Notes

Notes from 2022 Title 24, Part 6 Code Cycle
Utility-Sponsored Stakeholder Meeting for:

Grid Integration

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Meeting Information

Meeting Date: Tuesday, September 10, 2019

Meeting Time: 8:30am – 12:30pm PST

Location: Adobe Connect webinar

Meeting Host: California Statewide Utility Codes and Standards Team

Meeting Attendees

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Dan	Johnson		Beyond Efficiency
Peter	Grant		Beyond Efficiency
Kelly	Murphy		Boulder Natural Solutions
Robert	Raymer		California Building Industry Association
Earle	Earley		Camtriot
Vicki	Burlingham		Capital Rating Service, Inc.
Andrew	Kosydar		CBIA
Garth	Torvestad		Consol
Tom	Paine		Consol
Patrick	Casper		Consortium for Energy Efficiency
Chase	Maxwell		Ellison Schnieder Harris & Donlan
Jeremy	Laundergan		EnerNex
Chuck	Thomas		EPRI
Richie	Mohan		Goodman Manufacturing
Gregg	Ander		Gregg Ander, LLC; New Buildings Institute
Jennifer	Rennick		In Balance Green Consulting
Nick	Grahf		International Dark-Sky Association (IDA)
Badri	Patel		Johnson Controls
David	W Ware		Knauf Insulation
Michael	Jouaneh		Lutron Electronics Co., Inc.
Bruce	Severance		Mitsubishi Electric US
Lucas	Schroyer		Navigant
Mark	Frankel		New Buildings Institute (NBI))
Judie	Porter		NORESCO
Pierre	Delforge		National Resources Defense Council (NRDC)
Ellen	Franconi		Pacific Northwest National Labs
Lucas	Morton		Pete Moffat Construction
Eric	Young		Phone Connection
Anna	LaRue		Resource Refocus LLC

Margaret	Pigman		Resource Refocus LLC
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Marti	Ogram		Riptide
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Josh	Rasin		Sacramento Municipal Utility District
Randy	Young		Sheet Metal Worker's Local Union 104
Tom	Martin		State of CA
Nehemiah	Stone		Stone Energy Associates
Troy	Bevilacqua		SunPower Corporation
Beth	Braddy		Trane
Wayne	Alldredge		VCA Green
Henry	Richardson		WattTime
Alexi	Miller		Western HVAC Performance Alliance Fault Detection
Yanda	Zhang		ZYD Energy, Inc.

Resources

1. Agenda
2. Presentation Slides
3. Single Family Grid Integration Submeasure Summaries
4. Nonresidential Grid Integration Submeasure Summaries
5. Multifamily All Electric Pathway Submeasure Summaries
6. Title24Stakeholders.com
7. EnergyCodeAce.com
8. LocalEnergyCodes.com
9. 2019 Code Cleanup Form

Key Takeaways

Single Family Proposal

1) The objective of this proposal is to shift electricity use from peak periods to off-peak periods to align with photovoltaic (PV). Technological advances allow for peak demand reduction through several means: energy storage, rescheduling of loads, and turning off non-critical devices.

Nonresidential Proposal

1) The focus of the nonresidential grid integration CASE initiative is to adjust the demand response control requirements so buildings that comply with Title 24, Part 6 are more likely to use their controls to implement load management on a day to day basis, as well as participate in reliability or economic demand response events. This will help newly constructed nonresidential buildings contribute to grid reliability in a positive way, which is critical as California aims to achieve its energy and climate goals.

Multifamily Proposal

1) This measure will develop prescriptive and performance compliance pathway(s) for all-electric multifamily buildings that use electric appliances for all regulated and non-regulated end uses. This topic builds on the 2019 prescriptive requirements for low-rise residential buildings that allow heat pump water heating (individual water heaters) and space heating. The code updates during the 2019 cycle did not address central water heating and non-regulated end uses such as appliances and plug loads.

Meeting Notes

Welcome and Meeting Guidelines

1) Alanna Torres (Statewide CASE Team) presented.

Opening Remarks, Overview and Welcome

1) Peter Strait (California Energy Commission) (California Energy Commission) presented.
2) Kelly Cunningham (Pacific Gas and Electric Company (PG&E) (PG&E, Statewide Utility Codes & Standards Team) presented.

CASE Presentation I: Single Family Grid Integration

1) Bob Hendron, Kristin Heinemeier, Marc Hoeschele (Frontier Energy) presented.
2) David Zhang (Energy Solutions) presented.
3) Ben Larson (Ecotope) presented.
4) Presentation available here.

CASE Presentation II: Nonresidential Grid Integration

1) David Jagger, Jessica Petters, Christine Riker, Kitty Wang (Energy Solutions) presented.
2) Presentation available here.

CASE Presentation III: Multifamily All Electric Pathway

1) Abhijeet Pande (TRC) presented.
2) Presentation available here.

