

Meeting Notes

Posted May 2023



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

Multifamily Domestic Hot Water

Meeting Information

Meeting Date: 5/1/2023

Meeting Time: 12:30 am – 4:30 pm

Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Agenda

Time	Topic	Presenter
12:30 PM	Welcome and Introduction	Nikki Westfall, Energy Solutions Javier Perez, PG&E Mark Alatorre, PG&E
12:50 PM	Individual Heat Pump Water Heater (HPWH) Ventilation	James Haile, Frontier
1:20 PM	Individual HPWH Electric Ready Cleanup	Jose Garcia, TRC
1:50 PM	Central HPWH Electric Ready Cleanup	Jose Garcia, TRC
2:20 PM	BREAK	
2:30 PM	Central HPWH Cleanup	Dove Feng, TRC
2:45 PM	CA Plumbing Code (CPC) Appendix M Pipe Sizing	Amin Delagah, TRC
3:15 PM	Pipe Insulation Enhancement	Amin Delagah, TRC
3:45 PM	BREAK	
3:50 PM	Master Mixing Valve	Amin Delagah, TRC
4:20 PM	Conclusion / Wrap-Up	Nikki Westfall, Energy Solutions
4:30 PM	Adjourn	

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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 Multifamily Domestic Hot Water is important because:

- Market share of both unitary and central HPWH will increase significantly
- Ventilation needs for unitary HPWH are generally not being met in the field; the HPWH ventilation proposal establishes minimum ventilation requirements and provides a backstop of minimum requirements for consumer integrated HPWH (less than 120-gallon storage and less than 24 amps with less than 250 volts).
- Retrofitting to HPWH in existing buildings can be challenging, the individual and central electric-ready proposals include that new construction plan ahead to allow for space and infrastructure to support future individual and central HPWH installation.
- The Central HPWH measure includes cleaning up prescriptive language and adding an alternative prescriptive path to provide flexibility for a wider range of equipment and system design options by leveraging NEEA AWHV V8.0.
- The prescriptive measure Appendix M pipe sizing has not been updated in 80 years. Skinnier pipe for cold and hot water distribution systems will yield lower cost for builders, energy and water savings, improved hot water delivery performance, and improved water quality for occupants.
- Pipe insulation requirements provide clarity to the design and installation industry to ensure all DHW pipes are continuously insulated and minimizes heat loss.
- The California Plumbing and Energy Codes do not require the use of master mixing valves (MMV) for central domestic hot water distribution systems with recirculation. The MMV proposal will reduce pipe heat loss from lower temperature recirculation loops, and yields energy savings at the heating plant by diverting most of the return water.

Stakeholder Feedback Impacting Proposals

CASE Teams rely on feedback from stakeholders to create the best proposals possible. Since Round 1, stakeholder input has impacted the Multifamily Domestic Hot Water proposals in these ways:

- The CASE team considered whether MERV filters should be required when HPWHs are installed in conditioned space, where an inlet is ducted from an unconditioned space.
- The CASE team is considering whether compressor capacity be measured and reported by manufacturers according to a specific industry standard as there are no standardized reporting by manufacturers to reporting currently.
- The CASE team considered updating requirements so that designers can plan for 120-volt options alone, but did not in part because stakeholder advised that for new construction, we should keep the planning for 240-volt options which can also work for 120-volt options.
- We acknowledge that dimensional and air flow requirements are difficult to dictate with technology changing so quickly and new systems coming to the market. Therefore, we

performed additional research and updated the prescriptive requirements to two sets of prescribed sizing factors (instead of just one as originally proposed). We also considered this as we developed the code language, and the designer has several options to adapt to new equipment as it comes to market such as by performing a design around a future a HPWH they are familiar with, or reserving space for the heat pump outdoors which offers increased flexibility to meet evolving airflow and space requirements.

