Meeting Notes

Posted April 7, 2023

Notes from 2025 Title 24, Part 6 Code Cycle Utility-Sponsored Stakeholder Meeting for:

Nonresidential Commercial Kitchens and Controlled Environment Horticulture

Meeting Information

Meeting Date: 2/9/2023
Meeting Time: 9:00 am – 12:15 pm
Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Agenda

Time	Topic	Presenter
9:00 AM	Welcome and Meeting Directions	Cosimina Panetti Javier Perez Kelly Cunningham
	Commercial Kitchens	
9:20 AM	Demand control kitchen ventilation (DCKV)	Russel Hendrick
9: 50 AM	Electric readiness	Kiri Coakley Paul Kuck
10:20 AM	Discussion	Kiri Coakley Paul Kuck
10:40 AM	Break	
	Controlled Environment Horticulture (CEH)	Kyle Booth
10:55 AM	CEH Lighting minimum efficacy	Kyle Booth
11:25 AM	CEH HVAC/D Equipment and Controls Integration	Kyle Booth
11:55 AM	Discussion and Wrap Up	Kyle Booth
12:15 AM	Meeting Adjourns	

Members of the CASE Team

Statewide Utility Codes and Standards Team – Utility Staff

Name	Email Address	Affiliation
Kelly Cunningham	kelly.cunningham@pge.com	PG&E
Mark Alatorre	mark.alatorre@pge.com	PG&E
Thomas Mertens	thomas.mertens@pge.com	PG&E
Jeremy Reefe	JMReefe@sdge.com	SDG&E
Dom Michaud	dmichaud@sdge.com	SDG&E
Jay Madden	jay.madden@sce.com	SCE
Jim Kemper	james.kemper@ladwp.com	LADWP

Name	Email Address	Affiliation
Joshua Rasin	joshua.rasin@smud.org	SMUD

Statewide Utility Codes and Standards Team – Codes and Standards Enhancement (CASE) Team Members

Name	Email Address	Affiliation
Maria Ellingson	mellingson@energy-solution.com	Energy Solutions
Cosimina Panetti	cpanetti@energy-solution.com	Energy Solutions
Heidi Werner	hwerner@energy-solution.com	Energy Solutions
Nikki Westfall	nwestfall@energy-solution.com	Energy Solutions
Kiri Coakley	kcoakley@energy-solution.com	Energy Solutions
Russell Hedrick	rhedrick@frontierenergy.com	Frontier Energy
Paul Kuck	pkuck@energy-solution.com	Energy Solutions
David Zabrowski	dzabrowski@frontierenergy.com	Frontier Energy
Kyle Booth	kbooth@energy-solution.com	Energy Solutions
Remy Hutheesing	rhutheesing@energy-solution.com	Energy Solutions
Eileen Eaton	eeaton@energy-solution.com	Energy Solutions
DJ Joh	djoh@energy-solution.com	Energy Solutions
Jasmine Shepard	jshepard@energy-solution.com	Energy Solutions
Joe Sullivan	jsullivan@franklinenergy.com	Franklin Energy
Rob Eddy	rob@resourceinnovation.org	Resource Innovation Institute

California Energy Commission Staff Contacts for 2025 Code Cycle

Name	Email Address
Michael Shewmaker	michael.shewmaker@energy.ca.gov
Javier Perez	javier.perez@energy.ca.gov
Will Vicent	will.vicent@energy.ca.gov

Meeting Participants (available upon request by emailing info@title24stakeholders.com)

Action Items from Meeting

The Statewide CASE TEAM followed up on all questions or comments that required a response and were not discussed during the meeting.

Key Points from Meeting

This proposal for Commercial Kitchens and Controlled Environment Horticulture (CEH) measures is important because:

Commercial Kitchens

This proposal covers two measures related to commercial kitchens: demand control kitchen ventilation (DCKV), and all-electric readiness requirements.