Single Family Grid Integration

Batteries

Self-utilization credit

1) Bruce Severance (Mitsubishi Electric US): Is the self-utilization credit offered in the 2019 code?
    a) Lucas Morton (Pete Moffat Construction): Bruce—Yes, it is.
2) Mark Frankel (New Buildings Institute (NBI)): Self-utilization seems like it should focus on load shape, not just efficiency tradeoffs.
3) Peter Grant (Beyond Efficiency): Self-utilization - Why not implement a simulation model that calculates the hourly impacts? There are capabilities to do this, and it would be much more accurate than tradeoffs.
4) Matt Christie (TRC): Would a broader self-utilization credit be a fully-open performance-code tradeoff? Perhaps scaled against those envelope measures, but fully fungible against any proposed-home energy budget?
5) Dan Johnson (Beyond Efficiency): Why are we trading 10-year chemical batteries against 100-year envelope?
6) Rahul Athalye (NORESCO): There are some envelope backstops, but the trade-off approach needs to have stronger envelope backstops to appropriately weight the life the components being traded-off.
7) Danny Tam (California Energy Commission): The self-utilization credit is a small credit in the efficiency EDR to allow some builder flexibility and is similar to the photovoltaic (PV) credit from the 2016 code. Dan Johnson is correct, and the battery storage credit is massive. We do not want a battery to trade off for high performance attics (HPA) and high performance walls (HPW) and other envelope measures.
8) Peter Strait (California Energy Commission): Whether to permit the tradeoff against envelope is not unique or specific to batteries.
9) Mark Frankel (New Buildings Institute (NBI)): Are you thinking of the trade-off of efficiency versus load shape? It seems like you would want to trade off load shape for batteries. Can you talk more about what that trade off might look like?
10) David Zhang (Energy Solutions): I want to reach out to the Statewide Utility Team to determine if they have a strong preference for expanding these utilization cases. Currently, self-utilization credits can be used for trade-offs between building envelope and efficiency. At the moment, that is what we would be considering since that option is programmed into the compliance software and code. However, I do like your idea of looking at trade-offs for load shape. I would like to touch base more offline about what that tradeoff would look like and how we would translate that from the TDV perspective. At the moment, we do not have a clear idea of what that tradeoff will look like and I need to do a bit more of an investigation to make sure it makes sense to extend that credit and understand draw-backs.
11) Mark Frankel (New Buildings Institute (NBI)): There could be long-term implications of a short-term trade-off, I would also like to touch base offline about this.

12) David Zhang (Energy Solutions): For lithium ions, the lifetime is something that we are going to take into account for our cost-effective analysis.

13) Bruce Severance (Mitsubishi Electric US): I agree, and Mitsubishi builds powerwalls.

Battery testing and verification

1) Mark Frankel (New Buildings Institute (NBI)): Is this basically envisioned as a commissioning protocol?
2) Peter Strait (California Energy Commission): Note that we can treat the topic of limiting compliance tradeoffs against envelope measures as a separate (not specifically battery related) topic.
    a) Rahul Athalye (NORESCO): Agreed.
3) Eric Young (Phone Connection): Same question as Dan Johnson (Beyond Efficiency), trading 10 years chemical against 100-year envelope?
4) Nehemiah Stone (Stone Energy Associates): Have you considered making the battery/controls a Title 20 issue?
5) Wayne Alldredge (VCA Green): There are many different strategies that can be used. I think you should simply have the code power provider and City approved testing.
6) Kelly Murphy (Boulder Natural Solutions): On battery efficacy, I presume that we have incorporated the California Public Utility Commission's (CPUC) California Solar Initiative and the Self-Generation Incentive Program (SGIP) conclusions on the mis-aligned actual timing of battery charging Rulemaking (R.)12-11-005.
    a) Christine Riker (Energy Solutions): Yes, we have reviewed the SGIP evaluation, thanks for highlighting that.
7) Lucas Morton (Pete Moffat Construction): Batteries would hopefully not exclusively be a compliance credit, but also have ongoing bill savings that would warrant interest in replacement at the end-of-life.
8) Armen Saiyan (Los Angeles Department of Water & Power): I think that the controls strategy you apply will be super important, whether you let the home owner or business owner decide the strategies rather than have that be automated. I think that is a very important consideration.
    a) David Zhang (Energy Solutions): When we are revisiting these strategies, we have the benefits to the home owner in mind. We would like to align the battery with Time of Use period, but we are not mandating that they discharge at a specific time. There is flexibility within the compliance model to change the time. Homeowners could have different preferences depending where they live and what their systems are.
9) Simon Lee (California Energy Commission): If you start discharging early, then the battery could be empty by the time the grid peak. That is why we default that to 6-7, to account for the time you really need the battery.
    a) David Zhang (Energy Solutions): I agree with that, we have done research and there are previous calculations. We are waiting on 2022 TVD values before looking at optimal discharge time.

HPWH Load Shifting

Poll 1 (see Appendix A)

1) Jeremy Laundergan (EnerNex): Big issue with CTA-2045. The specification is complete but there is no testing and certification for the standard.

