OSHPD of Statewide Health Planning and Development

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HOSPITAL BUILDING SAFETY BOARD
Energy Conservation and Management Committee

Friday, June 17, 2016
10:00 a.m. - 4:00 p.m.

Office of Statewide Health Planning and Development
400 R Street, Suite 452
Sacramento, CA 95811

and

Metropolitan Water District Headquarters
700 N. Alameda Street, Suite 2-546
Los Angeles, CA 90012

Committee Members
Eric Johnson, Chair
Dr. David Bliss, Vice-Chair
Deepak Dandekar
Henry Huang
Scott Karpinen
Carl Scheuerman

Scott Karpinen, Board Chair
Mike Hooper
Bruce Macpherson

Consulting Members
Pete Kreuser
David Lockhart
Walt Vernon

OSHPD Staff
Robert David, OSHPD Director
Paul Coleman, FDD Deputy Director
Chris Dickey
Glenn Gall
Roy Lobo
Fran Mueller
Chris Tokas
Elizabeth Wied

HBSB Staff
Kathi Zamora
Krista Harrington
Evett Torres

1 **1. Welcome and Introductions**

Mr. Eric Johnson, Committee Chair, called the meeting to order. All those present introduced themselves.

2. Review and Discuss the Committee's Goals:

a. Develop innovative strategies and solutions in partnership with the healthcare industry to identify and deploy energy management projects at hospitals, while maintaining health and safety standards.

b. Evaluate statutory and regulatory code to identify opportunities where OSHPD has existing authority and flexibility to approve innovative strategies and pilot projects that would result in energy savings in hospitals.

c. Evaluate existing Alternate Method of Compliance projects and industry best practices for potential expansion to other hospitals and health facilities.

d. Consider future amendments to statute and regulatory code that would achieve energy savings and maintain facility health and safety.

Mr. Johnson reviewed the four proposed committee goals above.

Mr. Paul Coleman, OSHPD, welcomed the participants from the California Energy Commission (CEC). He gave a presentation to the group, as summarized below.

- One of the more important goals at this point is to look at how and which codes and regulations to change, in order to afford better energy conservation in hospitals – but not at the expense of patient safety and care.
- Hospitals have higher ventilation standards than commercial buildings. Patient health is involved, as is fire safety.
- Mechanical ventilation requirements are in the California Mechanical Code (CMC) Chapter 4; they closely follow the Facility Guidelines Institute (FGI).
- An allowable reduction of mechanical ventilation requirements in the CMC is for unoccupied rooms or spaces that do not require pressure differential. Some types of unoccupied rooms which Mr. Coleman listed are excluded from reductions in ventilation, while others allow reductions when not in use.
- Mr. Coleman explained ventilation rate changes according to the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).

- He explained Air Changes per Hour (ACH), which have to do with dilution of ventilation for helping to control infection particles. He then explained pressurization, which protects against cross-contamination infiltration.
- Ventilation systems may be a factor in hospital-acquired infections, one of the leading causes of death in the United States. This is another reason to be careful making changes to national standards, which have been created with the involvement of tests, research scientists, etc. Dr. David Bliss, Committee Member, brought up the Legionnaire's Disease incident – an example of an airborne infection from an air ventilation system that resulted in many fatalities.
- Going forward, FDD staff think there are still ways in which energy can be conserved in hospitals. Some standards may have room for movement, especially in non-patient areas.
- Mr. Coleman cautioned to bear in mind that OSHPD is not at liberty to unilaterally change some standards without impacting a hospital's accreditation or ability to receive federal reimbursement.
- Some standards are in place because history has shown that certain types of ventilation are required to provide a safe environment for patient care.

- **Discussion and public input**

Mr. Walt Vernon, Consulting Member and FGI Board Member, clarified that the ventilation requirements in the FGI are now under the jurisdiction of ASHRAE. ASHRAE is in the process of creating a sustainability set of guidelines (ASHRAE 189.3) that look at modifications to ASHRAE 90.1. The new guidelines allow for ventilation, among other energy-saving measures, in ways that do not compromise patient care.