Demand Control Kitchen Ventilation

This measure would move existing prescriptive DCKV requirements to a mandatory prescriptive requirement rather than one of several options. In addition, this measure will consider additional code enhancements to require active-cooking sensors (such as infrared (IR) sensors for smoke or status relay directly from the appliance) to ensure the actualization of full savings potential of DCKV hoods. Commercial kitchens are a large source of energy consumption in the nonresidential sector, and DCKV requirements would save energy with high cost effectiveness, as well as provide a better working environment.

Kitchen Electrification Readiness Requirements

This measure would require those new kitchens that meet a specific description to have the proper electrical infrastructure to convert to a future electrified cookline.

The 2022 code change cycle sectioned off the multifamily code and added an all-electric pathway for that section. Demand for electric-ready products is increasing due to regulatory pressures, customer interest, and decarbonization goals. There is documentation of successful all-electric kitchens in California across a variety of foodservice kitchen types, including large quick-service chains Wendy's and McDonald's. Foodservice buildings are one of the most intensive users of commercial energy, with correspondingly high energy savings potential.

Controlled Environment Horticulture (CEH), Lighting Efficiency

The lighting efficiency measures would increase lighting efficacy for both greenhouse CEH lighting and indoor CEH lighting, resulting in approximately 112.1 GWh of first-year savings. This proposed code change addresses a high energy use intensity industry and significantly contributes to state greenhouse gas reduction targets.

HVAC and Dehumidification (HVAC/D) Equipment and Environmental Controls Integration

The Statewide CASE Team will explore mandatory environmental and irrigation controls in indoor horticulture facilities larger than a certain square feet threshold. The controls will specify the monitoring parameters specific to plant growth such as temperature, humidity, CO2 levels, as well as parameters specific to plant irrigation such as pressure in irrigation lines. Optimal values for environmental parameters will be determined for all crop types. The evaluation will consider simple controls such as thermostats, switches, time clocks, irrigation timers, irrigation controllers, pressure sensors for irrigation lines as well as more complex controls that use computerized equipment. Interactions of lighting and HVAC systems will be considered.

MEETING NOTES

During the meeting, questions and comments were submitted in three distinct formats which are provided in these meeting notes in these [hyperlinked for quick access] sections:

1. **In-Meeting Questions / Comments:** Questions and comments submitted verbally during the meeting via the 'raise hand' function in GoTo Webinar, where participants were unmuted to speak, or in some cases, comments submitted in writing were discussed verbally during the meeting (in which case the person that commented may not be identified in these notes).
2. **Questions / Comments Submitted Via GoTo Webinar:** See this section for questions and comments submitted in written format via the GoTo Webinar question pane.
3. **Public Input Submitted Via Mentimeter:** This section includes public comments and questions, including screen shots of the polls that were conducted during the meeting, and responses to those polls.

Not all written questions and comments were discussed during the meeting but all have responses available in these meeting notes.

In-Meeting Questions / Comments

Demand control kitchen ventilation (DCKV)

1. **Audience question: Are these current requirements/options also prescriptive?**
    a. Statewide CASE Team (Russel Hendrick): The current T24 code identifies prescriptive requirements/options for all commercial kitchen ventilation systems with a combined exhaust rate greater than 5,000 cfm.

2. **Audience question: Was it stated that some options would be prescriptive with 2025, but they already are… do you mean mandatory?**
    a. Statewide CASE Team (Russel Hendrick): Currently we have four prescriptive options, and stakeholders only need to choose and comply with one. The proposed change would require DCKV as a mandatory prescriptive option, with the need to choose and comply with one of the three others.

3. **Audience question: There is no such thing as mandatory prescriptive in the Energy Code. If you want [this to be] mandatory, it [will] need to be moved to a different section of the Energy Code. Gina Rodda**
    a. Statewide CASE Team (Russel Hendrick): DCKV would now be mandatory, and the other requirement would be implementing one of the three remaining prescriptive solutions. The Statewide CASE Team will also follow up with the Compliance Improvement Team to continue discussions on how best to achieve compliance for this measure.