- We acknowledge concerns about the alternative prescriptive requiring NEEA AWHs Tier 3, so changed the requirement to require NEEA AWHs 8.0 Tier 2 commercial HPWH.
- We acknowledge that there is not data to show which primary storage tank design configuration is most efficient, so we removed the existing requirement on primary storage tank piping configuration.
- Thanks to feedback on pipe insulation verification component since the last stakeholder meeting, we moved the location of the code language from a prescriptive requirement in section 170.2 to a mandatory requirement in 160.4.
- Initially pipe code language clean up measure was mandatory and the pipe insulation verification measure was prescriptive; the current proposal is for both requirements to be mandatory so that designers using the performance approach do not trade off insulation installation quality verification and ensures that all multifamily building piping insulation installations are field verified to meet code.
- To allow flexibility for designers, the proposed measure for MMV proposal changed from mandatory requirement to prescriptive requirement. We also removed compliance credit for digital MMV.

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. **Mentimeter Polls & Responses:** This section includes public comments and questions, including screen shots of the polls that were conducted during the meeting, and responses to those polls.

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

In-Meeting Questions / Comments

Individual Heat Pump Water Heater Ventilation, James Haile, Frontier

- 1. Question asked via GoTo Webinar question pane by Robert Danielson: Are inlet / outlet ducting sized by the manufacturer?**
 - a. CASE Team Response (James Haile): They are. The sizing and what the unit can achieve will be determined by size of fan and that's not easy to standardize in the code.
- 2. Question asked via GoTo Webinar question pane by Meg Waltner: Does this measure cover both new and retrofits?**
 - a. CASE Team Response (James Haile): It covers both, and for SF and MF.
- 3. Verbal question asked by Michael Corbitt, Bradford White Corp: How is energy savings calculated; you mentioned you assumed "perfect ventilation". Will CBECC account for less than perfect? And how is "less than perfect ventilation" accounted for in the savings estimate?**
 - a. CASE Team Response (James Haile): That's not part of this measure – it's been talked about in the background. We were trying to avoid making unnecessary changes to software and forms with this measure. It would require more effort to do so. The less-than-perfect ventilation savings was accounted for using lab test results done by NEEA and PC&E projects. We used that data to adjust the outputs of CBECC for each prototype to a lower ventilation case.

Individual HPWH Electric Ready Cleanup, Jose Garcia, TRC

- 4. Comment via GoTo Webinar by Britney Caldwell, The Engineering Enterprise: FYI – starting to see large multifamily projects providing 208v 1 phase to each unit (instead of 240v.**
 - a. CASE Team Response (Jose Garcia): The current requirement to reserve an additional single pole breaker space adjacent to the existing breaker should work for 208 or 240 Volt.

Central HPWH Electric Ready Cleanup, Jose Garcia, TRC

- 5. Question via GoTo Webinar by Mark Jerome, CLEAResult: Should there be an additional maintenance cost for filter changes?**
 - a. CASE Team Response (Jose Garcia): In this case, the scenario we analyzed was a grill to the closet where the HPWH was installed. The closet is completely within conditioned space so there's no filter and therefore no filter maintenance cost.