2) Nehemiah Stone (Stone Energy Associates): Are you contemplating a minimum storage size and a credit for larger sizes?
    a) Ben Larson (Ecotope): Not in the cards yet, but modeling has shown that that can be beneficial. We will take that under further consideration.
3) Randy Young (Sheet Metal Worker's Local Union 104): Tankless water heaters are very popular these days, the advantage is having instant hot water. Has any discussion taken place regarding these products? They do not have any storage capability.
4) Peter Grant (Beyond Efficiency): Randy - Load shifting is primarily an electric problem. Since tankless water heaters are almost exclusively gas powered, load shifting is not very important.
5) Pierre Delforge (National Resources Defense Council (NRDC)): Note that the latest draft JA-13 submitted to the Energy Commission already includes an Advanced Load Up command that can exceed user set point (mixing valve required in all cases).
6) Kelly Cunningham (Pacific Gas and Electric Company (PG&E): Quick note of clarification for those of you that may be newer to Title 24, Part 6 language. You will not find JA-13 in the Standards. This is the name of the document that an expert group of stakeholders has put together to support the inclusion of this Appendix in the future in the Standards, or to incorporate the functionality into the compliance software in the near term.
7) Kelly Cunningham (Pacific Gas and Electric Company (PG&E): Contact Pierre Delforge (National Resources Defense Council (NRDC)) for more information or to get involved.
8) Chase Maxwell (Ellison Schnieder Harris & Donlan): Can you please give a specific code reference for the 2019 Standards for the pre-cooling credit?
9) Bob Hendron (Frontier Energy): We will try to find that reference.
10) Bob Hendron (Frontier Energy): Residential ACM, I think.
11) Pierre Delforge (National Resources Defense Council (NRDC)): Mark, the strategy can get most of the load shifting value because the vast majority of low and high Time Dependent Valuation (TDV) values happen in the same Time of Use (TOU) time periods. The only additional benefit of dynamic grid signals are freak events that fall outside of TOU time periods. But this is predicated on TOU rates that are aligned with the duck curve / TDV.

Q&A

1) Mark Frankel (New Buildings Institute (NBI)): How effective is this strategy in a 'rate response' deployment, vs. grid signal?
    a) Ben Larson (Ecotope): Can you expand on this?
    b) Mark Frankel (New Buildings Institute (NBI)): There are a couple of ways to look at this - keeping the water heater from turning on at the wrong time, utilizing some heat storage. Another way of looking at it is with a set time period – has this been looked at as a schedule?
    c) Ben Larson (Ecotope): Yes, this has been looked at. You will get more when it is dispatchable. If you look at the graph I showed, Time of Use might be a 10-15% change. Depending on how dynamic you make it, you could make up to a 50% reduction with corresponding cost.

HVAC Load Shifting

Thermal mass requirement and pre-cooling effectiveness:

1) Nehemiah Stone (Stone Energy Associates): Will there be a minimum thermal mass requirement as part of the pre-cooling credit?
2) Kristin Heinemeier (Frontier Energy): That is not something we have considered, but we will look into it.
3) Wayne Alldredge (VCA Green): Pre-cooling has a greater effect when there is adequate thermal mass. Today's buildings are highly insulated, advanced framed structures have reduced thermal mass. Do you not see this pre-cooling effectiveness diminishing as construction techniques advance? I believe you must include a minimum calculated thermal mass inside the envelope.
4) Bob Hendron (Frontier Energy): Thank you for the feedback about thermal mass. We will investigate further.
5) Dan Johnson (Beyond Efficiency): Mass like concrete goes the wrong direction on climate crisis, we need to be getting Portland cement out of buildings.
6) Bob Hendron (Frontier Energy): Good point, we could potentially do sensitivity analysis based on thermal mass when we mode precooling scenarios.
7) Mark Frankel (New Buildings Institute (NBI)): I agree; it seems like the thermostat needs to be 'smart' enough to sort out building lag and outside temperature, not just a hard code pre-cooling.
8) Gabriel Taylor (California Energy Commission): I agree, ideally the envelope & thermal mass will support the precooling such that occupants generally will not notice the precooling cycle.
9) Michael Jouaneh (Lutron Electronics Co.): So, we would rely on occupants to manually select "pre-cooling"?
10) Bob Hendron (Frontier Energy): Probably not, but we would like it to be as convenient as possible.
11) Dan Johnson (Beyond Efficiency): How about exterior window shading in lieu of thermal mass?
12) Dan Johnson (Beyond Efficiency): There is no way to simulate exterior operable shades in CBECC-Res
13) Bob Hendron (Frontier Energy): Another good point. We will look at these options for ensuring effective pre-cooling
14) Lucas Morton (Pete Moffat Construction): Typical/Minimum Thermal mass is already specified in the ACM. Additional thermal mass can be specified in limited ways (and I find this to be arbitrarily limited). Indeed, \pre-cooling should effectively be a thermal mass credit.
15) Gabriel Taylor (California Energy Commission): Let us keep in mind the goals of precooling: shifting load, saving money for the customer (through Time of Use (TOU)/TDV), but without causing any discomfort.
16) Chase Maxwell (Nest Labs): We agree that there need to be some improvements as far as what is expected of OCSTs (Occupancy Controlled Smart Thermostats), including JA5. We are concerned about complications especially regarding different zones and constraints that could be difficult to implement. We want to keep the dialogue going to accommodate functionality of pre-cooling. There

is a range of pre-cooling options, in the sense that there is no standardized pre-cooling period, whether there is flexibility for different buildings. 85 degrees could be hot for some, not for others. Parking lot the idea to review how restrictive the code should be regarding pre-cooling.

17) Kristin Heinemeier (Frontier Energy): There is a whole lot of things that could be done – the thermostat knows the stats of the building, the thermal mass. If you put in the actual Time-Of-Use schedule you can get an effective smart thermostat that takes the concerns of the homeowner into account.

18) Kristin Heinemeier (Frontier Energy): Thanks for your comments. I will review and follow up accordingly.

