Meeting Notes: October 23, 2025

Posted November 10, 2025

These notes summarize the content from the 2028 Title 24, Part 6 Code Cycle Utility-Sponsored Stakeholder Meeting on **Water Heating: ECM Circulator Pump with Controls, Water Heating: Require return to primary configuration, Water Heating: Unitary HP/ER hybrid heaters, and HVAC Fault Detection Diagnostics.**

If you are interested in providing input on any of the topics covered in this meeting, please email your comments to info@title24stakeholders.com by November 15, 2025. Comments received after then may not be incorporated into the first public draft of the CASE Report.

Quick Links

- ***Key Points from Meeting*** – Read through highlights from each measure and review feedback requested from stakeholders.
- ***In-Meeting Questions / Comments*** – Navigate directly to questions asked during the meeting and responses from CASE Authors
- ***Zoom Polls & Responses*** – Review the Poll Questions asked during the meeting and see the responses from stakeholders.
- ***Meeting Materials*** (available on Title24Stakeholders.com) – Review slides, measure summaries, proposed code language and more on our website.

Meeting Information

Meeting Date: 10/23/2025

Meeting Time: 10:00 am – 2:30 pm

Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Agenda

Time	Topic	Presenter
10:00 AM	Introduction	Cosimina Pannetti, Energy Solutions Javier Perez, CEC Kelly Cunningham, PG&E
10:15 AM	Circulator Pump Controls	Richard Fatu, TRC
11:00 AM	Require return to primary configuration	Yiyi Chu, TRC
11:45 AM	Unitary HP/ER hybrid heaters	Matt Stevens, TRC
12:30 PM	**BREAK**	

Time	Topic	Presenter
1:00 PM	Heat Pump Water Heating Ventilation Clean Up	Ryan Allen, Frontier Energy
1:45 PM	HVAC Fault Detection and Diagnosis (FDD)	Chris Battisti, TRC
2:30 PM	Adjourn	

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California Energy Commission

Contact for 2028 Code Cycle:

Any questions for the CEC can be sent to: EnergyCodeUpdateInquiries@energy.ca.gov

CEC Docket

Comments on the 2028 Energy Code update can be formally submitted to the docket: **https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=25-BSTD-03**

Key Points from Meeting

The purpose and benefits of each measure presented at this meeting are noted below. Specific topics we are looking for feedback on are highlighted.

To provide input, email the CASE Authors noted above or send to info@title24stakeholders.com.

Circulator Pump Controls

- **Purpose**: Add a prescriptive requirement for digital controls on service hot water circulator pumps.
- **Benefits**: Reduction in energy use, higher-efficiency system operation in heat pump water heating systems, and reduced destratification risk.
- **Feedback requested**: Provide clarification on critera and classification of digital vs analog controls and what would qualify as acceptable digital controls.

Require return to primary configuration

- **Purpose**: Create a prescriptive pathway to require return to primary configuration for split HPWH systems in NR buildings. Include alternative pathways for products and configurations on NEEA Tier 2 qualified product list. Include new requirements for documentation on design, installation, and startup, performance data reporting, RtP auxiliary heating, etc.
- **Benefits**: Obtain overall electrical capacity reduction, peak demand savings, installation cost savings, space savings, operational savings, reduced grid impact, improved grid reliability, and reduced complexity compared to previous HPWH standard design (Temperature Maintenance Heater in Series configuration). Startup requirements ensure long-term savings for central HPWHs

- **Feedback requested**: What condition would require back up heating for RtP configuration?

Unitary HP/ER hybrid heaters

- **Purpose**: Add prescriptive requirements for unitary heat pump/ electric resistance (HP/ER) hybrid water heater installations. The requirements would ensure that service water heating systems that use unitary HP/ER hybrid water heaters are designed and installed to make effective use of the heat pump heating and minimize electric resistance heating.
- **Benefits**: Reduced energy and demand charges, Higher-efficiency operation of equipment and systems, Improved hot water delivery performance, and Reduced risk of overcooling and condensation-related issues in utility spaces.
- **Feedback requested**: Are current ventilation air (volume/flow rate) requirements sufficient? Do current ventilation air requirements sufficiently account for the range of environments the unitary HP/ER hybrid are installed in?

Heat Pump Water Heating Ventilation Clean Up

- **Purpose**: Update mandatory HPWH ventilation code language for nonresidential buildings to reflect new research and better align with other codes in development. This measure also recommends eliminating two ducting configurations from the 2025 code: inlet air ducted from outside with no exhaust duct and exhaust ducted to outside with no inlet duct.
- **Benefits**: Simplify the HPWH ventilation decision-making process, reduce building energy consumption, prevent IAQ issues, remove moisture damage risk, and alleviate health and safety concerns.
- **Feedback requested**: What percentage of new construction small office buildings and quick service restaurants are implementing HPWHs with ventilation ducts? What percentage of retrofit small office buildings and quick service restaurants are implementing HPWHs with ventilation ducts? What percentage of each of these implement ventilation ducts? What clarifications are needed for the proposed code language?

HVAC Fault Detection and Diagnosis (FDD)

- **Purpose**: Add mandatory baseline FDD functional requirements for new HVAC systems that are over 300,000 Btu/hr in buildings over 100,000 SF to use system data to enhance operations and maintenance.
- **Benefits**: FDD provides building operators with a proactive way to maintain and optimize their systems by collecting and reporting operational data that can provide actionable insight, while sustaining HVAC efficiency and indoor air quality.

- **Feedback requested**: What percentage of new buildings over 100,000 SF are using FDD? What kind of energy savings can you expect when using FDD? What are common reasons FDD does not save energy over time? What are design and construction challenges with requiring FDD usage?

In-Meeting Questions / Comments

During the meeting, questions and comments were submitted in the Q&A pane in Zoom as well as asked aloud. Answers are provided below.

Attendees were also asked to respond to polls. Navigate directly to the ***Zoom Polls & Responses*** by clicking the link.

Due to time limitations, not all written questions and comments were discussed during the meeting, but all have responses available in these meeting notes.