- 6. Question via GoTo Webinar by Bryan Ahee, Bradford White Corporation: Why 20 years? What was used for HPWH life?**
 - a. CASE Team Response (Jose Garcia): Typically, the effective useful life of a water heater is 15 years. We used 20 years to be conservative with the estimate for the cost-effectiveness of the measure.
- 7. Comment via GoTo Webinar by Bill Schwartz, Osborne Company: A European sizing program called “Ecosizer” is being used by some manufacturers.**
 - a. CASE Team Response (Jose Garcia): If designers choose to not use prescribed sizing factors and size their own design using programs such as “Ecosizer” for HPWH systems, they can; there are two compliance pathways in the proposal.
- 8. Question via GoTo Webinar from Bryan Ahee, Bradford White Corporation: What study provided the prescribed sizing factors?**
 - a. CASE Team Response (Jose Garcia): We developed the sizing factors based on designs for building prototypes with an experience plumbing designer. We’ve updated it since the first round of stakeholder meetings, including fact-checking our assumptions to make sure they’re reasonable.
- 9. Question asked anonymously via Mentimeter open-ended poll: If a building is using solar thermal, is there a way to account for that in terms of sizing an ASHP?**
 - a. CASE Team Response (Jose Garcia): We considered this question when we developed the designs. The sizing of heat pump must also meet the needs at night and therefore solar thermal system does not impact the sizing of the prototype water heating systems.
- 10. Question via GoTo Webinar from Bill Schwartz, Osborne Company: Is ASPE input being considered?**
 - a. CASE Team Response (Jose Garcia): We did not specifically reach out to ASPE or ASPE members working in an official capacity for ASPE, but we did interview and work with several experienced plumbing designers who may be affiliated with ASPE.
- 11. Question via GoTo Webinar from Bill Schwartz, Osborne Company: Are there guidelines for “Swing” tank sizing based on watts per occupant for the backup electric elements?**
 - a. CASE Team Response (Jose Garcia): The HP configuration we looked at was a CO2 heat pump with no backup resistance in our design. The sizing factors table has guidance for how to size the swing tank. We did not provide guidance for how to size backup; we do not require electrical backup.
- 12. Question via GoTo Webinar from Michael Corbett, Bradford White Corporation: How do you ignore conduit? That is an extremely large cost to tear up roads, walls etc.?**
 - a. CASE Team Response (Jose Garcia): We removed the requirement for conduit from switchboard to the HPWH in this proposal. We looked at the feasibility and cost-

effectiveness of requiring it, and changed the proposal to not require it. However, it is required from the street to the main switch board.

13. Question via GoTo Webinar Michael Corbett, Bradford White Corporation: If Conduit after the panel were required would the measure not be cost-effective? Why is the burden being placed on a future building owner for the cost?

- a. CASE Team Response (Jose Garcia): We considered ‘how likely is it to get used’ and ‘how likely is it to be sized correctly’ in the development of the proposal. The market is moving fast. Currently, requiring the final conduit to the HPWH doesn’t make sense because we don’t know all the details of the future system including number of HP. We framed the electrical requirements in terms of KVA to address the unknowns, and only required major electrical components in the building to be sized for the future load. Regarding cost effectiveness, we found that the conduit from the switchboard to the HPWH is not cost-effective since the retrofit cost is not that much higher than the new construction cost, which is another reason we removed it.

Central HPWH Cleanup, Dove Feng, TRC

14. Question via CASE Team member: How do manufacturers get products listed on NEEA system?

- a. CASE Team Response (Dove Feng): Go to [NEEAs website](#) and there is a doc that explains how; manufacturers must submit product design and there’s a process for system performance and system COP to put the product into the category such as Tier 1, 2, 3.

CA Plumbing Code (CPC) Appendix M Pipe Sizing, Amin Delagah, TRC

15. Question via GoTo Webinar by Zalmie Hussein, NORESCO: Would App M be the only option for sizing MF buildings? Or would App A still be an option for those who wish to use it?

- a. CASE Team Response (Amin Delagah/Jose Garcia): Yes. Appendix M will become an option but builders can still use Appendix A. If they use Appendix A, they’d be penalized for the energy contribution.

CA Pipe Insulation Enhancement, Amin Delagah, TRC

No questions were asked during this section of the presentation.

Master Mixing Valve, Amin Delagah, TRC

16. Question asked via GoTo Webinar question pane by Bill Schwartz: Is Legionella high temp disinfection being considered in electronic mixing valve?

- a. CASE Team Response (Amin Delagah): It is not being considered as a requirement of energy code; it would fit better in plumbing code. A benefit of a mixing valve is that it

could be set up as an overnight higher setpoint as a way to disinfect your entire distribution system from Legionella disease. It's up to the operating of the building for how they want to do that but the mixing valve provides flexibility for how to do that.

