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HOSPITAL BUILDING SAFETY BOARD
Energy Conservation and Management Committee

Wednesday, October 25, 2023
10:00 a.m. – 4:00 p.m.

Teleconference Meeting Access:
HBSB Teams ECM Committee
Access Code: 604-967-33

Committee Members Present
Scott Jackson, Committee Chair
John Griffiths, Vice Chair
Louise Belair
Michael Foulkes

HCAI Staff Present
Richard Tannahill
Jamie Schnick
John Gray

Consulting Members Present
Eric Johnson
David Lockhart

HBSB Staff Present
Veronica Yuke, Acting Executive Director
Marcus Palmer
Evett Torres

1. Call to Order and Welcome

Scott Jackson, Committee Chair, called the meeting to order on October 25, 2023, at 10:00 a.m., and HBSB Acting Executive Director, Veronica Yuke, called roll.

2. Roll Call and Meeting Advisories/Expectations

Six members of the Committee present constitute a quorum. There being six present at the time of roll, a quorum was established.

Ms. Yuke read the meeting rules and procedures.

3. Microgrids Update

Presenter: Jamie Schnick, HCAI

Discussion and Input

Mr. Schnick updated that the Building Standards Unit (BSU) started reviewing Skilled Nursing Facilities (SNF) assessment to evaluate and provide written documentation of the existing conditions, identify areas of non-compliance, and put together a proposed solution.

Mr. Schnick stated that there were 153 submitted assessment projects, 105 of these resulted in non-compliance and the remaining 48 were pending.

He highlighted that the SNF assessment was done to evaluate existing conditions, identify areas of non-compliance, and suggest potential solutions.

Mr. Schnick said that if the assessment identifies as non-compliance, specific areas like insufficient resources or data are pinpointed, and guidance given to rectify these issues for future assessments.

Mr. Schnick stated that if a facility lacked resources to support cooling equipment or sufficient fuel for 96 hours, an assessment would be submitted, which, upon review and agreement, would be marked as non-compliant.

He said that the dashboard was constantly shared with the California Department of Public Health (CDPH) to display the number of facilities, their submission statuses, and whether they are deemed compliant or non-compliant.

Mr. Schnick reported that several facilities use on-site green power generation such as photovoltaics, batteries, fuel cells, and combined heat systems, however, these systems shut off during power outages due to strict utility requirements, making on-site resources inaccessible.

Mr. Schnick predicted that future projects would focus on reconfiguring these existing assets and distribution systems into microgrid systems to enable facilities to function independently and generate power during utility outages, enhancing resilience.

Mr. Schnick talked about a completed large-scale microgrid project at Kaiser San Marcos, which ensured 100% backup for the entire site.

He disclosed that the project primarily involved a substantial fuel cell operating in parallel with the normal system, promoting sustainability, resilience, and energy cost savings.

Mr. Schnick said that seismic certification was a requirement in healthcare microgrids to retain functioning generators during earthquakes rather than replacing them with uncertain alternatives.

Mr. Schnick advocated the use of software simulations to ensure the microgrid resources could endure various load profiles, emphasizing the necessity for comprehensive commissioning during the incorporation of microgrids.

He announced an upcoming intervening code that would enable microgrids from July 1, 2024.

Mr. Schnick highlighted the introduction of a new HCAI CAN that would define the reliability criteria for microgrids as emergency power sources, aiming to align with the NFPA 70 and NFPA 90 language.

Mr. Schnick stated the intervening code cycle changes for the California Electrical Code:

- 220.110 - Enhanced demand factors for receptacles in Patient Care Spaces.
- 517.1 - definitions related to AB 2511 requirements, microgrid controllers, and allowances for microgrids as emergency power sources added.
- 517.30 - Microgrids as emergency power sources at hospitals requirements from NFPA 99 6.10.
- 517.40 - encompass the regulations allowing microgrids for SNFs.
- 517.4 - derived from NFPA 99, to eliminate the use of the term normal and focus on refining the code to accommodate and integrate new technologies.
- 517.30 & 517.41 -Multiple resources for entire site power and essential electrical system.
- 517.30 & .40 – Address new emergency power source requirements.