4. **Audience question: What are typical demand loads of DCKV's? Will panel upgrades be a necessity?**
    a. Statewide CASE Team (Russel Hendrick): This system typically does not change the demand load. It should be the same designed airflow rate, but turn down with low to no activity.

5. **Electric and gas kitchens will be impacted differently, so are there different thresholds?**
    a. Statewide CASE Team (Russel Hendrick): Currently that's not a consideration we've been making since we're analyzing how much energy is being consumed for exhaust and supply fan. We're looking at the whole system. If someone could provide a good argument for why they should be addressed separately, we'd be interested in that data. We chose 5,000 cfm as a cutoff for the exhaust rate due to the incremental cost for implementing that system, and the amount of time the system would be able to operate in a turn-down mode. We are concerned about the cost effectiveness of the measure as we start getting into the smaller systems for a mandatory requirement.

6. **Why aren't we considering cooling savings? (Meg Waltner)**
    a. Statewide CASE Team (Russel Hendrick): The application for different climate zones made more sense to use heating savings. This assumption helps us get a more conservative estimate of energy savings. Additionally, not all cooling is mechanical for all commercial kitchen facilities.

Kitchen Electrification Readiness

1. **Audience question: Definitely need to study the electric kitchen heat and capture in electric kitchens vs. gas. They are fundamentally different kitchens and need study. Smoke and Heat are 1/10th that of gas kitchens. The sensors are impacted differently.**
    a. Statewide CASE Team: Agreed. There is a lack of data on the impact of fuel source[s] on kitchen ventilation systems and kitchen temperatures.

2. **Audience question: which universities are participating (in transitioning to all-electric)?**
    a. Statewide CASE Team: Cal State, a few universities back east, and a lot of discussion among universities thinking about transitions.

3. **Audience question: Have you quantified the amount of natural gas used for commercial kitchens versus the other uses for natural gas such as heating?**
    a. Statewide CASE Team: US Energy Information Administration data from their 2018 CBECS survey shows the following breakdown of natural gas use as a percentage of total facility natural gas use: 73% cooking energy, 18% space heating, 9% water

heating. Foodservice buildings are one of the most intensive users of commercial energy, with no statistically significant decrease in energy intensity in recent years. *Source: https://www.eia.gov/consumption/commercial/data/2018/*

4. **Audience question: Are you looking to electrify dishwashing?**
    a. Statewide CASE Team: We are focusing on electrifying the cookline, but we're looking for other suggestions as well. The primary non-electric energy consumption for dishwashers is through gas-fired water heating, and commercial foodservice facilities require high throughput for hot water loads. There are some heat pump water heater technologies that are starting to address high throughput applications like foodservice facilities, but they have limited commercial adoption at this time.

5. **Audience question: Does wiring need to be run or just conduit and panel infrastructure installed?**
    a. Statewide CASE Team: We have not yet built out those details, but since we're looking at new construction and larger additions, there may be requirements for the panel updates. Wiring is important as well, so thanks for that comment and we will continue to look further into it.
    Configurations would be custom for every site. There isn't necessarily a specification that can be given for full-service restaurant. So, in the design aspect, there will need to be specification for two pieces of equipment for understanding how to convert gas to electric fryer, for example. The amperage can differ in this conversion as well. Electrifying the kitchen means considerable upgrades of a panel or two since it's adding a lot of amperage.

6. **Audience question: Some dishwashing equipment uses booster heaters served by natural gas. Observed in foodservice locations in Vermont.**
    a. Statewide CASE Team: The market for gas booster heaters in California is very small. More than 90% of installed booster heaters are electric.

Controlled Environment Horticulture

7. **Statewide CASE Team (Kyle Booth):** For questions on HVAC testing of dehumidification equipment, nothing is out on that yet, but information will be shared as it comes out, likely in the Draft CASE Report.

8. **Audience question: Is the code language only applicable to new buildings or also existing?**
    a. Statewide CASE Team (Kyle Booth): This would be for new buildings and likely any large alterations similar to what we did in 2022. We haven't yet drafted the code language, but it would likely also apply to alterations.