17. Comment in GoTo Webinar question pane by Wayne Alldredge: Need to be careful with this requirement when the return comes back to the MMV. When there is no demand and the circulation pump is adds more heat to the cold water side to the MMV than the loss in the circulation loop (or if the circulation loop isn't circulating) then there can be a high temperature blast of water to the first faucet that turns on. (I have seen this happen only once and yes, the design was sub optimal.)

- a. CASE Team Response (Amin Delagah): This is a concern, and we've placed a reference appendix to address proper installation. This speaks to the limitations of mechanical mixing valves (MMV) since they can only mix in a 80% to 20% ratio and when there are period with no draws there will be temperature creep. This can be mitigated by install and commissioning a balancing valve – this will be included in RA. Temperature creep is not an issue with digital MMC since they can mix to 100%.

18. Question asked via GoTo Webinar question pane by Zalmie Hussein, NORESCO: Some MMV manufacturers suggest that mixing valves be failsafe tested and serviced/maintained annually; and replaced every 5 years. Should service and maintenance be considered in the incremental costs? Why or why not?

- a. CASE Team Response (Amin Delagah): If that is a recommendation, we'd like to review it and update our analysis. Please contact me directly. Thank you for this feedback.
- b. CASE Team Response (Amin Delagah): After review of manufacturer's technical documents for several major manufacturers, yearly maintenance was identified as a recommendation or requirement to ensure that the optimum performance levels of the mixing valve are maintained. We are reviewing adding maintenance costs to the incremental cost calculation for this proposed measure.

Wrap-Up

- All Draft CASE Reports will be posted May through June at title24stakeholders.com
- Meeting adjourned at 4:25 PM

Questions / Comments Submitted Via GoTo Webinar

The questions and comments below are provided as-submitted in the GoTo Webinar Question pane. Responses provided by CASE Team support team. In addition, some of these questions were verbally discussed during the meeting and are captured in the In-Meeting Questions / Comments section above.

Question Asked	Response	Responder
Why 20 years? What was used for HPWH life?	Conservative estimate of cost-effectiveness of this measure. 15 years is the typical life span of water heating equipment.	Dove Feng
What study provided the prescribed sizing factors?	The CASE team worked with experienced plumbing designers to determine sizing factors based on prototype building designs.	David Douglass-Jaimes
I think permitting any configuration that progresses the HPWH industry into the right direction should be permitted.	Thank you for that comment. The CASE team will take this into consideration.	David Douglass-Jaimes
Need to be careful with this requirement when the return comes back to the MMV. When there is no demand and the circulation pump is adds more heat to the cold water side to the MMV than the loss in the circulation loop (or if the circulation loop isn't circulating) then there can be a high temperature blast of water to the first faucet that turns on. (I have seen this happen only once and yes, the design was sub optimal.)	We have plans to make a Reference Appendix to address proper installation. This is more a concern with mechanical MMV since they can only mix in a 80% to 20% ratio, and when there are periods with no draws there will be temperature creep. This can be mitigated by install and commissioning a balancing valve (this will be included in RA). Temperature creep is not an issue with digital MMV since they can mix to 100%	David Douglass-Jaimes
Agreed with the balancing valve. (Yes, I am a commissioning agent)	Thank you for the feedback.	
FYI, starting to see large multifamily projects providing 208V 1 phase to each unit (instead of 204V).	Thank you for this comment. We will take this into consideration.	David Douglass-Jaimes
BWC uses 208. Still #10 wire 10-2	Thank you for this comment. We will take this into consideration.	David Douglass-Jaimes
It is an option. Element performance is de-rated, but installation and wiring remains the same	Thanks for the comments.	Dove Feng
How do you ignore conduit? That is an extremely large cost to tear up roads, walls etc.	Main service conduit from street to building is required. But not from electrical panel to HPWH equipment, because the CASE Team's research showed that it can be installed relatively easily	David Douglass-Jaimes
If anything, conduit should be included and oversized to meet worst case	Thank you for the feedback.	
If conduit were required, which makes sense in new construction, the measure would likely not be cost-effective. Is that true? Why is the burden being placed on a future building owner	There were two main factors. The first is the uncertainty about the equipment sizing for the future HPWH equipment. The second factor was that the retrofit cost to add conduit at the time of the retrofit is not much higher than including it at new construction.	David Douglass-Jaimes