Mr. Schnick reported future speaking engagements were scheduled on:

- CAHF – Onsite/Generac Webinar, November 9th.
- Healthcare Project Delivery Conference at San Diego, January 29-30, 2024.
- ASHE Project Delivery Conference Summit at San Diego, March 17-20, 2024.

Mr. Jackson highlighted the fire marshals concern about safety in handling battery storage, emphasizing recent code adaptations requiring physical separation of lithium batteries into their containment areas.

Mr. Jackson mentioned the reliance on designers for safe technology application and underlined the need for fire marshals to expand their role beyond regulation to include

engineering and visionary thinking, ensuring code compliance and adapting to technological advancements.

An interested party asked about the assessment approach in handling challenges with power quality, site affordability, and integrating varied energy sources in compliance with the electrical code. Mr. Schnick answered that the assessment process identified current conditions and deficiencies and helped formulate a remediation plan for review.

An interested party asked if there was a plan to move away from Automatic Transfer Switches (ATS) if microgrids were to power the entire facility. Mr. Schnick answered no, because there was a distribution requirement and a cell generation requirement.

An interested party asked if there was a parallel side from a fire marshal point of view on code changes and fuel sources. Mr. Schnick answered that fire marshals were making sure the codes were considered.

Mr. Griffiths asked if there was a move to allow the use of a hybrid inverter that combines batteries, solar power, and a generator, which allowed for seamless switching between these power sources. Mr. Schnick answered that a hybrid solution for power backup would be acceptable.

An interested party asked how projects were currently evaluated ensuring that energy sources could handle abrupt load changes without compromising the microgrids stability. Mr. Schnick answered that there was a code intended to incorporate these requirements, thus ensuring the success of microgrid systems in the future.

Informational and Action item

- None

4. Microgrid project at Kaiser Permanente San Marcos Medical Center

Presenter: Duc Bui, Salas O'Brien

Discussion and Input

Mr. Bui briefed that Kaiser Permanente San Marcos Medical Center project had four existing medical office buildings (MOB), a new hospital with 168 beds, and a central plant situated adjacent to the hospital.

Mr. Bui discussed the challenges in establishing a second incoming service from the utility company, which was a considerable expense and required specific allocations and guarantees for power provision during emergencies.

Mr. Bui mentioned that most hospitals have individual power purchase agreements (PPA) for photovoltaic (PV), battery, and fuel cell support but were designed to go offline, causing a power loss.

Mr. Bui stated that the project electrical design contained:

- Normal Power Sources:
  - Primary source of power is from Bloom FC (fuel cell) – On-site.
  - Second source of utility power from SDG&E.
  - Provision for future PV power connection.
  - Provision for future Battery connection.
- Emergency Power Source:
  - Two 2,000kW Diesel Generators.

Mr. Bui discussed the benefits of microgrid on the Kaiser Permanente San Marcos project:

- The project had a different design compared to other Microgrids (12kV versus 480V, Normal Power versus Emergency Power).
- Hospitals can be fully functional during loss of utility power.
- No need for canceling surgery.
- System is fully automated- Bloom was responsible for all Power Purchase Agreement (PPA) tolling rates.
- Eliminated a second utility power feed to the site.
- Eliminated need for a third 2MW emergency generator.
- Utility savings due to Bloom tolling rate plus gas being less than the average grid.
- Utilized the 12kV Main Service for the Microgrid.
- Less run time required for the generators and reduced air pollution.

Mr. Bui stated that the project went through installation, setting and testing, field verification, microgrid final testing and commissioning.

Mr. Smith reported that Bloom Energy was fully capable of transitioning from neutral gas to hydrogen if the industry develops to be cost effective.

Mr. Griffiths stated his understanding of the electrical design was that the hospital would be provided with normal power 24 /7 via the fuel cells which use non-renewable natural gas.

Mr. Smith expressed that Bloom Energy fuel cell, at the facility, could autonomously power specific loads around the clock, operating independently of the utility grid while

staying connected, enabling both inverter sets to function concurrently and provide a valuable solution to protect facility loads from power quality issues or grid outages.

Mr. Smith said that Bloom Energy platform with the current fuel cell generation allowed seamless blending of up to 20% hydrogen with natural gas without compromising efficiency or output and had an option for a form factor designed for 100% hydrogen use.