9. **Statewide CASE Team (Kyle Booth):** Commissioning through an acceptance test would be done through an acceptance test technician. We're still forming what that may look like.
10. **Statewide CASE Team (Kyle Booth):** I see a note about controls. If you have thoughts about how to update the controls part of the code language, we welcome that feedback with specific ideas.
11. **Statewide CASE Team (Kyle Booth):** Currently dehumidification has different technology paths written into the code. Integrated HVAC units have a minimum, as do chilled water systems. Desiccants have specifications about relative humidity percentages in their design.
12. **Statewide CASE Team (Kyle Booth):** We determine the most common designs through stakeholder outreach. This is where we need your input to help inform this. We are doing outreach with manufacturers and designers currently but looking for more support here.
13. **Statewide CASE Team (Kyle Booth):** I see a technical barrier with equipment constantly failing. I'd like to know more about why the equipment is failing, so would like to learn more there.
14. **Statewide CASE Team (Kyle Booth):** Question about requiring all HVAC to use single speed versus variable compressors. That has not been determined yet and is still being considered. We're trying to eliminate the least efficient designs. So, we're considering how modulating equipment can benefit growers and save energy.
15. **Statewide CASE Team (Kyle Booth):** For the 2022 code cycle, the requirement is only for new construction or major additions. So, the code wouldn't affect existing equipment. When it's time to replace lighting, if it hits a major alteration trigger, then it would require an upgrade to minimum code efficacy.
16. **Statewide CASE Team (Kyle Booth):** Question about a total W/m2 – that was considered last code cycle and there were a lot of potential issues and complications (such as defining canopy size, compliance issues, etc.) that came up there, especially from what we've seen in other states. So we chose to go with an efficacy pathway per that research and information.
17. **Question submitted in Mentimeter anonymously: What are the reasons for differences in minimum requirements for indoor and greenhouse CEH lighting?**
    a. Statewide CASE Team (Kyle Booth): There are multiple different use cases for greenhouses. Some are for season extending, some have supplemental lighting to extend photoperiod, whereas others are growing for high light intensity. So part of this was being sensitive to different use cases, whereas indoor is 100% supplemental lighting, more so a singular use case.

18. **Audience Question:** What is the current or proposed definition of a greenhouse for the lighting measure?
    a. Statewide CASE Team (Kyle Booth): Greenhouses are defined as having a Skylight Roof Ratio of greater than or equal to 50 percent.

19. **Audience question:** Will the new code language only apply to new builds?
    a. Statewide CASE Team (Kyle Booth): Focusing on new buildings and major alterations for now.

20. **Statewide CASE Team (Kyle Booth):** I see a note about concerns conflating efficacy best practice and standard practice. There are a wide range of efficiencies within what qualifies as standard. CA's state GHG reduction and energy goals affect this, since this can be a high energy process.

21. **Statewide CASE Team (Kyle Booth):** I see feedback that DLC is not standard practice efficacy. We welcome your thoughts on what is standard practice efficacy.

22. **Audience question:** How was 40kW load determined?
    a. Statewide CASE Team (Kyle Booth): Last code cycle we looked at higher energy intensity crops like cannabis. We analyzed what a canopy could be and having a carveout for smaller facilities or those using lighting more for the photo period, without necessarily having a high lighting density or intensity. So that was intended to provide a carve out for those small and medium businesses. If you think that should be change or data to support that aim, we're open to hearing from you.

23. **Audience question:** I have to go to another meeting, will a recording of this be available?
    a. Statewide CASE Team (Kyle Booth): The recording of this meeting will not be made public, but the slides and Measure Summaries, along with meeting notes will be posted on www.title24stakeholders.com after the meeting

Wrap-Up

- All CASE Reports will be posted on title24stakeholders.com/events
- Round 2 meetings begin in April
- Meeting adjourned at 12:15 PST