Mr. Vernon addressed the licensing issue. The Joint Commission for accreditation will defer to the state requirements rather than to the FGI. What OSHPD adopts is what the Joint Commission will enforce.

Mr. Vernon stated that it is very important for FGI that its requirements have credibility. FGI has hired a Ph.D. researcher to do literature reviews in order to understand the evidence for everything in the Guidelines – for now, non-ventilation requirements. FGI has also entered into a joint research project with ASHRAE to look at ventilation

standards. FGI knows that ventilation, pressure, humidity, etc. all matter, but FGI needs to know the extent and the combinations.

Mr. Coleman made the point that FGI has adopted ASHRAE's standard for ventilation requirements. The Joint Commission's website states that one of their requirements for compliance is compliance with ASHRAE.

Mr. Glenn Gall, OSHPD, noted that the 2015 Uniform Mechanical Code, which OSHPD adopts as part of the 2016 California Mechanical Code, has adopted ASHRAE 170 for ventilation in healthcare facilities. It is now base model code in the state.

Mr. Gabriel Taylor, CEC, commented that Mr. Coleman's presentation provided information of which the CEC needs more of an education. He added that the CEC is interested in energy *efficiency* opportunities.

Mr. Travis English, Kaiser Permanente, gave a presentation entitled "Energy Proposals for Consideration," as summarized below.

- Kaiser has a goal of achieving carbon neutrality by 2020 and carbon positive by 2025. Two-thirds to three-quarters of the energy in a hospital goes straight to the HVAC system. The single biggest use of energy in any hospital in the U.S. is heating energy – even in summer.
- Medical equipment comprises 10% of energy use; lighting is similar.
- Ventilation technology has progressed tremendously in the last 40 years. Health care's best interest is to start to adopt that knowledge.
- An alternative for consideration is Return Air Variable-Air-Volume (VAV) controls.

  Mr. Scott Karpinen, Committee Member, asked about issues with rated corridor doors closing. Mr. English replied that they have not encountered any; the barrier between the patient room and the corridor is normally open; with the cross-balance, to create a door force would require a serious pressure differential. With VAV, the pressure in the system drops, so the potential for creating imbalances between rooms goes down rapidly. Mr. English added that Kaiser has been talking about pilot projects rather than code reform.

  Mr. Coleman asked if Kaiser had determined the energy savings of eliminating the return air VAV. Mr. English replied that most of Kaiser's construction in the

last 10 years has supplier VAV boxes. However, California code requires return-air box controls so they are set up for Constant Air Volume (CAV) mode.

Mr. Coleman stated that OSHPD was not opposed to doing some pilots if there were adequate justification.

Mr. Karpinen noted that this option saves fan energy as well as reheat energy. Mr. English added that it also saves cooling energy.

Mr. Vernon mentioned the fire point: this is done in 49 other states and we are not seeing a lot of problems. Mr. English commented that you still must respect smoke zones, areas that require exhaust, protections, mechanical system controls, etc. – they are all still in place.

Mr. Coleman asked about nosocomial infection rates – are the numbers smaller in California? Mr. English answered that they are not. HVAC is one of many, many variables that affect those infections.

Mr. Johnson asked about California's energy footprint per square foot compared to the other 49 states. Mr. English answered that in the national energy database, California's energy correction factor for consumption is about 70-80% of the national average. Mr. David Lockhart, Consulting Member, pointed out that California's low humidity figures in.

Mr. English said that the pie chart showing sources of hospital energy use came from Legacy Salmon Creek Hospital in Washington state.

Mr. Coleman asked about reducing the system down – would that cause issues with the duct it supplies? Mr. English answered that the fluctuation might. When you reduce the Cubic Feet per Minute (CFM), you reduce the pressure in the duct by the square of the reduction of the CFM; you reduce the energy of the fan by the cube.