[Circulator Pump Controls, Richard Fatu]

1. **Question asked via Zoom question pane by Steve Taylor:** How do you define "riser" and "non-riser"?
    a. Jose Garcia: Riser systems have multiple pipes, non-riser would have one path such as a single loop system
2. **Question asked via Zoom question pane anonymously:** Better term may be “electro-mechanical” vs “digital” and not “analog” and “digital”. Analog means variable - which is not what you are trying to explain.
    a. Jose Garcia: Thank you for the unput, we will consider this as we move forward
3. **Question asked via Zoom question pane by Jon McHugh:** Would baseline pump be on a time clock for unoccupied hours?
    a. Jose Garcia: We are researching this, but in many cases the pumps are operating 24/7.
4. **Question asked via Zoom question pane by Steve Taylor:** Is the DHW pump energy savings spreadsheet available for review?
    a. Jose Garcia: Hi Steve, the calculations are still preliminary and will be updated as we advance the measure. We're happy to connect and share the analysis with you. Please reach out to Richard via email.
5. **Question asked via Zoom question pane by Jon McHugh:** Good to clarify if analog is an analog control that is variable speed with simple temperature setpoint versus a digital

control with digital connection to EMS system or as the anonymous attendee discussed about on off versus variable speed.

a. Jose Garcia: It's not just an on off analog. Typically it is an existing aqua stat or time clock. Digital can be integrated into the clock. Can also be additional addons for the controls.
b. Jon McHugh: Using an analog circuit rather than a digital connection?
c. Amin Delagah: Analogue is an unpowered pretty simple device. A very simple time clock. Digital can adjust their time to make sure they are always correct and adjust for seasonal changes.
d. Jon McHugh: Assuming the base case is time clocks. What are you finding?
e. Amin Delagah: Current code can be interpreted. There's no specification that you have to operate it. A lot of the time it's on the wall but not connected up. Some are operating but a good number are not.
f. Jon McHugh: Is the flow rate proportional to power?
g. Amin Delagah: We haven't put thought into this.

6. **Question asked verbally by Steve Taylor:** For pump energy savings, with an electric resistance heater there is no savings. Is that in your model? The savings will come from the heat losses in the piping. Reducing flow may not be enough. The savings calculations will be interesting. The issue with the aqua stat idea is that it's at the pump. It cycles on and off all day long. You need to define what your functionality is rather than the controller. Requirements need to be stated in terms of functionality.
    a. Richard Fatu: That is a good point. I believe that integration would be considered a digital form of controls.
    b. Amin Delagah: We'll make sure to have some language to cover this.
7. **Question asked verbally by Jon McHugh:** Is the assumption that these are ECM driven for both the base case and proposed case?
    a. Richard Fatu: Yes, both are ECM motors.
8. **Question asked via Zoom question pane by Jon McHugh:** For savings are you assuming the affinity laws for the relationship between flow and power or something else?
    a. Jose Garcia: We'll look at thermal and pump savings. Preliminary estimates are based on existing research, we'll eventually model the distribution system and savings will be based on reduced pump power due to lower speed operation and thermal savings. Further analysis may be conducted for demand control which is on/off

[Return-to-Primary Configuration for Central HPWHs in NR Buildings, Yiyi Chu]

9. **Question asked via Zoom question pane by Dan Johnson:** Could you summarize why the research in 2019 was so insistent on using a swing tank to decouple the temperature maintenance, but now the advice is the opposite? We'd like to know what changed in the underlying facts.
    a. Amin Delagah: Yes the work in 2019 was the best available research at the time. The swing tank was the only option because it decoupled. Regardless of heat pump configuration or type it would function in every situation. With more

information we have seen that is it viable which gave an opportunity to change the baseline and get a performance gain.

10. **Question asked via Zoom question pane by Dan Johnson:** What about all the studies that said, "continuous recirculation ruins the COP and capacity of heat pump water heaters"?
    a. Amin Delagah: If you return to primary and use recirculation the heat pump and primary storage tank COP will be lower, but the overlap COP would be higher. Overall, you would see a higher system COP if you use return to primary rather than the swing tank. This is specified on the NEAA list.
11. **Question asked via Zoom question pane by Jim Casey:** What defines NR? eg, where do Hotels, gyms, high volume manufacturing, laundromats, fit in?
    a. Jose Garcia: Non-residential buildings includes the service hot water systems in manufacturing occupancies but not process loads. Laundromats, restaurants, retail, gyms, are examples of nonresidential facilities we may consider for the measure. Hotels would not be subjected to this proposed measure.
    b. Kelly Cunningham: Hotel is occupancy R but is not included because of assembly bill 130. In the absence of AB130, would you have considered hotels?
    c. Amin Delagah: Yes, we would have and we would have also looked into it for multifamily.
12. **Question asked via Zoom question pane by Dan Johnson:** Are you proposing simply to make HPWH without swing tanks prescriptive and the standard design for NR, in lieu of the mixture of electric resistance and gas water heaters currently used as the standard design, following ASHRAE 90.1?
    a. Amin Delagah: The CASE team is saying if you're already planning to have a new building or do a major retrofit and want a split HPWH, then you have to follow these requirements.
13. **Question asked verbally by John Arent:** If most of the systems installed today use the temperature maintenance in the swing tank, are there still scenarios where those might be viable? Since the load for the hot water isn't dictated by the standards it might be hard to give a specific system type.
    a. Amin Delagah: The prescriptive requirement is return to primary. The alternative prescriptive pathway allows you to do any pathway you want as long as you meet

the NEEA requirements. So you still have the option for swing tank. The performance path also has an option for swing tank.

b. John: Are single and multi-pass allowed?
c. Yiyi Chu: Yes they are.

14. **Question asked verbally by Dan Johnson:** Prescriptively you'd be able to use either return to primary or the current system. It doesn't change the design, doesn't change how you are allowed to pipe the system. What is the actual change?
    a. Yiyi Chu: The prescriptive requirement is changing to return to primary, but swing tank is an option in the performance pathway. If you use a swing tank under the performance path there is an energy penalty.
    b. Jose Garcia: In the current NR code there is no requirement either way for the configuration, so we are only talking about new requirements for the residential code.
    c. Jon McHugh: Dan asked what is the standard design for the performance approach, is it a mix of electric performance and gas water heaters?
    d. Yiyi Chu: It should also be the return to primary pathway.
    e. Amin Delagah: You can still select either. But if you select electric HP's then you have to follow return to primary. You are allowed to use conventions.
    f. Jon McHugh: What is the baseline?
    g. Jose Garcia: This measure only applies if you are picking a HPWH. The baseline would be gas.
    h. Jon McHugh: For the performance approach, if you have a gas water heater it gets compared to a gas?
    i. Yiyi Chu: If you choose gas this standard would not apply.
15. **Question asked verbally by John Arent:** What refrigerants are assumed to be used for these systems? It's my understanding they don't work well.
    a. Amin Delagah: Baseline is intended for conventional refrigerants. The code readiness team is doing research looking at return to primary with CO2. We are seeing MF buildings that are doing it reliably. But this baseline is using conventional refrigerants.
    b. Dan Johnson: If you feed hot water as the return the capacity is very diminished. It feels like the technical aspects are not well considered. If this is blindly followed it could ruin the output of the system. Also, for the standard design for the performance modeling, that needs to be thought about more.
    c. Amin Delagah: Great feedback, in terms of the CO2 system. There are conventional refrigerants that are not being phased out.
    d. Jose Garcia: Dan we'd love to connect with you offline, thank you for all the input.
16. **Question asked via Zoom question pane by Cathy Chappell:** When the CASE Team refers to baseline for the RtP proposal, we mean the baseline for the savings analysis for this measure. It does not refer to the T24 standard design system.
    a. Jose Garcia: This comment refers to the previous topic and is an accurate clarification of the baseline for that proposed measure.