Home Energy Management

Control systems

1) Simon Lee (California Energy Commission): There is also energy management control system (EMCS) allowed for meeting single family residential lighting control requirements.
   a) Simon Lee (California Energy Commission): in Section 150.0(k)2G (2019).
   b) Bill Dakin: Thanks for the clarification.
   c) Simon Lee (California Energy Commission): You are welcome. EMCS is also mentioned in Section 130.0(e) for nonresidential
2) Heidi Werner (Energy Solutions): Bob, if you have not read the 2019 Demand Response (DR) Controls Cleanup CASE Report, there is a section that speaks to confusion as to when energy management control systems/home automation systems (EMCS/HAS) can be used to comply with control requirements. We made a recommendation during the 2019 cycle to clean up the requirements. I think we addressed the issue that Home Automation System does not actually have a definition in the code and that there is confusion as to whether a HAS equals an EMCS.
   a) Heidi Werner (Energy Solutions): http://title24stakeholders.com/wp-content/uploads/2019/01/2019-T24-CASE-Results-Report_Demand-Response-Cleanup_Final_with_Attachments.pdf
3) Judie Porter (NORESCO): There are issues associated with connectivity to personal Wi-Fi system.

Poll 2 (see Appendix A)

1) Matt Christie (Frontier Energy): The quickly changing landscape of technologies, widgets, and options makes codification very difficult. Too much is up in the air and changing. How do you keep it open ended to near-term industry advancements?

   a) Bob Hendron (Frontier Energy): The biggest challenge is how to set rules and criteria that do not become a barrier down the road. As these technologies become more common and can help grid integration, rules could keep creativity out of the market and cause harm. We want to keep flexible so as not to interfere with integration in the market place

Questions

1) Tom Paine (Consol): Do not under estimate the value of a quality internet connection. A device loses connection with a homeowner that does not notice means it could be functionally lost forever.

   a) Michael Jouaneh (Lutron Electronics Co.): This makes sense for larger homes.

2) Lucas Morton (Pete Moffat Construction): Thinking out loud a bit beyond my ken: I have heard about some of the technology impasses regarding electric vehicle (EV) charging and broader integration into ADR. Could HEMS be a sort of backhanded way to make this impasse irrelevant for home charging?
    a) Lucas Morton (Pete Moffat Construction): Yeah-- sorry it is a bit more involved.
    b) Bob Hendron (Frontier Energy): One of the goals would be to integrate demand response and energy efficiency across all of these measures. In addition to all of the small uses, home energy management could optimize whole-house energy use and impact on the grid. That is probably all I can do, we are out of time now.
    c) Lucas Morton (Pete Moffat Construction): Talk to Noel Crisostomo at the Energy Commission regarding electric vehicle (EV) charging.

Nonresidential Grid Integration

1) IOU C&S Team: You can sign-up to attend the Nov. 12 meeting Christine Riker mentioned here: https://title24stakeholders.com/event/single-family-whole-building-and-nonresidential-software-improvements-utility-sponsored-stakeholder-meeting/

Compressor Capacity Control for Load Management (Speed Control):

HVAC and technical considerations:

1) Lucas Morton (Pete Moffat Construction): It would be important for there to be feedback to occupants on the ADR signal to avoid HVAC service calls.
    a) Bob Hendron (Frontier Energy): Lucas, I do believe HEMS can help enable broader use of other technologies like optimal EV charging. I will look closer at the EV opportunities related to HEMS and provide an update at the next stakeholder meeting.
    b) Christine Riker (Energy Solutions): Lucas, we have seen it common to allow that decision to the building owner/operator as some prefer to notify their commercial occupants and some utilize strategies that are not even noticed by the occupants so choose not to tell the occupants.
    c) Lucas Morton (Pete Moffat Construction: Yes-- agreed. So, I would rephrase that it should be communicated to the building owner/operator in an obvious way as to what is happening and why the HVAC system appears to be handicapped.
    d) Christine Riker (Energy Solutions): Lucas - I see that point you are making, thanks.
2) Bruce Severance (Mitsubishi Electric US): Note: Compressor speed affects all zones connected to it, so selectively reducing capacity in "non-critical zones" is an anomaly.
    a) Christine Riker (Energy Solutions): Bruce, thanks for the note about coordination on zones and compressor capacity limiting. The compressor serving a specific zone would impact the entire zone.

3) Beth Braddy (Trane): As an HVAC manufacturer, I have concerns about the reliability of the compressor if control of its operation is taken over outside of the unit controls with all of the safeties and timers in place to protect it as a component.

   a) Beth Braddy (Trane): There would need to be a significant amount of development on the HVAC controls side to even make this work as well.

   b) Christine Riker (Energy Solutions): Beth, let us continue the discussion. The goal is to provide an additional pathway for the VRF/VSD and other control technology that is already able to provide this feature.

   c) Beth Braddy (Trane): I understand that this is another optional way to do demand shed, but taking the compressor as a component out from under the umbrella of the unit controls to take direct control for demand management is fraught with risk for the compressor (and ultimately the HVAC unit). The unit controls function is not only to provide comfort but also to protect the HVAC equipment from an operating mode that is not intended for the component. Variable speed compressor technology can have these same risks.

   d) Christine Riker (Energy Solutions): Thank you Beth, the intent is not to isolate or have outside control of the compressor but to enable the adjustment of the compressor capacity control. Thanks for the input Beth.

Questions

1) Josh Rasin (Sacramento Municipal Utility District): Would it not likely depend on the threshold limits required?

   a) Christine Riker (Energy Solutions): Josh, we will follow-up.