Mr. Taylor said that he prefers to separate the issues of conservation and efficiency. Conservation measures involve turning off the supply of unnecessary air, where efficiency measures involve buying a newer fan with a better quality of service. Efficiency should maintain or improve quality of service. Conservation should reduce quality of service for a justifiable savings in energy or cost.

Dr. Bliss added to the efficiency piece that power quality is a big impactor of efficiency. UC San Diego is doing very good modeling in this area.

- Mr. English went on to the next idea: adoption of room parameters from 2013 ASHRAE-170. The big areas are administrative areas and the standard med-surg patient rooms. There is an opportunity to delegate admin, cafeteria, and general exhausted areas to the non-residential standard. Hospitals in other states may benefit from not laying air change requirements into non-patient common areas.

  Mr. Coleman commented that OSHPD does not allow reductions in admitting and waiting areas because of the possible presence of communicable diseases. For the other areas, OSHPD would be happy to do a pilot program on separate ventilation systems.

  Mr. English commented that the only waiting rooms covered in ASHRAE 170 are emergency department and radiology: there is considered to be a risk there of airborne transmissible diseases.

- The next idea was performance-based ventilation (ASHRAE-62 Indoor Air Quality Procedures) in selected locations. The fundamental philosophy is that the reason we do ventilation is for indoor air quality – to achieve a safe level for the occupants of the space. Today we have environmental safety professionals and industrial hygienists combined with good monitoring tools. We can design an air quality validation program for a facility at a reasonable price point. Mr. English described how to set up such a program. We could start to make changes to the HVAC system and start to vary rates, while getting actual environmental feedback.

  Mr. Coleman stated that in order for that to be viable, we would need a double-blind study – a “placebo” hospital and a hospital with changes being made.

  Mr. English felt that the ventilation requirements we have – two air changes per hour – do not have any relationship to indoor air quality variables. The benchmark is indoor air quality standards set by OSHA and ASHRAE – actual measured contaminant rates that we can do, rather than using an existing facility

operating under two air changes per hour as the benchmark, and trying to compare it with a changed facility.

Dr. Bliss suggested that doing an internal control in one facility, having chosen the benchmark air quality measures and instituting the new program: so long as there is no negative change in any of those parameters, it is really a test of setting the measures. The absence of change would suggest that there has been no meaningful impact. Mr. English agreed.

Mr. Vernon stated that the National Institutes of Health (NIH) is looking at this issue across the country. There are different ventilation systems operating in a lot of places now. An NIH colleague is putting together a protocol for measuring contaminant levels in different kinds of systems, to try to identify the variables that actually matter.

Mr. Coleman stated that if we know what is existing now, and we have changes, we can look at them to see if they really matter. Mr. English noted that Kaiser's industrial hygienist had told him not to try to compare facilities – you will see wild variations. Mr. Coleman concurred that a before-and-after comparison would work.

Mr. Johnson asked if Licensing has indoor air quality on their radar. Mr. English answered that for proposed studies of hospital ventilation measures in California and Oregon, Kaiser had talked to hospital administration including Employee Health and Safety, Infection Control, and Licensing. The one they talked to the most was Licensing.

Mr. Coleman said that OSHPD would use an Alternate Method of Compliance (AMC) for a period of time. If they felt that a Licensing component was involved, then Licensing would need to sign off.

- Another idea was a risk-based ventilation setting. It is based on what is done with water systems. A risk management team looks at a room and discerns the risk involved and the appropriate mitigations: demographics, physical configuration of the space, etc. In that scenario, the team would come up with a tailored solution for the room.

Mr. Vernon commented that when ASHRAE developed its Legionella management standards, it created a separate carve-out for health care facilities. The carve-out permits them to sidestep all of the prescriptive requirements and create a risk management team to look at community risk, water quality, and all other factors, creating the appropriate measures for that set of systems. They place controls including ongoing infection surveillance to identify any issues.

Dr. Bliss counseled the group to pick not only measureable items, but also items that give a reasonable expectation of getting useful data out of those measures that circle back to the purpose of the code.