Question Asked	Response	Responder
are inlet / outlet ducting sized by the manufacturer ?	Yes. They are dependent on the size of the fan and therefore difficult to put into code requirements.	David Douglass-Jaimes
Would App M be the only option for sizing MF buildings? Or would App A still be an option for those who wish to use it?	Appendix M would be an option in CPC. In energy code, the piping would be required prescriptively but Appendix A would still be an option for projects using the performance pathway and they would just be penalized for the additional energy use	David Douglass-Jaimes
Some MMV manufacturers suggest that mixing valves be failsafe tested and serviced/maintained annually; and replaced every 5 years. Should service and maintenance be considered in the incremental costs? Why or why not?	Thank you for this information. The CASE team will look into this.	David Douglass-Jaimes
Should there be an additional maintenance cost due to filter changes	In this case, the scenario we analyzed was a grill to the closet that the HPWH was installed in. There is no filter on the grill and the HPWH is installed within the conditioned space.	David Douglass-Jaimes
I believe CBECC can model the small room reasonably well. I don't see any reason why ventilation couldn't be added to the airnet model	Thank you for these comments. The proposed measure is mandatory requirements, so not necessarily need to be modeled in CBECC.	David Douglass-Jaimes, Dove Feng
to wit, the lack of nuanced ventilation in CBECC is a ruleset issue, not a physics engine problem	Thank you for these comments	David Douglass-Jaimes
as an addendum-- I think the approach of using lab data to discount CBECC performance is probably more believable and reliable than doing a pure modeling approach! I like how you did it.	Thank you for this comment, We will include the lab testing results that used to support saving calculations in the CASE report Appendix. Thank you	David Douglass-Jaimes, Dove Feng
I am not finding the slides being presented at the links provided. Is there are different link?	https://title24stakeholders.com/event/multifamily-domestic-hot-water-utility-sponsored-stakeholder-meeting-2/	Panetti Cosimina
Appendix A would still apply for commercial buildings, correct?	This proposal is limited to multifamily buildings. Appendix A still applies for commercial buildings.	David Douglass-Jaimes
An we get a copy of this presentation?	Yes, its also on the website in the events page. The presentation is posted on the events page for this event. https://title24stakeholders.com/events/	Panetti Cosimina
Are there any considerations for MF central heat pump systems with large storage?	Central systems will be addressed in later topics in this meeting.	David Douglass-Jaimes

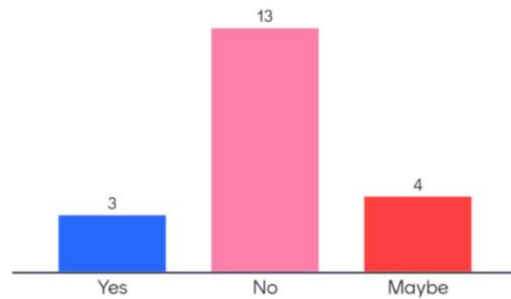
Question Asked	Response	Responder
Add electric loads	Thank you for this feedback	David Douglass-Jaimes
Seeing a European sizing program called Ecosizer being used by some manufacturers	If designers are using sizing program such as "Ecosizer" to design for future HPWH systems, they don't need to use prescribed sizing factors.	Dove Feng
Is ASPE being consulted?	Not that we're aware of. The CASE team will follow-up on this.	David Douglass-Jaimes
Are there guidelines for swing tank sizing based on watts per occupant for the backup electric element?	Thank you for this question. The swing tank element is included in the sizing factor	David Douglass-Jaimes
Long overdue. Need to eliminate sizing to Hunters curve.	Thank you for this comment.	David Douglass-Jaimes
Is it only for HCD jurisdictions?	HCD jurisdictions cover residential and MF buildings. For now, the majority or all MF buildings fall under HCD jurisdiction. HCD has to approve CPC adoption of App M before energy code can reference in the Energy Code.	David Douglass-Jaimes, Dove Feng
Is Legionella high temp disinfection being considered in electronic mixing valve?	It is not being considered as a requirement of the energy code. Such a requirement would be jurisdiction of the CPC if implemented. One benefit of digital mixing valve is to implement a temperature kill at night to disinfect entire distribution system	David Douglass-Jaimes
Sorry, I'm sure you covered this, but does this apply to both new construction and retrofits or just new construction?	Yes, both new construction and retrofit; single family and multifamily	David Douglass-Jaimes
Can you clarify when the CASE report will be published? Is the May 15th deadline for comments on the draft report?	The draft report will be published on May 10th to Title 24 Stakeholder Website	Dove Feng