[Unitary Heat Pump/Electric Resistance Hybrid Heaters, Matt Stevens]

17. **Question asked via Zoom question pane by Dan Johnson:** The HPWH system diagrammed right now is return to primary, right? Yet it runs very poorly. Can you please clarify?
    a. Jose Garcia: This measure is for integrated heat pumps, whereas return to primary is a configuration for split heat pumps. Technically, you are right that with integrated HPWHs, the recirculation return does come back to the primary water

heater/tank. We don't call it return to primary since using an integrated HPWH with downstream resistance water heater (swing tank) has poor COP and is not a viable option paired with integrated HPWHs due to high electrical capacity requirements and peak demand along with much higher energy use from this configuration. Thus, it is not recognized in the market or with the NEEA AWHS with the set of approved configurations.

18. **Question asked via Zoom question pane by Randall Higa:** My understanding is that "Heat Pump Only" mode still allows the electric resistance heating to be energized -- if true, how can these requirements be enforced?
    a. Amin Delagah: That is correct, in heat pump only mode the resistance is engaged when the system is close to running out of hot water. This makes it work in hybrid mode temporarily. When running the heat pump for long durations and you fall above the limit, it can also initiate resistance. It will be enforced using manufacturer data.
19. **Question asked verbally by Bill Healy:** Are you aware of products on the market now that would meet the compressor cutoffs?
    a. Matt Stevens: We are not aware of specific units but this is something we will investigate.
20. **Question asked via Zoom question pane by Luke Morton:** Reviewing the measure ahead of time, I had some concerns with ventilation requirements, but I think you have the same concerns. Specifically, the requirement for dual ducted systems (I think you covered this here-- arrived late) didn't seem always prudent. In short, even in new construction the requirements I saw didn't qualify as always prudent. That is ok for a best practice but not ok for code from what I could tell.
    a. Matt Stevens: We can discuss this offline.
    b. Jose Garcia: Thanks, Luke, for the feedback, we'll reach out to you after the meeting to discuss this further"

[HPWH Ventilation Clean-Up, Ryan Allen]

21. **Question asked via Zoom question pane by Kyle Bergeron:** Can you confirm that the 12" requirement is just for the ducting and not the axial fan size?
    a. Daniel LaCommare: Yes, the 12" requirement is for the ducting specifically for units that utilize axial fans as opposed to centrifugal fans.
    b. Ryan Allen: They require a larger diameter since that helps with the airflow for axial fans.
22. **Question asked via Zoom question pane by Steve Taylor:** The issue with axial fans is (presumably) due to limited static pressure capability of that fan type. But using a 12" duct will not always solve that -- it could be 500 feet of 12" duct. And not all axial fans have low static pressure capability. So, the requirement as proposed does not make sense. The installation should just meet the manufacturers requirements which should address fan capability.
    a. Ryan Allen: Thank you for the feedback. Yes, axial fans are not able to maintain air flow rates as well as centrifugal fans due to limited static pressure capability. To address this difference, the proposed code change requires a larger diameter duct for axial fans than centrifugal fans. The proposed code language does not address duct length at the moment, only the duct diameter. HPWH manufacturers provide a maximum duct length requirement for ducts of different diameters between 6 inches and 8 inches but they do not provide different requirements for different fan types. Because of the limitations of axial fan static pressure capabilities, a larger duct size is needed to ensure proper airflow for HPWHs. We will update the proposed code language to say that a 12 inch

diameter duct with a length no longer than the manufacturer specified requirements for the 8 inch diameter duct must be used for HPWHs with axial fans (which is 100 to 131 feet of flexible duct) where elbows and bends in the ducting have equivalent lengths of 5 to 10 depending on the manufacturer.

23. **Question asked via Zoom question pane by Luke Morton:** It was this measure about the prudence of this (not the last one) that I couldn't see.
    a. Ryan Allen: This measure is important for preventing moisture damage and poor indoor air quality during days with poor air quality outside. Without this proposed change, HPWHs may get a negative review and this may lead to reduced market adoption.
24. **Question asked via Zoom question pane by Luke Morton:** This measure has no savings in many cases that I can see. It's expensive to install with no specific benefits for some kinds of projects and layouts. That's my concern. Maybe I'm missing something?
    a. Daniel LaCommare: We expect limited but positive net savings in the cases where these changes apply, to be confirmed with modeling. Projects can still comply via adequate NFA or vented doors. The primary driver for savings is avoided infiltration and pressure penalties from single duct installs that pull in unconditioned air and add heating load.
25. **Question asked verbally by Steve Taylor:** 200 CFM is very small relative to HVAC air flow rates in most commercial buildings. Title 24 doesn't even require toilets to turn off exhaust fans. Title 24 has no requirement for this, so the design is perfectly reasonable and it's going to be hard to show that it's not.
    a. Ryan Allen: Thank you for the context of air flow rate magnitude and for the information about a lack of requirement for exhaust fans. When a HPWH pulls air in from the outside, the air can be very humid and have gases, bacteria or particulates that come with it. The HPWH compressor will not extract all of the moisture before the air is exhausted into the room and the HPWH filter is not fine enough to capture PM2.5 or PM10 particulates. Moisture and contaminates will enter the HPWH room and make their way into the rest of the building which can have negative health effects.
26. **Question asked via Zoom question pane by Daniel LaCommare:** If heat pump water heaters are going into both conditioned and unconditioned spaces, and those spaces have complex air nets to adjacent conditioned or unconditioned spaces, are we going to address that in our modeling?.
    a. CASE Team Response Name: We are still in process of modeling. The simplest method would be to change the modeling temperature to match the outside and see the HPWH performance overall. A slightly more advanced method would be to add nodes where the HPWH is pulling air from the outside and exhausting it to the inside. Exhaust air will influence air temperature in the room where the HPWH is located. An additional modeling option is to include the airflow coming into the space through an added ventilation fan. We do not plan to account for the complex air networks of the HVAC system and restroom ventilation fans in our modeling because it assumed that the benefit of the added complexity will be small. In the future it would be possible to include the air temperature definition (outside or indoor zone) and the ventilation fan air could be treated as one thing in CBECC, but right now they are treated separately in the energy plus model.
27. **Question asked verbally by Luke Morton:** In terms of the modeling, because this is a mandatory requirement and you need to show savings to some extent. You need to be able to evaluate as part of the compliance process. Think about how to weed through

what is advantageous in terms of the application. We are dealing with orders of magnitude of more air in many cases. There's a bigger picture here.

   a. Ryan Allen: Thank you, we have anecdotal feedback here as well that implementing this modeling in CBECC may not be worth the time since there is only a small savings. We do still have a lot of questions to answer.
   b. Luke Morton: How do we finesse newer technology, lots of other factors like acoustics. Are still headwinds.
   c. Ryan Allen: This measure does reduce some of the risk which is good. Hopefully that streamlines things. Thank you for the comments and the feedback.