Questions / Comments Submitted Via GoTo Webinar

Last Name	First Name	Time Asked	Question / Comment	CASE Team Response
Cseidel	Chip	09:27:21 AM PST	Can we download this PP?	Should be in the handouts. Also available here: https://title24stakeholders.com/event/nonresidential-commercial-kitchens-and-controlled-environmental-horticulture-utility-sponsored-stakeholder-meeting/
Waltner	Meg	09:28:20 AM PST	Are these current requirements/options also prescriptive?	The current T24 code identifies prescriptive requirements/options for all commercial kitchen ventilation systems with a combined exhaust rate greater than 5,000 cfm.
Rodda	Gina	09:34:04 AM PST	I had a similar question, it was stated that some options would be prescriptive with 2025, but they already are....do you mean mandatory?	Currently we have four prescriptive options, and stakeholders only need to choose and comply with one. The proposed change would require DCKV as a mandatory prescriptive option, with the need to choose and comply with one of the three others
Rodda	Gina	09:36:51 AM PST	There is no such thing as mandatory prescriptive in the Energy Code. If you want mandatory, it would need to be moved to a different section of the Energy Code	To Gina Rodda DCKV [comment]. DCKV would now be mandatory, and the other requirement would be implementing one of the three remaining prescriptive solutions. The CASE Team will also follow up with the Compliance Improvement Team to continue discussions on how best to achieve compliance for this measure.
Waltner	Meg	09:42:02 AM PST	Have you considered setting different thresholds for gas vs electric kitchens? e.g., should the CFM threshold be lower for gas kitchens due to air quality issues?	Currently we've not made that consideration, looking at just energy savings as the system as a whole. If we can get feedback from stakeholders, we will consider. 5k cfm threshold exception was determined on an incremental cost savings perspective.
Tiffany	Ted	09:45:12 AM PST	Definitely need to study the electric kitchen heat and capture in electric kitchens vs. gas. They are fundamentally different kitchens and need study. Smoke and Heat are 1/10th that of gas kitchens. the sensors are impacted differently.	Agreed. There is a lack of data on the impact of fuel source on kitchen ventilation systems and kitchen temperatures.

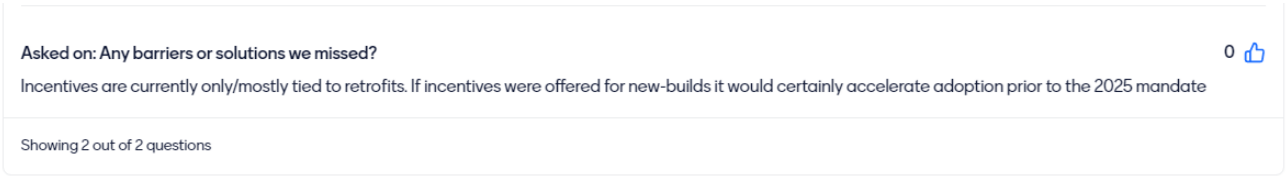
Last Name	First Name	Time Asked	Question / Comment	CASE Team Response
Waltner	Meg	09:51:02 AM PST	Why aren't you considering cooling savings?	Given climate zones, made more sense of using heating savings, going more conservative in our energy savings calculations approach. Also, not all cooling is not mechanically cooled, so electrical savings may not be there necessarily, so sticking with heating to be conservative.
Schimelpfenig	Gretchen	10:26:56 AM PST	Is it meant to say gas to electric?	Yes, should say "least inclined to switch from gas to electric".
Schimelpfenig	Gretchen	10:30:27 AM PST	Are we looking at dishwashing equipment here?	The focus is on cooking equipment. Most commercial dishwashers are all-electric.
Schimelpfenig	Gretchen	10:32:57 AM PST	Some dishwashing equipment uses booster heaters served by natural gas. Observed in foodservice locations in Vermont.	The market for gas booster heaters in California is very small. More than 90% of installed booster heaters are electric.
Morrison	David	11:09:46 AM PST	What is the current or proposed definition of a Greenhouse for the lighting measure?	Greenhouses are defined as having a Skylight Roof Ratio of greater than or equal to 50 percent.
Paulin	Eric	11:14:04 AM PST	Yes, agree with LED costs and percentage of sales vs. HPS.	Thank you for your input.
Schimelpfenig	Gretchen	11:17:36 AM PST	Create a funding pool that is outside of utility incentives to encourage code adoption and compliance.	Thank you for your input.
Malmquist	Emily	11:26:46 AM PST	Will the new code language only apply to new builds?	Focusing on new buildings and major alterations for now.
Schimelpfenig	Gretchen	11:45:42 AM PST	Improperly sized HVAC equipment is a cause for equipment failure	Thank you for your input.
Schimelpfenig	Gretchen	11:49:12 AM PST	Why is canopy area per luminaire the same for GH and indoor?	The table shown was specifically for the cannabis crop type, where light spacing is often similar to indoor spacing to achieve high light intensity when no sunlight is available. The Draft CASE Report will provide details on all crop types.
Dean	Patricia	11:57:25 AM PST	I have to go to another meeting, will a recording of this be available?	The recording of this meeting will not be made public, but the slides and Measure Summaries, along with meeting notes will be posted on www.title24stakeholders.com after the meeting.