Demand Responsive Lighting

Outdoor lighting:

1) Peter Strait (California Energy Commission): Is the proposal considering the behavioral impact of preventing folks from setting outdoor lighting at less than full-on so that the additional demand response (DR) dimming does not create hazard or liability?

2) Michael Jouaneh (Lutron Electronics Co.): Would outdoor lighting be required to turn on during daylight hours?

   a) Christine Riker (Energy Solutions): Michael, interesting comment, are you thinking as a way to utilize renewables? No, that is not currently being considered due to the total energy use impacts.

3) Peter Strait (California Energy Commission): Safety and liability for outdoor lighting at night is significantly different than indoor lighting during the day and early evening. Proposal will need to expressly address safety concerns.

   a) David Jagger (Energy Solutions): To Peter's comment about DR capabilities and outdoor lighting, we are addressing safety concerns. Part of this measure's evaluation is how these interact with sensors (occupancy and lighting sensors for those dusk-to-dawn hours). This is not assuming that lighting has dimming capabilities. It comes down to 50-80% for dimming, but not getting

below 50% so as not to get below recommended levels. If there is an available load because the spaces are not occupied, sometimes there will not be a load. Part of the cost-effective analysis is looking at these hours.

   b) David Jagger (Energy Solutions): We are just looking at the capabilities, and not trying to get below that and dim too much for safety reasons. Josh, to your point – entirely possible, we want to pay attention to this while peak loads shift during the evening. It is possible this might be a very small load, but it is worth looking in to see if it is cost-effective. This becomes more valuable later into the evening. We are investigating to see what is available and what is cost-effective.

   c) Christine Riker (Energy Solutions): We will definitely need to consider the safety impacts.

4) Josh Rasin (Sacramento Municipal Utility District): Outdoor lighting seems to be an incredibly small load with outsized safety concerns that would greatly reduce the cost-effectiveness of load flexibility using this source. Especially considering the potential overlay with any daylighting or occupancy controls.

   a) Christine Riker (Energy Solutions): Bi-level lighting has been found to increase safety in situations, so this will keep safety as high factor.

   b) Michael Jouaneh (Lutron Electronics Co.): Christine, I was thinking it would not look good if outdoor lighting is turned on during the day for DR purposes. Seems wasteful.

   c) Christine Riker (Energy Solutions): Agreed. We are not proposing turning on outdoor lighting during the day

5) Peter Strait (California Energy Commission): Note that code is requiring design to RP-20. We need to be careful in assuming there is an additional dimmable/reducible margin.

   a) Christine Riker (Energy Solutions): Great points! That is why we want to bring this up to stakeholders

   b) David Jagger (Energy Solutions): We are not trying to make any unsafe recommendations as part of this proposal.

6) Peter Strait (California Energy Commission): Code already specifies that outdoor lighting must shut off when daylight is available - I am assuming any new DR requirement would not change this existing requirement.

   a) Title 24 Advocacy Team: http://title24stakeholders.com/wp-content/uploads/2017/10/2013_CASE-Report_Nonresidential-Demand-Responsive-Lighting-Controls.pdfj

7) Peter Strait (California Energy Commission): As a bit of background, note that the 15% reduction value is based on threshold of perceptibility and automatic adaptation of human vision to changes in light levels. (i.e., 15% is right at the limit of what our vision will adapt to without us noticing that the lighting level has changed.)

   a) Christine Riker (Energy Solutions): Thanks Peter, good background reminder.

   b) Jessica Peters (Energy Solutions): This update is not intended to change the existing requirement that outdoor lighting must shut off when daylighting is available.

8) Simon Lee (California Energy Commission): It looks like there may not be many lighting folks on this call.
    a) Christine Riker (Energy Solutions): Simon, we can coordinate with other 2022 lighting measures to make sure we are getting full stakeholder input, thanks for the note.
    b) Nehemiah Stone (Stone Energy Associates): Check with Lisa Heschong.
    c) Jennifer Rennick (In Balance Green Consulting): You should also reach out to building operations managers.
    d) Jessica Peters (Energy Solutions): Thank you Nehemiah, we will be sure to follow up.
    e) David Jagger (Energy Solutions): Thanks Jennifer, we will make sure to reach out to those stakeholders as well.

Compliance Options

1) Jessica Peters (Energy Solutions): Reminder: You can sign-up to attend the Nov. 12 meeting here: https://title24stakeholders.com/event/single-family-whole-building-and-nonresidential-software-improvements-utility-sponsored-stakeholder-meeting/

Questions:

1) Mark Frankel (New Buildings Institute (NBI)): It seems like there should be specific commissioning requirements associated with all of these grid integration measures.
2) Mark Frankel (New Buildings Institute (NBI)): You mentioned which ones have the biggest impact. This is a modeling question; how would you define a baseline with the biggest impact? Would this look at credits within the software?
    a) Christine Riker (Energy Solutions): With the software, you give a pathway to account for these impacts. It is not energy saving; for example, with pre-cooling you would actually use more energy during the day, so it is accounting for the impact.
    b) Mark Frankel (New Buildings Institute (NBI)): Would you use a baseline? Looking at TVD? There is no way to value passive features on the grid, but very specific control or design elements?
    c) Christine Riker (Energy Solutions): The baseline would be a building not using these features. Aspects are included in overall energy use and TDV when using the energy. When modeling, you are looking at the value of all of these impacts. Not all items are necessarily captured in the model yet. Controlling a heat pump water heater in the commercial space has an impact, and right now the software cannot quantify that benefit while the orientation of building and insulation are a part of the software right now.
    d) Mark Frankel (New Buildings Institute (NBI)): This is not included.
    e) Christine Riker (Energy Solutions): It is included. We are trying to get more ways to add value.
    f) Lucas Morton (Pete Moffat Construction): Mark-- you have a good point here. There is some arbitrariness about which occupant-controlled measures are allowed for compliance credit versus which are not.

g) Sally Blair (NORESCO): Mark, that is accounted for by TDV. Because the valuation is time of day weighted.