28. **Question asked via Zoom question pane by Luke Morton:** I'm still unsure how this is going to be modeled-- I'm seeing HPWH's going into both conditioned and unconditioned spaces, and those spaces have complex air nets to adjacent conditioned and/or unconditioned spaces.
   a. Ryan Allen: See the response to Question 26.
29. **Question asked via Zoom question pane by Luke Morton:** I agree with Steves point here, the mechanical ventilation requirements generally for these spaces are often an order of magnitude more than what the HPWH would induce.
   a. Ryan Allen: See the response to Question 25.
30. **Question asked via Zoom question pane by Liz Becker:** I would think because this is a consumer-rated product that the installation requirements should be the same based on scale and configuration.
   a. Ryan Allen: We agree, HPWH ventilation for all consumer-rated products should be the same, so residential should eventually be updated to match the proposed HPWH ventilation for nonresidential buildings.

[HVAC Fault Detection and Diagnostics]

31. **Question asked via Zoom question pane by Jon McHugh:** For ECMS with full implementation of Guideline 36, what incremental capability is envisioned?
   a. Michael Mutmansky: We don't anticipate a substantial difference if the hardware is covered by G36. However, we are working through the specifics of G36 to see if there are additional items that aren't covered in there specifically. Thanks for your comment and if you have additional thoughts, we'd be happy to hear from you directly after the call.
   b. Michael Mutmansky: T24-2025 only requires G36 for 4 control logic measures. The libraries are required to include FDD, but projects are not required to use that part of the library. So, the short answer is that these FDD requirements are

entirely new. What we need to investigate is if the certified G36 libraries can be the same as the new FDD requirements.

32. **Question asked via Zoom question pane by Liz Becker:** I also wanted to ask about how much of this is already incorporated for 2025 through ASHRAE 36 guidelines. Is it going to increase fault detection?
    a. Chris Battisti: We are looking into guideline 36 and agree that we need to take it into account.
33. **Question asked via Zoom question pane by Guru Ravi:** Am I correct in assuming that this proposal does not mandate native FDD capabilities for HVAC equipment such as rooftop units, large split systems, beyond the existing economizer functionality?
    a. Rupam Singla: The proposal would mandate FDD on systems above 300,000 Btu/h, in buildings over 100,000 sqft.
34. **Question asked via Zoom question pane by Guru Ravi:** Does it need to be in the equipment or can it be handled outside the equipment with 3rd party solutions?
    a. Rupam Singla: The requirement could be met with the native BAS or with a 3rd party solution.
35. **Question asked verbally by Liz Becker:** You mentioned that a lot of facilities mangers report issues daily, would this suggest that fault prevention is already active but isn't being used properly? When doing a cost analyses, I'm all for renewability but we need to be reasonable in our expectations. I would be shocked if the standards would have enough longevity, so a shorter analysis is warranted. On the hardware requirements, it's very vague. I've brought it up with the CEC that there's stuff in the reference appendices completely missing. The hardware requirements need to be clearer.
    a. Chris Battisti: It's being implemented some places, it doesn't have that big of a market yet. We don't want it to be a nuisance. This measure should not make those problems worse and will hopefully address some of those problems. Thank you for those comments.
36. **Question asked verbally by Farhang Razzaghi:** How are cybersecurity and data privacy being addressed?
    a. Chris Battisti: That's very important, we need something onsite on premises to address those concerns. It's hard to get the full grasp of who has those problems and how big they are.
    b. Farhang Razzaghi: Also on data privacy, FDD vendors have to go through controls vendors. How is the code going to address data privacy issues?
    c. Chris Battisti: That's fair and is something we are going to try and address. The code needs to be broad enough that people can keep stuff in their own system and still meet the requirements.
37. **Question asked verbally by Jon McHugh:** For the 30-year life cycle cost evaluation, there's a shorter expected useful life for every measure. So only a portion of the 30

years is being used. We aren't using 30 year measurements for measures only lasting 10 years.
    a. Chris Battisti: Thank you.
38. **Question asked verbally by Kevin Teakell:** Is there a specific proposal for what you would have in FDD?
    a. Chris Battisti: Yes, there are specific faults for those within 100,000 square feet.
    b. Kevin Teakell: What are the specific faults you're looking for?
    c. Chris Battisti: Looking at HVAC scheduling, broken valve, high low air flow, etc. Ones that are fairly prevalent and have issues with saving energy if they are not functioning. Will just be a baseline.
39. **Question asked via Zoom question pane by Farhang Razzaghi:** Many commissioning agents aren't necessarily qualified enough on FDD. It could be helpful to include definitions for FDD to help those agents.
    a. Chris Battisti: Thank you, please let us know if you have thoughts on how to do that.

Wrap-Up

The meeting concluded with a call for participation throughout the code cycle. Several future meeting dates were presented. Draft CASE Reports will be posted December 2025 through March 2026 on title24stakeholders.com.

Please reach out to the specific topic lead or info@title24stakeholders.com with input on the measures presented today.

The meeting adjourned at 2:30 PM PST.

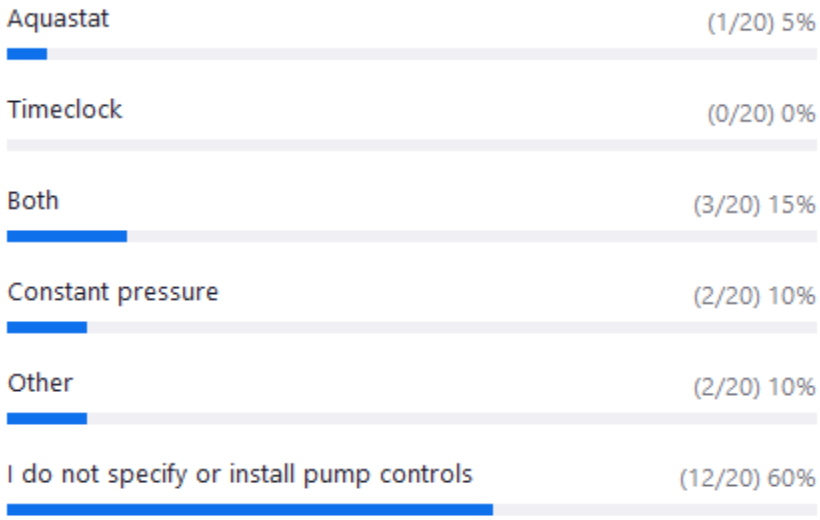
Zoom Polls & Responses

The Poll questions asked by CASE Authors during the meeting along with responses are provided below. Questions were either in a multiple choice or long answer format.