Public Input Submitted Via Mentimeter

Note: all questions and comments submitted via Mentimeter are anonymous. **Those that were discussed during the meeting are incorporated into the 'In-Meeting Questions / Comments' section above; others are shown below.**

Commercial Kitchens

Controlled Environment Horticulture



Commercial Kitchens

Which equipment types are customers least inclined to switch from electric to gas?

Which equipment types are customers most inclined to switch from electric to gas?

Which foodservice business types do you think are most ready for becoming all-electric?

Do you agree with these considerations? What else should we include?

You could have a requirement of kVA/Btuh by equipment type

I mean to give people an understanding of how much electrical capacity they'll need to install to be electric ready

Suggestion, have additional electrical capacity at a sub-panel within a specific proximity to the kitchen. Then when they switch it would less expensive to put the branch in, and allow them more flexibility

Make sure people don't switch to solid fuel cooking from gas

Provide recommendations of switching appliance types: broiler to griddle or plancha switch

Is electrification limited to new construction or major retrofits also?

Include exemptions based on Btuh (small kitchens)

Consider how wood-fired cooking is or is not allowed

Consider how this may encourage propane usage

Are there any other major sources of loads for commercial kitchens?

plug loads

refrigeration

hvac

We want to hear from you! Please provide any last comments or feedback...

Consider when existing buildings will need to comply with these requirements.

Do you agree with this description? What else should be known?

Mentimeter

- Yes
- I think you have it right
- What certifications will be required for the T24 testing/inspections?
- I think you should contact DLC to see what they think might be possible in terms of efficacy
- What is the average efficiency of a HPS light?
- For CEH facilities. Are you more focused on large scale building CEH or does this include container farms?
- Don't tie regulations to DLC!
- Significant differences in adoption for greenhouses vs. indoor and for vegetative/propagation vs. flowering should be noted
- Just to note, incentives for hort lighting (through traditional IOU EE programs) have all but dried up because the CPUC insists the baseline is already LED (with no supporting evidence).

Implementers cannot get hort lighting incentives through IOUs at all right now.

The MAP program is the only way hort lighting is getting supported by IOUs because of the CPUC

We are seeing T24 efficacy baselines being used to determine standard practice efficacy for the purpose of calculating incentives. Yet if T24 is based on DLC and DLC represents best practice not standard practice, this is a vicious cycle

How are we addressing equipment and material shortages to accommodate installations to follow the adjusted codes?

I think that environmental controls can modulate to adjust for various growth stages of the plants

HVAC&D industry requires additional assistance calculating the sensible and latent load throughout the life of the plant.

What certifications will be required for the testing and inspections of the HVAC/D equipment?

digital compressors tend to be more reliable than variable speed

How was 40kW connected lighting load determined?

Has there been any research done on whether LED's used in a grow context have adverse health affects such as skin cancer or other cancers?

How is efficacy verified? Is it based on spec sheet data or relying on spec sheet claims?

For most indoor farms (depends on crops grown), LEDs are more common than HPS.

