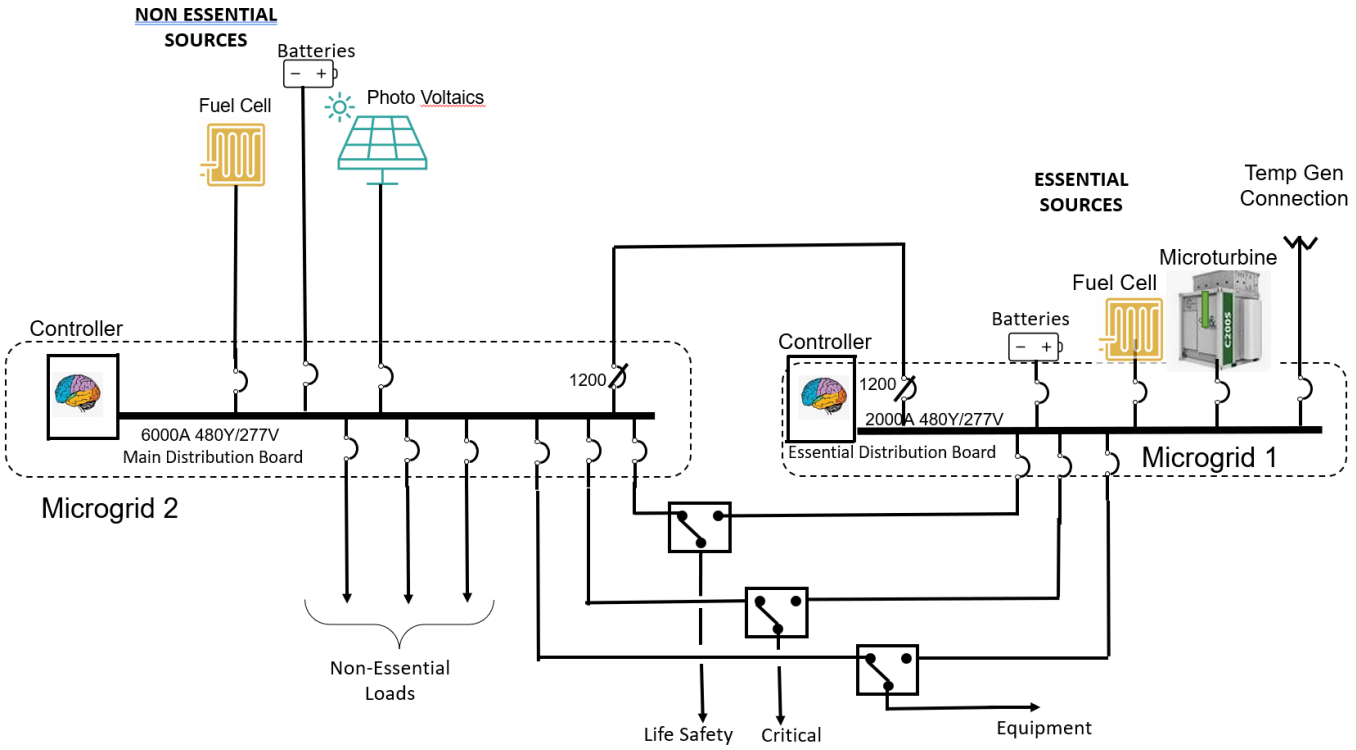
- Integrated reciprocating engine - natural gas or hydrogen
- Heat recovery
- Controls
- Electrical distribution single point of connection
- UL Listed
- 55dB
- Shaker table testing completed in June/Berkley