Multiple Choice Questions

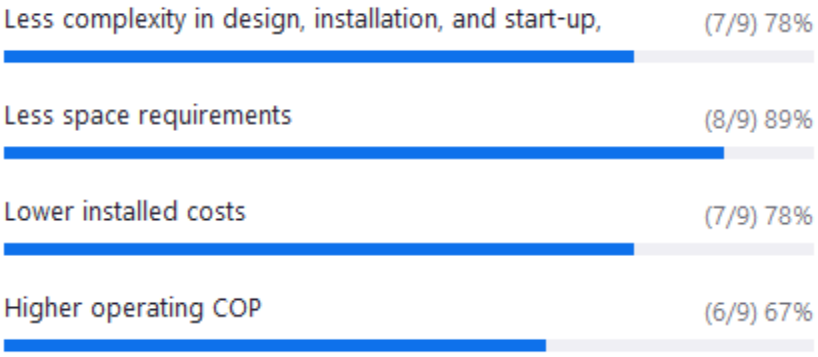
Circulator Pump Controls

1. Contractors or Designers: Do you specify or install pump controls? If so which ones? (Single choice)

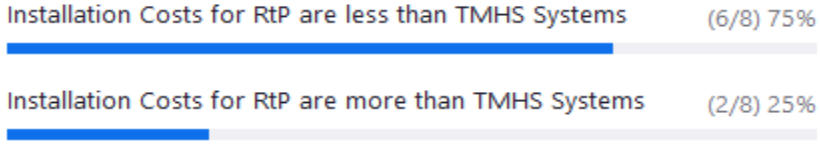


Require Return to Primary Configuration

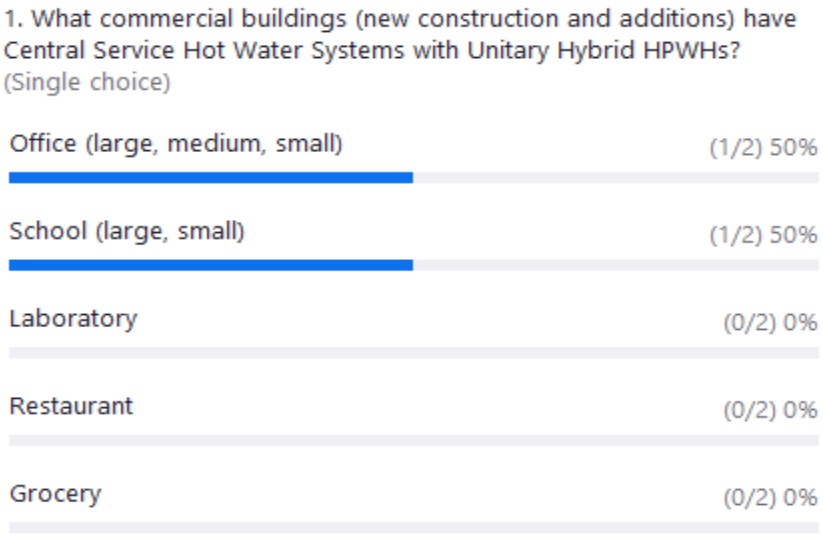
1. The Statewide CASE Team has identified the following market forces that drive the future adoption of RtP configurations, please select all the following items that you think are true about RtP Configurations compared to TMHS: (Multiple choice)



1. Do you think installation cost for RtP systems is less or more than TMHS systems? (Single choice)

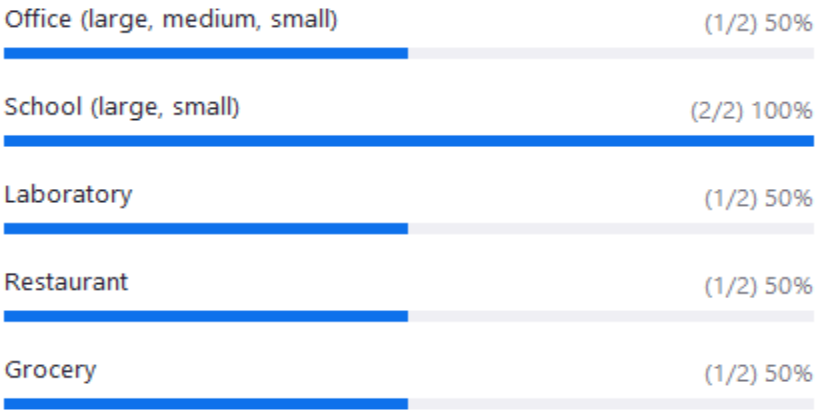


Unitary HP/ER Hybrid Heaters



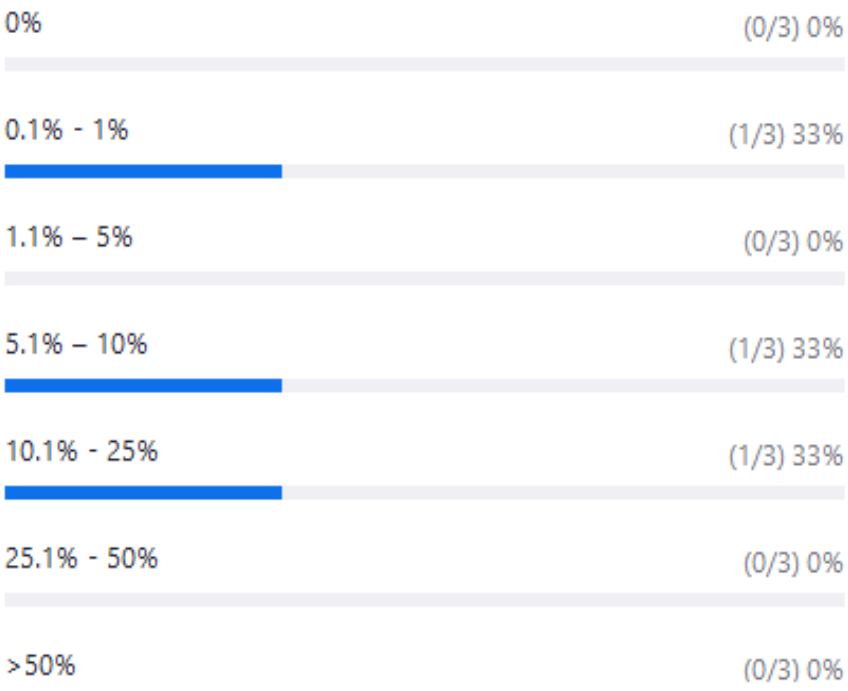
- Comment by Dan Johnson: The poll only allowed a single choice.
- Response by Jose Garcia: Thanks for the feedback Dan, we'll plan to send the poll in question out with the correct number of options after the meeting.