- The last idea was to bring in international alternate ventilation rates where applicable. Mr. English had gone through a fairly robust effort of benchmarking ventilation standards internationally, including the U.K. and Germany.

  Mr. Vernon commented that in the Netherlands, hospitals manage risk differently; they also manage patients differently. They set up operations and facilities to work together with the multidisciplinary team.

  Mr. English mentioned mixed mode systems with windows that open. Currently ASHRAE 170 has a subgroup that is looking at natural ventilation.

  Dr. Bliss commented that if infection control is a consideration, you face the variable that infection rates vary over time. The problem is association as opposed to causation. You could change the ventilation in a building as a test case and observe the rise and fall of infection rates. Statisticians and infection control people will say that you will double the time making those things connect whatever level is associated. It is association, not causation, until you can prove a causal link.

  Mr. English stated that in 2009 the World Health Organization produced a paper concluding that evidence suggests that insufficient ventilation and poor indoor air quality is a hygiene factor in hospitals and will lead to an increase in infection rates and a decrease in patient outcomes. However, there is no evidence to show that enhancing ventilation rates is going to provide any noticeable benefit.

Mr. English stated that Kaiser's stance is that affordable care is about being outcomes-based. Kaiser will spend money on things that work.

- **Discussion and public input**

Mr. Coleman emphasized to the group that although Mr. English had mentioned potential pilot projects that Kaiser is interested in pursuing, pilot projects are not limited to Kaiser. OSHPD would welcome any other entity to pursue energy conservation measures, providing a program and justification for review, with Licensing and stakeholders involved. One of OSHPD's core values is innovation. If there are ways to ensure that OSHPD is providing safe health care in California, at the most reasonable cost possible, we all benefit.

Mr. Rick Ginley, Kaiser, stated that Kaiser is open to doing a pilot project, but also wants to share results with its partners. From the owners' side, they are in the business of taking care of people. The worst that could happen is to do something with a negative outcome. Mr. Ginley requested that if there are other ideas out there, to please present them so that we pilot everything we can.

Mr. Coleman noted that Mr. English had mentioned many different standards: ASHRAE, U.K., German, etc. We need to be careful about mixing and matching standards within a building; each standard is based on a total approach to the system.

Mr. Coleman mentioned natural ventilation. While the concept should not be discarded for health care, it will probably be a hybrid system. In order for it to work in hospitals, some fairly sophisticated building management systems are needed. Further, it may work better in some areas of the state than in others.

Mr. Coleman noted that some older hospitals in the state cannot take advantage of some of these approaches because of old CAV systems, building construction, and so on. Pilot projects using these older systems are welcome for consideration as well.

Mr. Lockhart stated that the California Society for Healthcare Engineering (CSHE) is preparing to announce its Energy Gold Rush challenge to hospitals throughout the state to look at opportunities to save energy, including older systems.

3. Discussion regarding the steps hospitals may take now to reduce operating costs and increase energy efficiency

Mr. Coleman asked the group to consider steps that hospitals can take today, especially hospitals in Southern California that may experience energy shortages, to alleviate or reduce their energy load to help the state this summer.

Mr. Taylor offered the CEC team as a resource for anyone who wants to discuss concepts or ideas for improving energy efficiency.

Mr. Coleman told the group that OSHPD will put contact information up on the website: hbsbsupportstaff.oshpd.ca.gov.

- **Discussion and public input**

The group discussed the challenge of having pressurized rooms and maintaining pressure throughout the range of fluctuation, including spaces that may not have pressurization requirements. Over-pressurizing can affect accessibility in a room or a space in terms of opening doors.

Mr. Johnson directed the group to consider any statutory or regulatory impedance to trying any pilot programs.

Mr. Coleman pointed out that the Building Code and the Mechanical Code both have provisions for AMCs. The pilot project applicants would have to show that their system is meeting the intent of the code for which they are offering the alternate. These pilot projects have a fairly high standard, and there is some subjectivity. In some cases OSHPD may want to bring the proposed pilot back to this committee for additional input.