3) Michael Jouaneh (Lutron Electronics Co.): Have you thought about using some of the controlled receptacles for plug load DR?
   a) Jessica Peters (Energy Solutions): Good thought Michael, we will look into that.
   b) Christine Riker: Michael, there is an effort on plug loads. I can connect you on that effort
   c) Michael Jouaneh (Lutron Electronics Co.): OK.

Multifamily All Electric Pathway

Chat Questions/Comments

1) Jennifer Rennick (In Balance Green Consulting): For low-rise Multifamily Central HW, will 2019 code CBECC-Res be able to model RCC as a viable option?
   a) Dove Feng (TRC): can you clarify RCC?
   b) Jennifer Rennick (In Balance Green Consulting): Reverse cycle chiller used as central system heat pump.
   c) Dove Feng (TRC): There is effort to develop central heat pump water heater.
   d) Peter Strait (California Energy Commission): We are still working on how to model central systems for high-rise MF; if you send an e-mail to me, I can follow up with our SME on central RCCs.
   e) Dove Feng (TRC): But as far as I know, no effort to model RCC for combined space heating and water heating
   f) Peter Strait (California Energy Commission): Nothing is been started on it, though I can see where it is in the queue.
2) Michael Jouaneh (Lutron Electronics Co.): Will this include requirements for inside dwelling units? Or is this for the common areas?
   a) Dove Feng (TRC): The all-electric topic will look at both systems inside dwelling units and the common areas.
   b) Michael Jouaneh (Lutron Electronics Co.): OK.
3) Randall Higa (Southern California Edison): Why are water-source heat pumps not included?
   a) Abhijeet Pande (TRC): The intent was not to include.
   b) Dove Feng (TRC): Water source heating pump still would require heating source, which maybe still gas boiler.
4) Nehemiah Stone (Stone Energy Associates): Please include cost savings from not having to extend a gas line, install gas meters, pipe gas throughout the building, and install venting.

a) Abhijeet Pande (TRC): Yes, that is part of the cost-effective analysis including ongoing costs and any fixed charges that you might have.

b) Cathy Chappell: Nehemiah, that is part of our cost analysis when comparing to gas baseline.

5) Nehemiah Stone (Stone Energy Associates): For CDHW HPs, commissioning is very important.

6) Jennifer Rennick (In Balance Green Consulting): Building owner maintenance staff (as additional market actor).

7) Jennifer Rennick (In Balance Green Consulting): Eliminate thermal solar component.

Discussion and Questions:

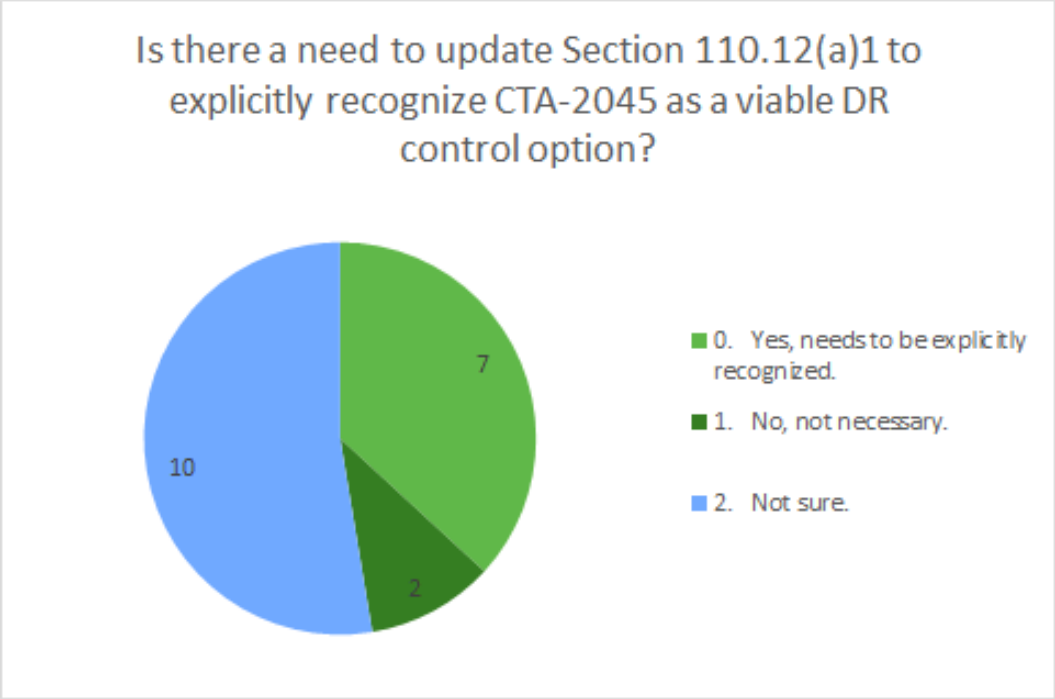
1) Jennifer Rennick (In Balance Green Consulting): For mild climate zones, i.e. 5 and 6, individual split system and individual HWHP is the only thing that works.