1. What commercial building with Central SHW systems installed Unitary Hybrid HPWHs in alterations? (Multiple choice)

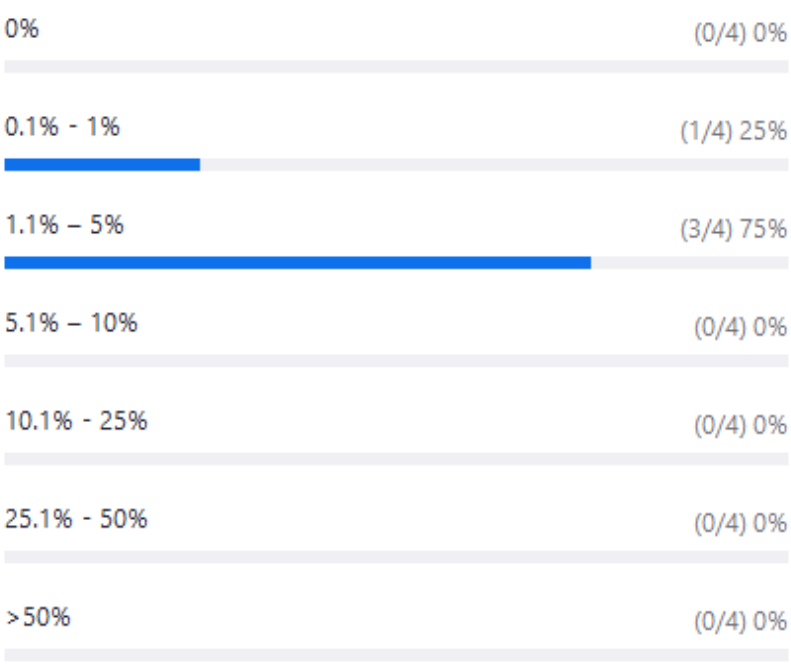


Heat Pump Water Heating Ventilation Clean up

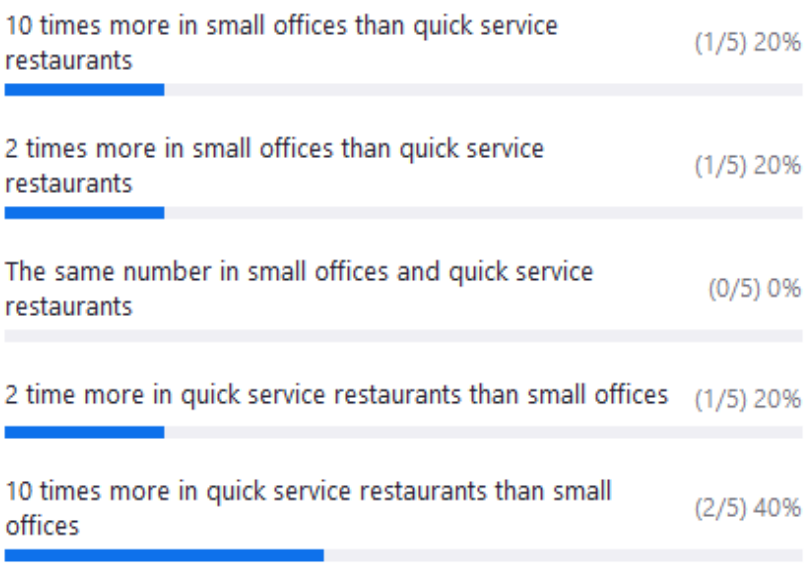
1. What is the current market share for non-residential new construction (including additions)? That is, what percentage of annual new construction in California currently use HPWHs with either an intake duct or and exhaust duct in small offices and quick service restaurants? (Single choice)



1. What is the current market share for non-residential alterations? That is, what percentage of annual retrofits in California currently use HPWHs with either an intake duct or and exhaust duct in small offices and quick service restaurants? (Single choice)



1. What building type is implementing more HPWHs with either an intake duct or and exhaust ducts: small offices or quick service restaurants? (Single choice)