Mentimeter Polls & Responses

Individual Heat Pump Water Heater Ventilation

Should MERV filters be required if the HPWH is installed in conditioned space, but inlet is ducted from unconditioned space?

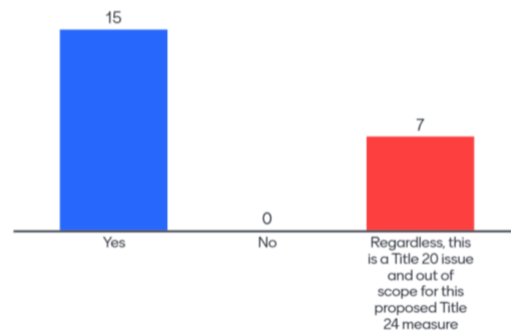
Mentimeter



20

Should Title 24 require that compressor capacity be measured and reported by manufacturers according to a specific industry standard?

Mentimeter



22

Go to www.menti.com and use the code 2523 2024

Do you agree with this assessment of cost effectiveness? Why or why not?

11 Answers

Mentimeter

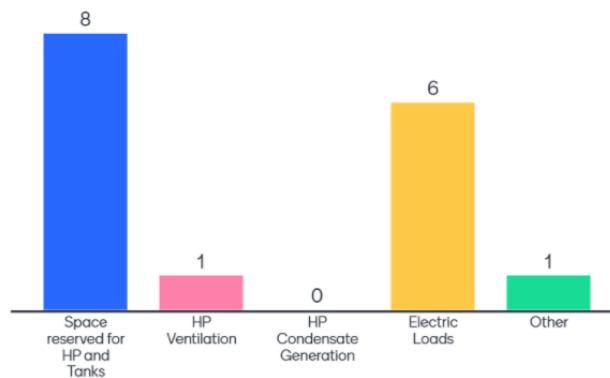
sure, why not	Maybe. Need more clarification	yes
Agree!	Seems like the methodology is adequate	Needs more analysis of lifetime costs, etc, but useful
I need more details, but I overall agree.	Agree!	Not clear from the methodology that is public at this point.
Need to review the data to comment.	Generally yes, but I don't think the costs reflect the distribution of costs for retrofits	

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Central HPWH Electric Ready, Jose Garcia, TRC

Go to www.menti.com and use the code 2523 2024

Which components do you think are necessary for Central HPWH Electric Readiness. Select all that apply:



Go to www.menti.com and use the code 2523 2024

Are there any questions about the prescribed sizing factors?

3 Answers

Mentimeter

If a building is using solar thermal, is there a way to account for that in terms of sizing an ASHP?

NA

Ensuring that capacities are adequate when replacing gas systems

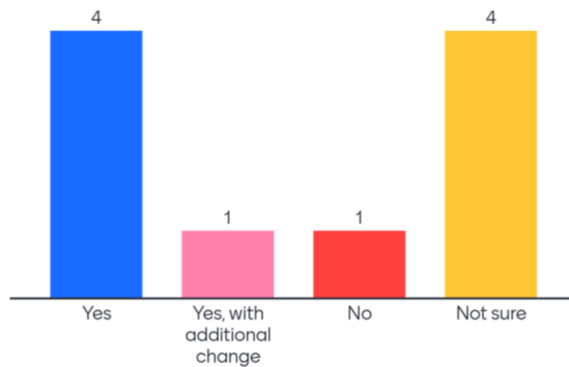
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Central HPWH Cleanup, Dove Feng

Go to www.menti.com and use the code 4228 7659

Do you support the proposal to require NEEA Tier 2, instead of Tier 3?