COMPRESED NATURAL GAS

- 4000psi
- Regulator 4000 PSI – 5 PSI
- Multiple Sizes and shapes

UL 142 READY



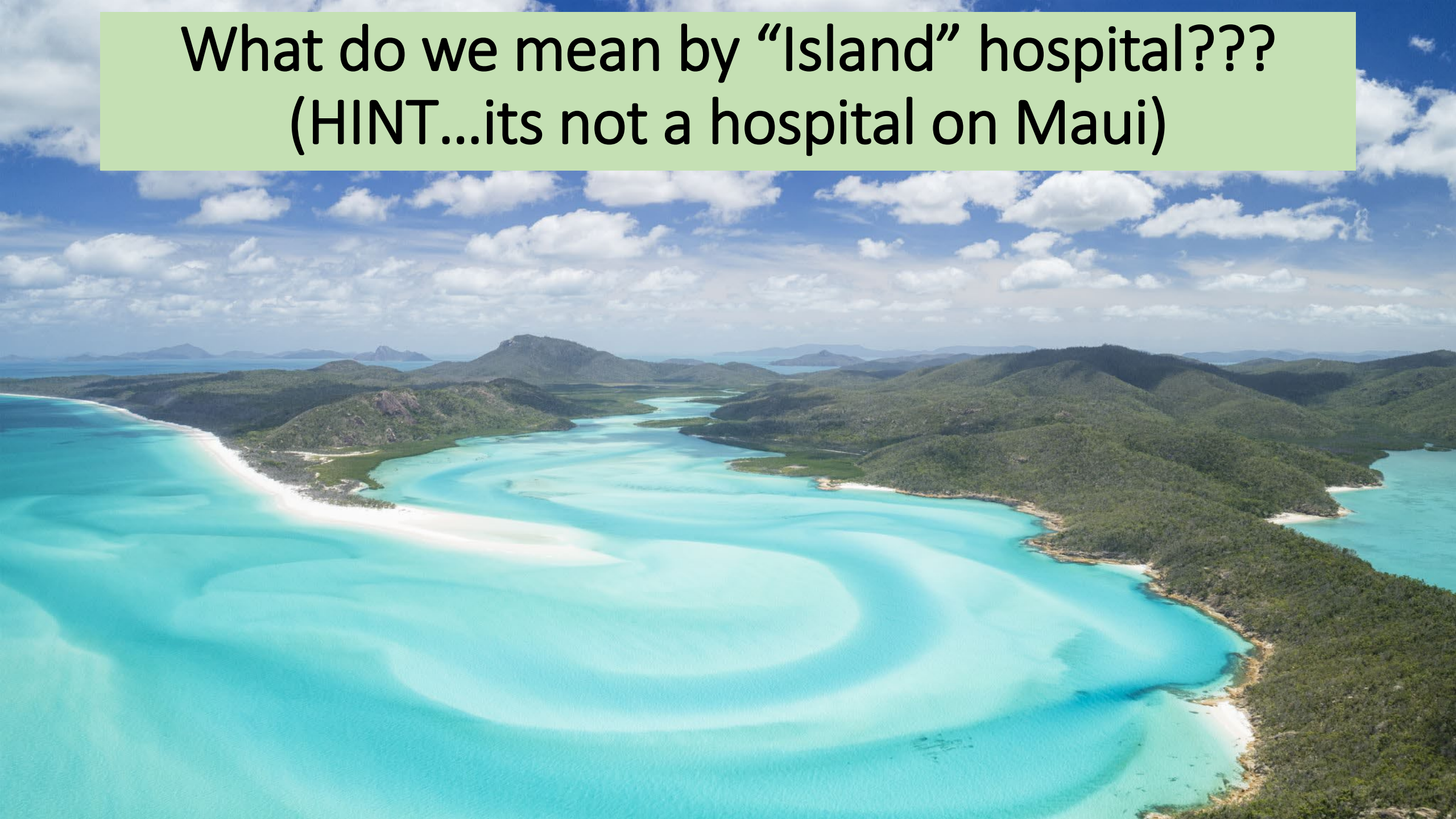
HCAI "Off-Grid" Hospital - Focus Group

1) Duc Bui– Salas O'Brien
2) Dr David Bliss – Faraday Microgrids
3) Marc Hoffman - Innovus
4) Jamie Schnick - HCAI

Initial Discussions

1) Utilities in CA are built to minimum seismic standards
2) Utilities have incredibly high spinning reserves (stiffness to source) which will be tough to replicate
3) Power Quality can be an issue with microgrids if not designed correctly
4) Hybrid Microgrids (with some prime mover) most likely 1st to be built
5) Resources that serve entire site load can also be 1N of essential power
6) Commissioning and annual testing will be required

What do we mean by “Island” hospital???
(HINT…its not a hospital on Maui)



Path to “Island” Hospital – Utility + DER’s/Generator(s)

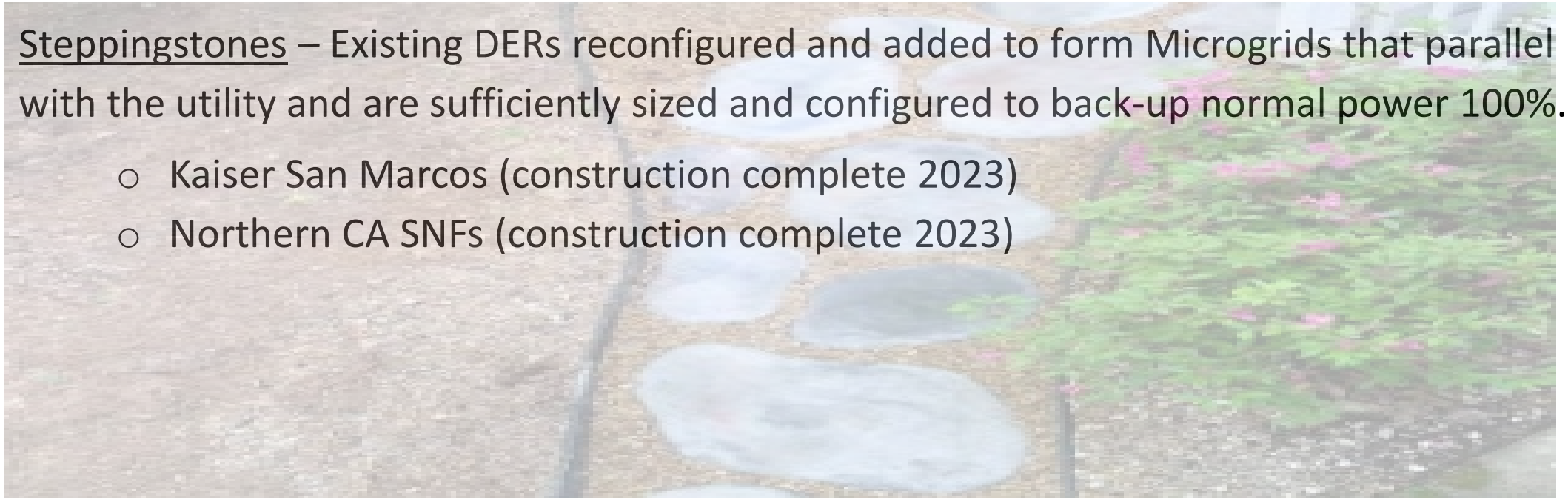
1) Original configuration - Utility service for normal power and diesel generators for emergency power