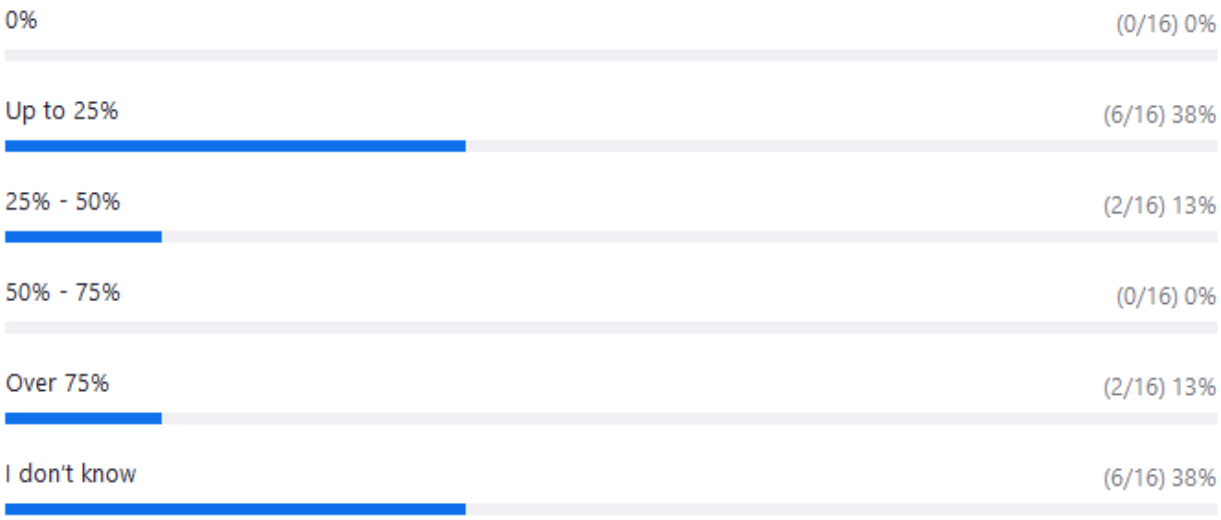


HVAC Fault Detection and Diagnostics

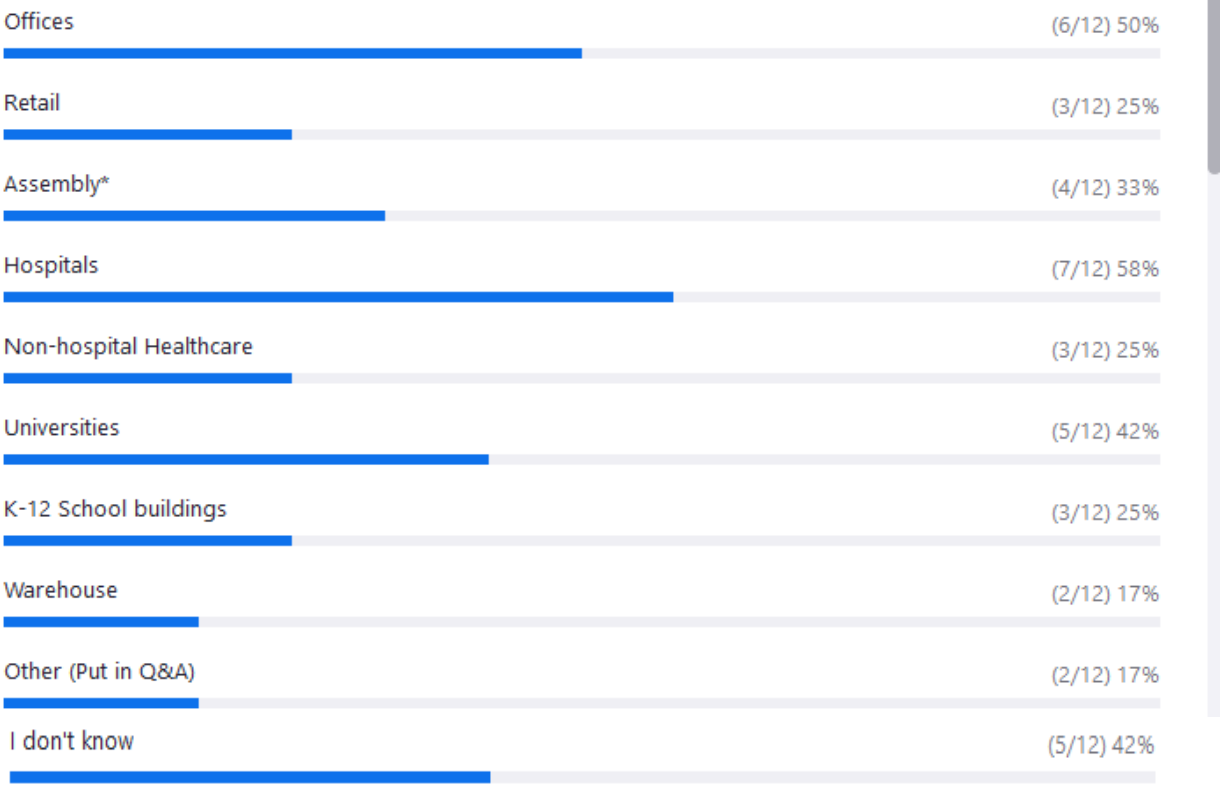
1. What is your role in the industry? Pick the option that best describes your role. (Single choice)

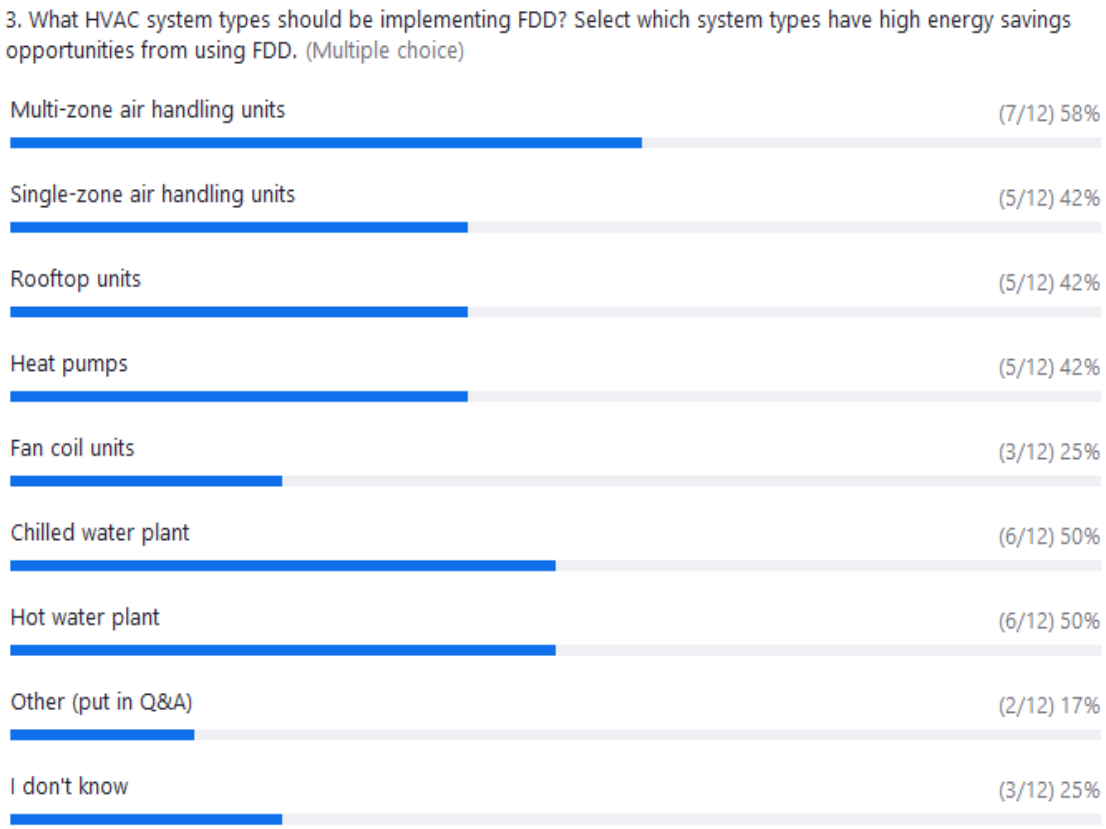
Building owner	(0/18) 0%
Building operator	(0/18) 0%
HVAC designer	(6/18) 33%
HVAC contractor	(0/18) 0%
Controls contractor	(0/18) 0%
FDD provider	(3/18) 17%
Commissioning agent	(0/18) 0%
HVAC or controls manufacturer	(5/18) 28%
Building official (plan checker, inspector, etc.)	(0/18) 0%
Other (put in Q&A)	(4/18) 22%

1. What do you believe the current market penetration of HVAC FDD for buildings over 100,000 square feet? In your experience, select a percentage of large buildings in California currently have HVAC FDD. (Single choice)



2. What building types are currently implementing HVAC FDD? In your experience, select which building types have had FDD added to their systems. (Multiple choice)