Mr. Coleman suggested for the committee to look, in conjunction with the CEC, at new systems coming on the market, to see which really do conserve and reduce energy consumption. Are they viable in hospitals? The new systems could be placed on the website for consideration.

Mr. Johnson suggested that metering and sub-metering could be put to good use in the pilot programs.

4. Comments from the Public/Board Members on issues not on this agenda

For next steps, Mr. Johnson said that the group would see what kind of projects OSHPD receives as submittals.

Mr. Coleman recommended for the committee to reach agreement on the proposed goals.

Mr. Scheuerman asked about the second goal. Does it focus on the actual code language? Mr. Coleman replied that it identifies the opportunities for where to do these alternate systems.

Mr. Taylor stated that the CEC was present partly to answer questions regarding regulatory language. Some ideas might emerge that make sense as regulatory measures rather than pilot projects.

Mr. Coleman added that some ideas may end up as regulations in the California Energy Code.

Mr. Scheuerman asked about the third goal regarding existing AMC projects. Mr. Coleman responded that OSHPD has a record of all AMCs it has done, and can extract them. The problem with AMCs is that they are approved on a case-by-case basis; every situation is different. Each AMC indicates what OSHPD has allowed and the reason it was allowed.

Mr. Scheuerman suggested a presentation from OSHPD on AMCs. Mr. Coleman agreed. The presentation will be placed on a future meeting agenda.

Mr. Johnson asked the meeting participants from the industry about any areas of energy efficiency other than HVAC.

Mr. Scheuerman posed the question of what is going on in the HVAC manufacturing industry – how are they addressing the perceived need for more efficient, less costly systems to operate? In addition, is there a way for CSHE to broadcast OSHPD's message requesting the industry to share what they are doing?

Mr. Gall noted that water usage and water heating should be a part of this conversation.

Dr. Bliss mentioned upcoming technologies including solar concentration, fuel cells, and microgrids, all of which the CEC is very involved with. They go back to supply and efficiency as opposed to internal building efficiency.

An Interested Party stated that the CEC has accumulated many lessons learned from energy programs which they are happy to share. Mr. Coleman suggested creating a checklist for the website derived from those lessons learned.

MOTION: (M/S/C/) [Scheuerman/Bliss]
The Committee voted unanimously to adopt the proposed goals as presented.

MOTION: (M/S/C/) [Karpinen/Scheuerman]
The Committee voted unanimously to change the name of the committee to "Energy Conservation and Management Committee."

Mr. Taylor asked about subjects the committee would like the CEC to present on. Mr. Coleman answered that anything related to HVAC would be helpful because it is such a large energy consumption in hospitals. Water conservation, fixtures, and flows would also be helpful.

An Interested Party commented that the management of our power grids is becoming more fragile. Large consumers such as hospitals that can manage their load and create a collaborative environment with the grid are becoming increasingly important.

An Interested Party emphasized the energy supply challenges and reliability concerns in the state, especially in Southern California.

An Interested Party said that it would be advantageous for this group to have representatives from the utility companies (SoCal, PG&E, ISO, etc.) come and speak, possibly addressing the renewables.

The group discussed meeting next in September and decided on the 29th. There will be two presentations, from OSHPD and the CEC, and possibly one from the public utilities. If OSHPD receives any feedback from today's meeting regarding potential savings and so forth, it will be posted on the website.

Dr. Bliss requested information for the website on obstacles and challenges to supply-side energy systems for hospitals.

Mr. Coleman suggested adding any proposed pilot projects to the next meeting agenda. At the same time, people can propose a pilot project or AMC at any time before the next meeting.

Mr. Lockhart said that CSHE can make available any type of communication from this committee to send out to all the hospitals that are part of CSHE, so that they can contribute any ideas they have.

5. Adjournment

Mr. Johnson adjourned the meeting at 12:18 p.m.