Mentimeter

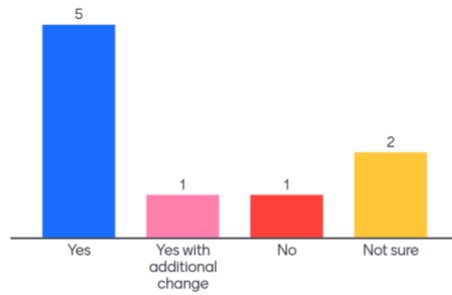


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Go to www.menti.com and use the code 4228 7659

Do you support the proposal to remove requirement on primary storage tank configurations?

Mentimeter



CA Plumbing Code (CPC) Appendix M Pipe Sizing, Amin Delagah, TRC

Go to www.menti.com and use the code 4228 7659

What are your concerns with applying CPC Appendix M for pipe diameter sizing? (If no concerns, please reply "NONE")

8 Answers

Mentimeter

NONE

None

NONE - Gary Kline has been heard YAY!

None

Appendix A is a conservative approach and there have been no issues using it.

none

Flow pressure when multiple fixtures are being used at the same time

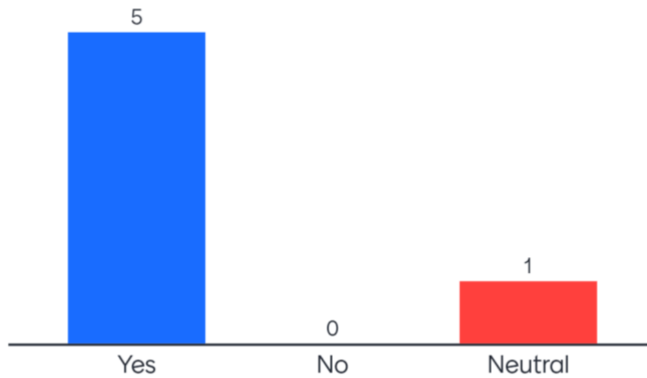
We have used it in Seattle with good results.



Go to www.menti.com and use the code 4228 7659

Do you support this measure?

Mentimeter



4

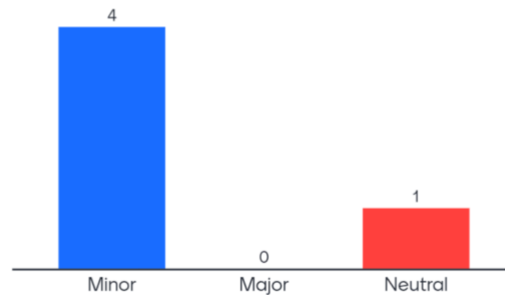


CA Pipe Insulation Enhancement

Go to www.menti.com and use the code 4228 7659

Do you think that the additional HERS verification time is a minor or major barrier for implementation of this measure?

Mentimeter

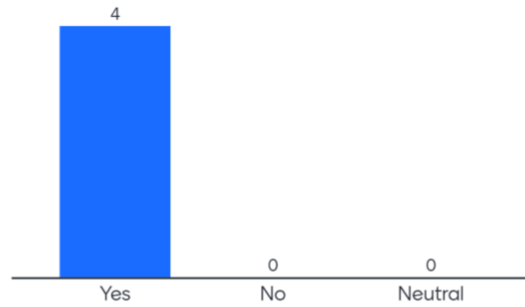


Master Mixing Valve

Go to www.menti.com and use the code 4228 7659

Mentimeter

Is the proposed change from mandatory to prescriptive for the master mixing valve measure a change for the better?



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