Why do they still HPS efficiency as lamp efficiency when the fixtures lose at LEAST 6% and generally considerably more. This makes no sense. Total system efficacy is what matters, yes?

While I don't think any legacy technology can meet 2.3 umol/J, code compliance folks will (still) have no way of verifying efficacy of legacy products.

There's a lot of confusion about the efficacy requirements for luminaires vs. lamps - this needs to be emphasized

Yes, agree with LED costs and percentage of sales vs. HPS.

Are you considering including 700-750nm in efficacy figures? A lot of LEDs have far red which is photosynthetically active.

Any barriers or solutions we missed?

Mentimeter

The slide captured all of the major ones.

Solutions: funding pool outside of utility incentives so that code adoption and compliance can be supported through government funding

Just the pure educational play, some growers still are stuck in the past... and don't understand the key science

Incentives are currently only/mostly tied to retrofits. If incentives were offered for new-builds it would certainly accelerate adoption prior to the 2025 mandate

We can't get incentives through IOUs except through the MAP program right now

To some degree, familiarity/comfort with LEDs is still a problem that is mostly unique to CA (and perhaps OR) due to the long history of the market in the state.

The rebate payment structure for the new retrofit rebate program makes it almost impossible to make it work.

Yes, MAP payments are complicated and completely M&V based

(Mostly applies to outside CA) Some growers benefit from radiant heat of HPS

Fresh air requirements for buildings create an issue with CEH using C02 to enhance the growth of the plants. Will there be a carve out to not require economizers to be installed into the HVAC unit?

Hot Gas bypass is favored by some CEH users to prevent freezing coils during night cycles. Would hot gas bypass be allowed for CEH facility usage?

With cannabis, Photosynthetic action isn't the only important factor. Photomorphogenesis is important in cannabis because plant and flower structure impacts yield and price. Spectrum influences the plant through this process so it's important.

Daylight balancing dimming makes rebate calculations very difficult.

Do you agree with this description? What else should be known?

Mentimeter

Still no movement on standard CEA-specific testing conditions for dehu or integrated HVAC/D systems

False loads can be put on controls systems before plants, and then "post-occupancy" testing can be performed once plants are in house.

The industry needs more assistance developing sensible and latent load calculation

ASHRAE MTG.CEA needs to be moved forward on this point

Environmental controls can adjust the fans and other equipment per plant growth stage

Efficiency programs are still only able to incentivize HVAC equipment based on EER and that is not optimized when HVAC equipment is serving high latent loads

Commissioning! Yes!

It's very difficult to assess HVAC/D efficiency without more industry/testing standards being developed first. The market has been woefully slow on this. But hard to write code without more in place first.

In what ways is AHRI 920 falling short of the needs for CEH?

Lighting choice influences leaf temp, which influences target grow conditions.

The efficiency (or lack thereof) of HVAC/D systems can be affected almost more from application than actual equipment efficiency. That again makes it tough to write code based on cultivator application.

Agreed on including wavelengths beyond 700nm to capture far red.

The existing standards for dehu test the equipment at conditions not used for CEA

Work with the commissioning associations to develop sample functional performance tests

What certifications will be required for the testing and inspections of the HVAC/D equipment?

Some growers might have a combination of different fixtures, with varying efficacies. Operating time might be relevant.

Any ideas or potential solutions the stated market barriers?

Mentimeter

Potential to dictate certain types of dehumidification technology (desiccant?) when dewpoint targets are below X?

Would the commissioning be done by the equipment manufacturer to ensure it is properly installed and understood or would it be a government official?

Work with commissioning authorities like BCxA to create sample prefunctional checklists and functional performance tests

If dehumidifiers aren't used it can be a huge energy drain because they are heating the humid air and exhausting it out!

Recommend the requirement be third-party commissioning agent

Integrated DX equipment keeps failing, especially the modulating type. HGRH valves, scroll compressors fail in part due to poor refrigerant management and poor circuit design. Growers are getting fed up with fixing failed components.

Recommend commissioning include a scope for energy monitoring, refrigerant management, leak detection