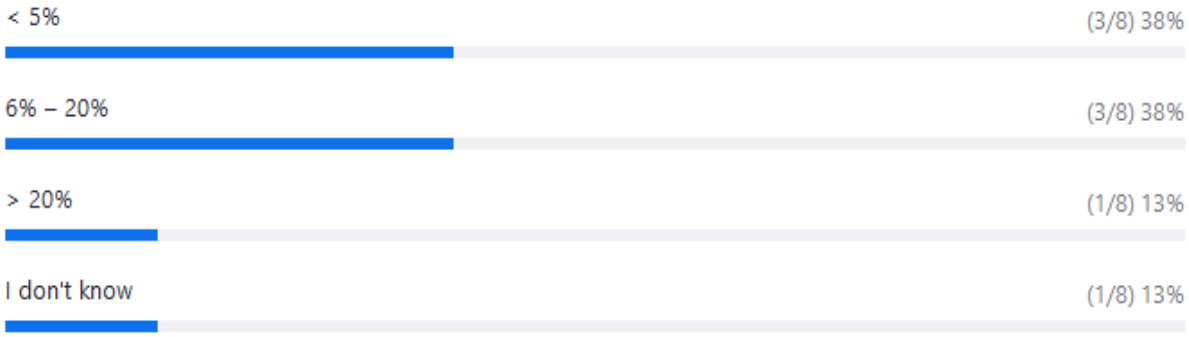




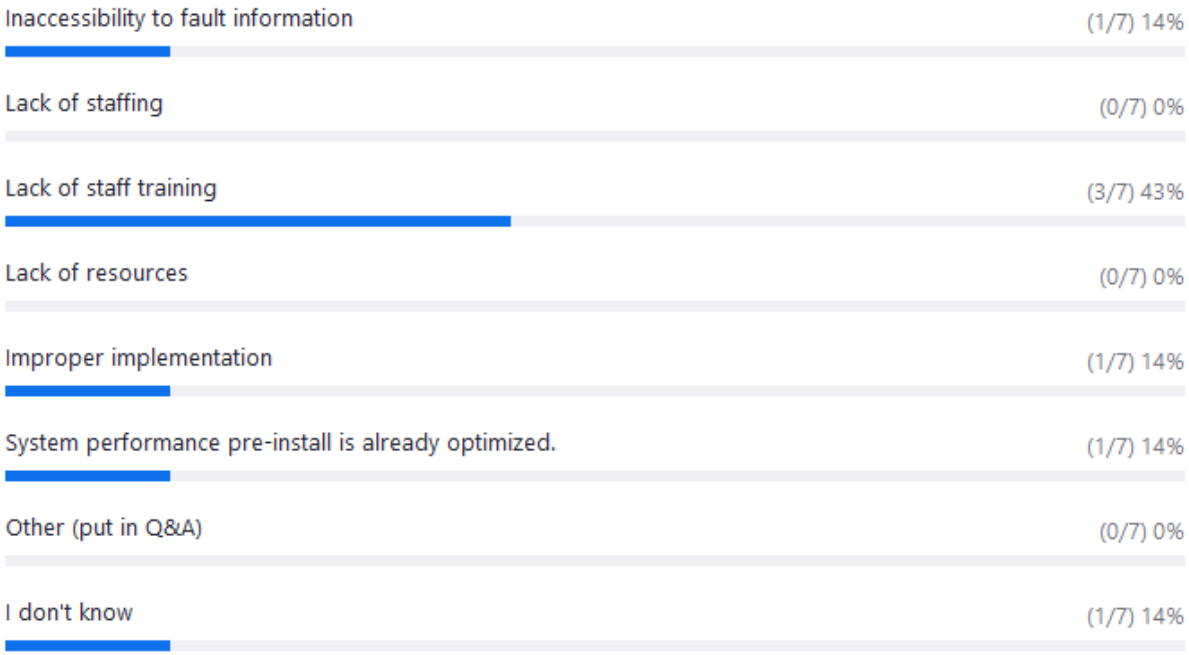
Responses from participants who picked “Other (put in Q&A)”:

- Manufacturing, pharma, labs
- Data centers

1. What is the range of HVAC energy savings that can be expected? Based on HVAC FDD usage, select the range of total HVAC energy savings that can be expected. (Single choice)



2. If buildings are not seeing energy savings or sustained energy efficiency, why? Select all that apply from the list below on the most common reasons buildings would not see energy efficiency benefits from FDD. (Single choice)



Long Answer Questions

1. **When servicing hot water systems, which controls are still working? Are controls bypassed or manually turned off? If so, which ones?**
    a. Timers, usually turned off eventually
    b. Bypassed
    c. Often the pump has been disabled.
    d. We use the BAS to control pump on/off - basically the same as a timeclock but can be tied to occupancy of HVAC zones. They tend to not be disabled.
2. **What else should we know? Are there market or technical barriers or solutions that should be considered?**
    a. Effect of constant circulation on control of Legionella bacteria
    b. Look closely into issues with circulation pumps with the controls that come with WSHP's. At least in Single Family they are not compatible.
    c. How robust are digital controls relative to analogue controls?

3. **Are you aware of any HPWH systems deployed in central applications in NR buildings? If so, please explain**
    a. I do not have any experience in projects that use them.
    b. No
    c. Yes. Mandated by Carlsbad CA.
4. **Are you aware of any RtP HPWH system deployed in central applications in NR buildings? If so, please explain**
    a. No - but the diagram seems confusing. Why bring cold water into and out of the bottom of the storage tank? Why bring both return and cold into the mixing valve?
    b. No, familiar only with RES buildings that have central HPWH.
    c. No.
5. **Are there current standard practice guidelines or requirements for design, installation, and start up of RtP configurations in NR buildings?**
    a. YES. Refer to HPWH manufacturer's required piping diagrams. Also, the 2019 Prescriptive CHPWH piping guidelines issued by the CEC (requiring a swing tank for temperature maintenance separation).
6. **What needs to be done to ensure intended operation occurs regardless of control scheme?**
    a. Prevent continuous recirculation. Locate the HPWH indoors, with an air volume per manufacturer's requirements.
    b. My understanding is that in "heat pump only" mode, the strip heat can still come on. So, the heat pump only mode should lock out strip heat.
7. **Do recommended ventilation requirements sufficiently account for the range of environments?**
    a. Yes. Follow manufacturer's requirements.
8. **What else should we know? Are there market or technical barriers or solutions we should consider?**
    a. Climate zone will play a big part in this, should be factored vis-a-vis condensation, etc.
    b. The market barrier is, unintentionally, but arguably this measure. But I'd say it's minor overall compared to the general headwinds that HPWHs face in the market.
9. **What else should we know? Are there market or technical barriers or solutions we should consider? Are there other faults and FDD requirements for large buildings that we should know about?**
    a. Look at the success or failure of the current requirements for packaged systems having FDD.
    b. There is no set product definition or test of FDD products - "
    c. FDD on terminal units is less helpful because issues at the zone level tend to be apparent and consume relatively tiny amounts of energy compared to 25 ton and up systems.