An interested party asked if the peak load and load-interval data was collected from the project. Mr. Bui answered that the energy model gave peak demand around 2 megawatts and operated below 1.5 to 1.6 megawatts.

Mr. Johnson asked if the fuel cell energizes a cold transformer inrush when the utility power is lost. Mr. Bui answered that the systems were continuously energized, not initiated through a start-up process, and extended to the main 12 KV board on the grid-independent side.

Mr. Johnson asked whether a seismic safety shut-off switch was required to stop the natural gas supply to the fuel cell in case of seismic activity. Mr. Smith answered that the seismic shut-off switch was not required for the project by SDG&E and AHJ.

Mr. Griffiths asked for lessons learned from the project and who was the commissioning agent. Mr. Bui answered that there was a collaborative effort involving multiple parties, including the owner and manufacturers, which enabled successful project completion, resulting in a satisfying result. Mr. Bui did not give an answer regarding the commission agent.

Mr. Johnson asked if running on natural gas would be cost-effective. Mr. Smith answered that natural gas was a third of the cost of fuel sources tolling rate that Bloom Energy charges.

Mr. Griffiths asked if the project was able to ramp up and down fuel cells to minimize the response demand charges. Mr. Smith answered that step load capabilities were dedicated to load following on the microgrid side for repeat demand charge.

Mr. Griffiths asked how the project team justified not using the local utility power, which at times could comprise 100% renewable power, instead choosing to provide 100% of the power via the fuel cells, which used 100% non-renewable source, given California's greenhouse gas reduction goals and Kaisers corporate sustainability goals.
Mr. Hempstead was cut off due to poor cell coverage before providing a complete answer.

Informational and Action item

- None

5. Microgrid Components Review

Presenter: John Griffiths, Committee Vice Chair

Discussion and input

Mr. Griffiths said legislative and code barriers were being removed, however, there remained other barriers that needed to be overcome so teams could deliver sustainable hospital microgrids for emergency and normal branches.

Mr. Griffiths highlighted various barriers to achieving a fully sustainable microgrid in hospitals:

- Availability of seismically certified equipment.
- Education for facility engineers and designers so they can have the confidence to incorporate these systems.
- The ability to demonstrate there was a robust support network in place, similar to that provided by automatic transfer switches and generators, by experienced technicians who are available 24/7.
- Lack of awareness of the value sustainable microgrids provide over and above the traditional distribution system.

Mr. Johnson highlighted a critical concern about the rapid reduction in equipment lifespan across industry manufacturers causing challenges as newer advanced facilities coexist with older infrastructure.

Mr. Lockhart emphasized the importance of designing equipment for long-term use, meeting industry regulations, and ensuring reliability and availability.

Mr. Bui stated that there was a need for strong cybersecurity measures in microgrid technology to prevent cyber-attacks.

Mr. Schnick asked what HCAI role in health and safety of the microgrid was. Ms. Belair answered that the Hospital Building Safety Board (HBSB) functions as an advisory board to HCAI, providing guidance on the adoption of new technologies or code modifications necessary to stay current in the industry.

Informational and Action item

Mr. Griffiths discussed several key points and next steps in pushing for advancements in hospital microgrids:

- Get input from major manufacturers to deliver the systems.

- Identify what other barriers there are to delivering these systems and components.
- HBSB could involve the community to produce a white paper or initiate conversations to further innovation.
- Schedule a workshop and charette with major stakeholders to identify barriers and the need for collective community involvement.

6. Topics for future Committee meetings in 2024

Presenter: Scott Jackson, Committee Chair

Discussion and input

Mr. Jackson stated that the committee topics for next year were:

- Research applications for Aircuity Inc. in California Universities.
- Code changes that affect Skilled Nursing Facilities.
- Discussion and public input.

Mr. Johson asked about the primary proposed solutions focused on cost savings for small to medium healthcare facilities. Mr. Schnick answered that he would give an update and add the topic for future discussion.

Informational and Action item

- None

7. Comments from the public/committee members on issues not on this agenda

Presenter: Scott Jackson, Committee Chair

Discussion and input

- None

Informational and Action item

- None

8. Adjournment

Mr. Jackson adjourned the meeting on October 25, 2023, at approximately 1:50 p.m.