Steppingstones – DERs installed at many hospitals that parallel with the utility and take load off the utility with on-site green power producers. These systems typically disconnect during power outages. Diesel generators provided to meet code mandated essential power requirements.

- Fuel cells operate 24/7.
- PVs with intermittent energy production
- Batteries charged during off peak and discharge during on peak periods.

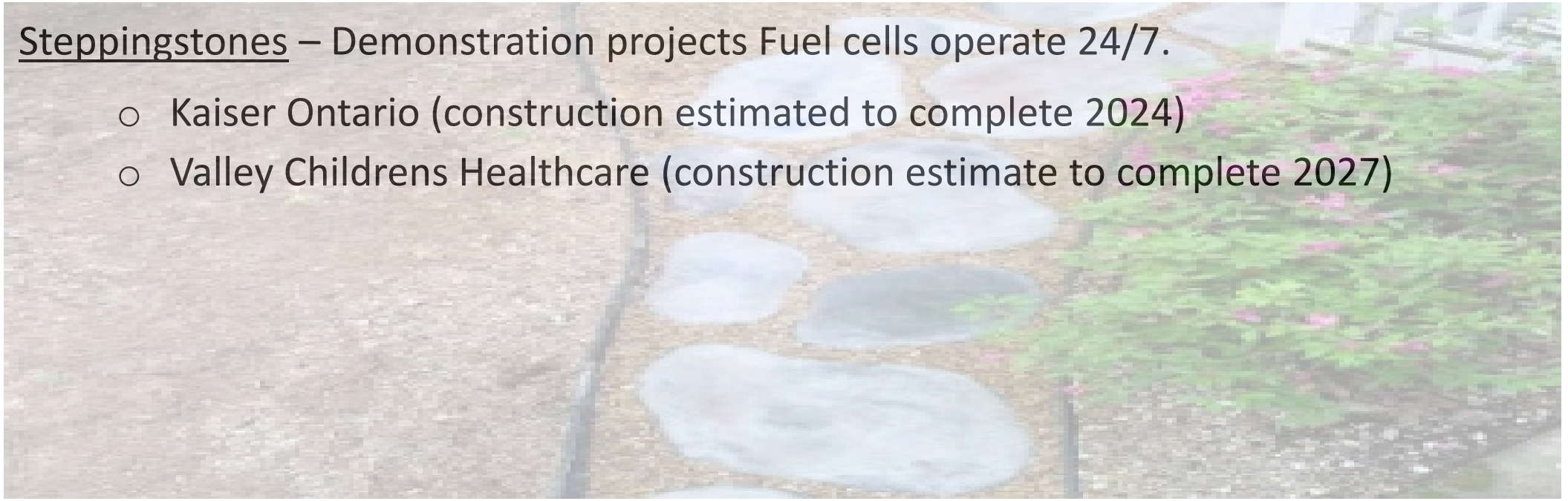
Path to “Island” Hospital - Utility + Microgrid/Generator(s)

2) Some facilities are designed with microgrids paralleled with the utility service configured to pick up the entire facility during interruption to the utility service.



Path to “Island” Hospital – Utility + Microgrid/Generators + Microgrid

3) Existing and new DERs re-configured/configured as Microgrids with controllers to back-up 100% of normal power and configured to back-up emergency power as well—parallel with utility and parallel with generators.



Path to “Island” Hospital –Microgrid (No utility service)/Generators optional)

4) (Future) Full Isolation from the utility - All resources on-site for entire building, and 2 independent sources for essential power.

QUESTIONS?

Item #6 Discussion on potential future meeting topics

A. Recent California healthcare microgrid projects
   - When removing buildings from acute care services, what energy saving opportunities are there to reduce energy in shelled spaces prior to being returned to local jurisdiction?

B. Hospital commissioning
   - With the increasing sophistication of healthcare building systems, what are best (and most efficient) practices for commissioning?

C. Impacts of extreme natural hazard events
   - Current building systems are failing due to high temperatures and new equipment may not be rated for new design temperatures. What are best practices for existing and new buildings?

D. Discussion and public input

Facilitator: Cody Bartley (or designee)

Item #7 Comments from the Public/Committee Members on Issues not on this Agenda

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

Facilitator: Cody Bartley (or designee)

Future Energy Conservation and Management Committee meeting:

- October 8, 2025

Item #8 Adjournment