2) Jennifer Rennick (In Balance Green Consulting): Clarify for small unit sizes.

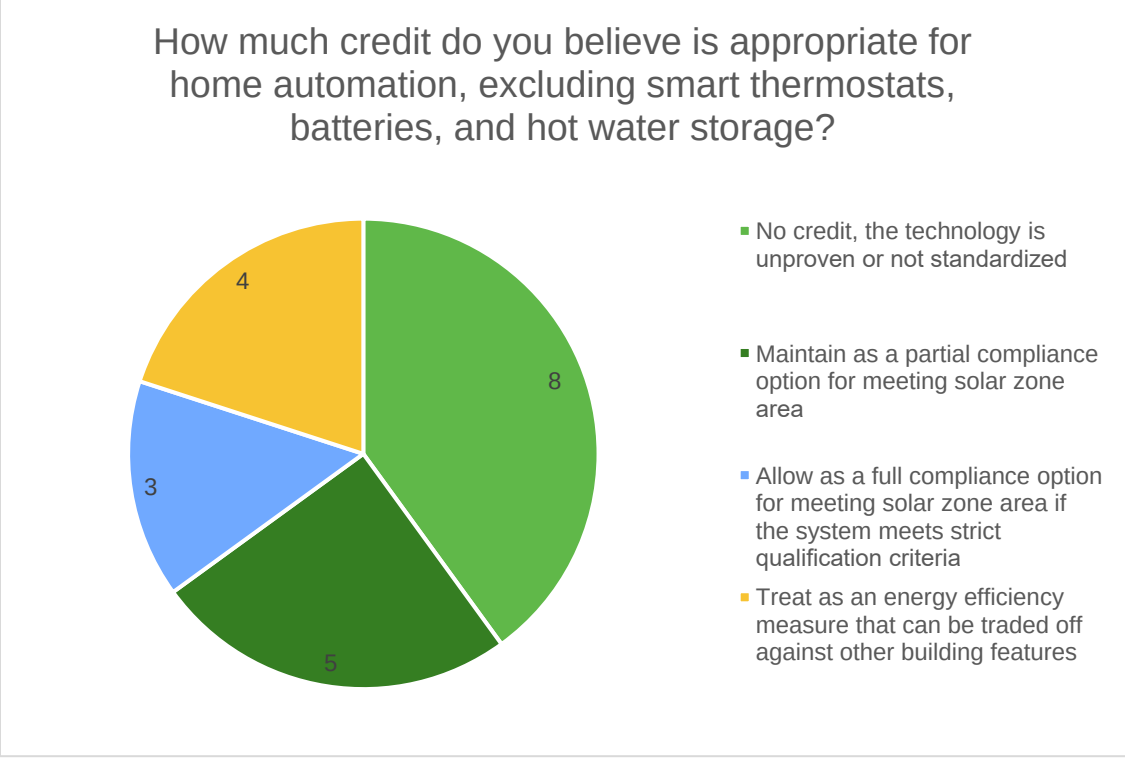
a) Abhijeet Pande (TRC): We can talk more offline. This has to do with the base level as well as cost and technical feasibility.

Appendix A - Poll Results

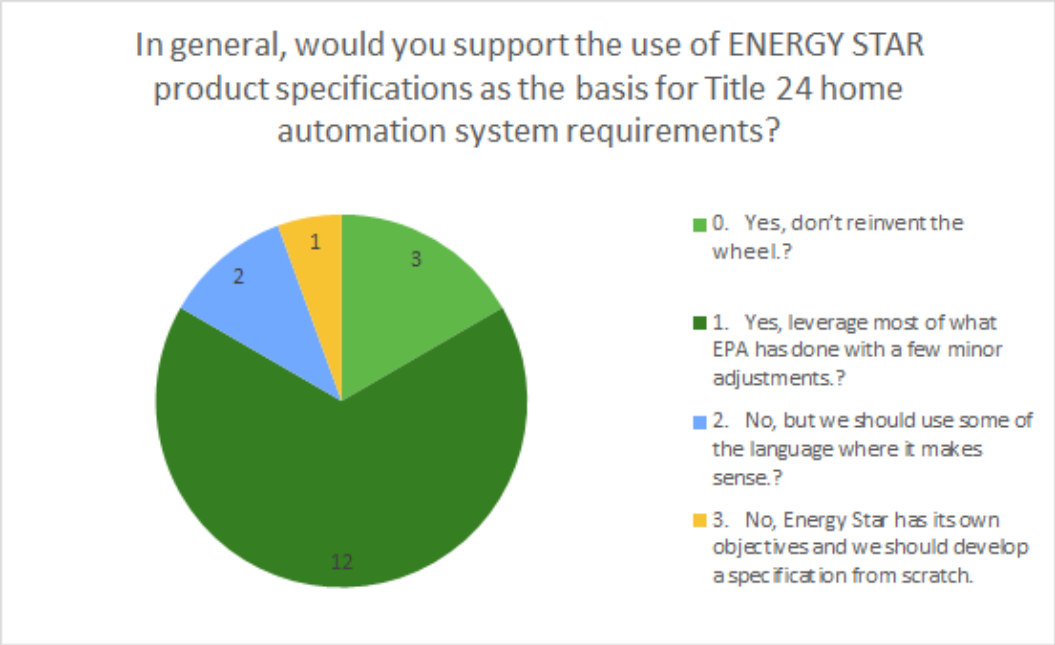
Poll 1:



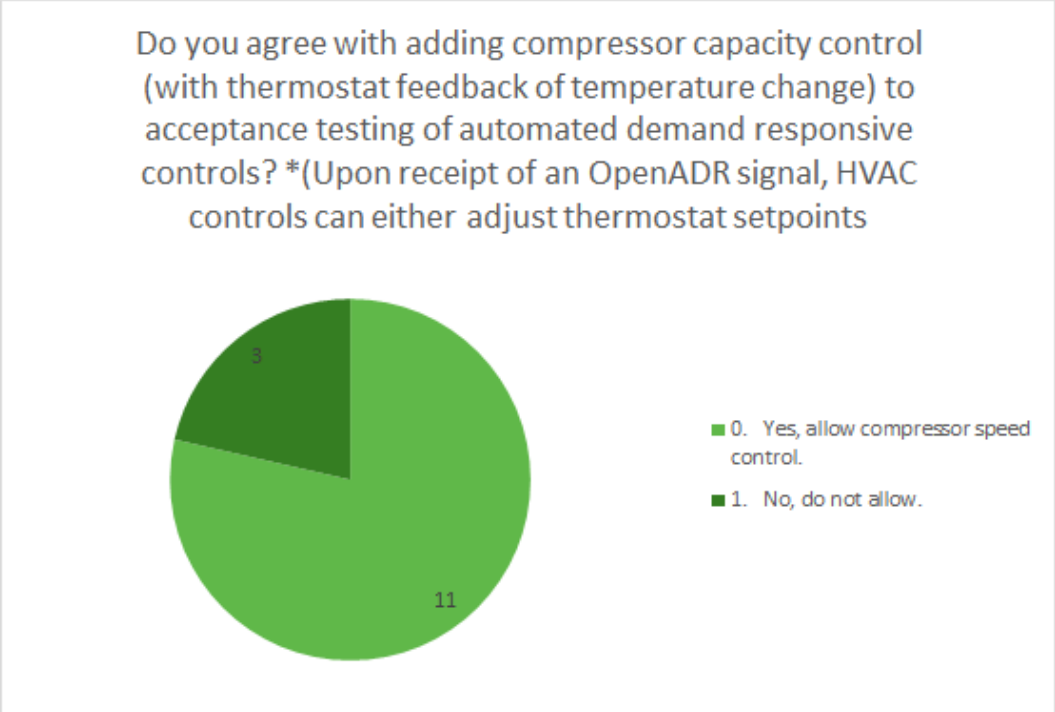
Poll 2 (corrected January 2, 2020):



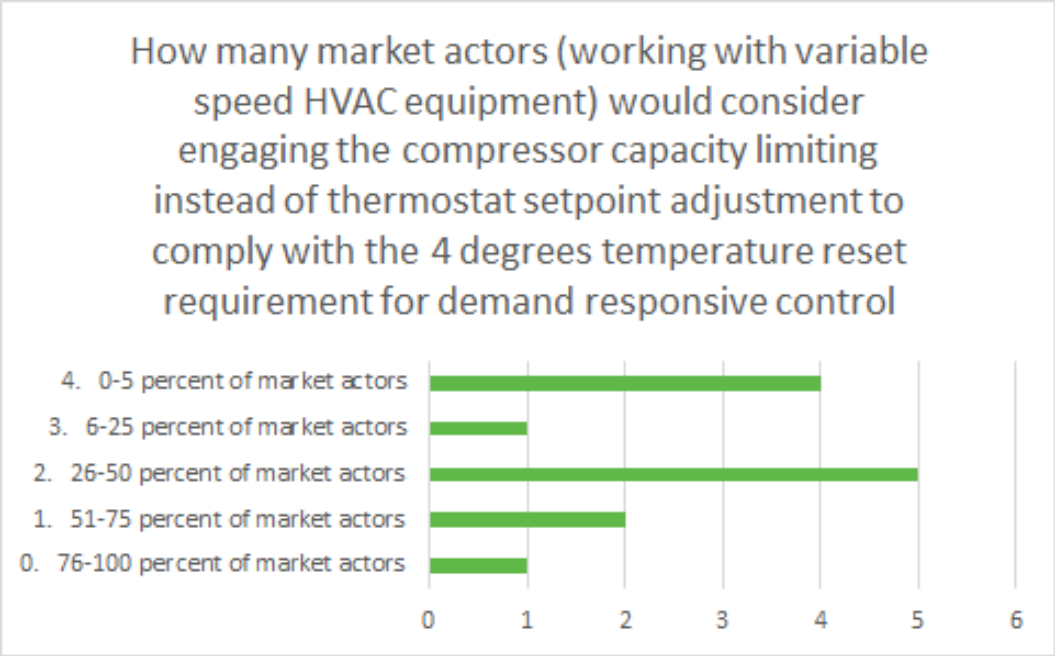
Poll 3:


In general, would you support the use of ENERGY STAR product specifications as the basis for Title 24 home automation system requirements?
3
12
2
1
0. Yes, don't reinvent the wheel.?
1. Yes, leverage most of what EPA has done with a few minor adjustments.?
2. No, but we should use some of the language where it makes sense.?
3. No, Energy Star has its own objectives and we should develop a specification from scratch.

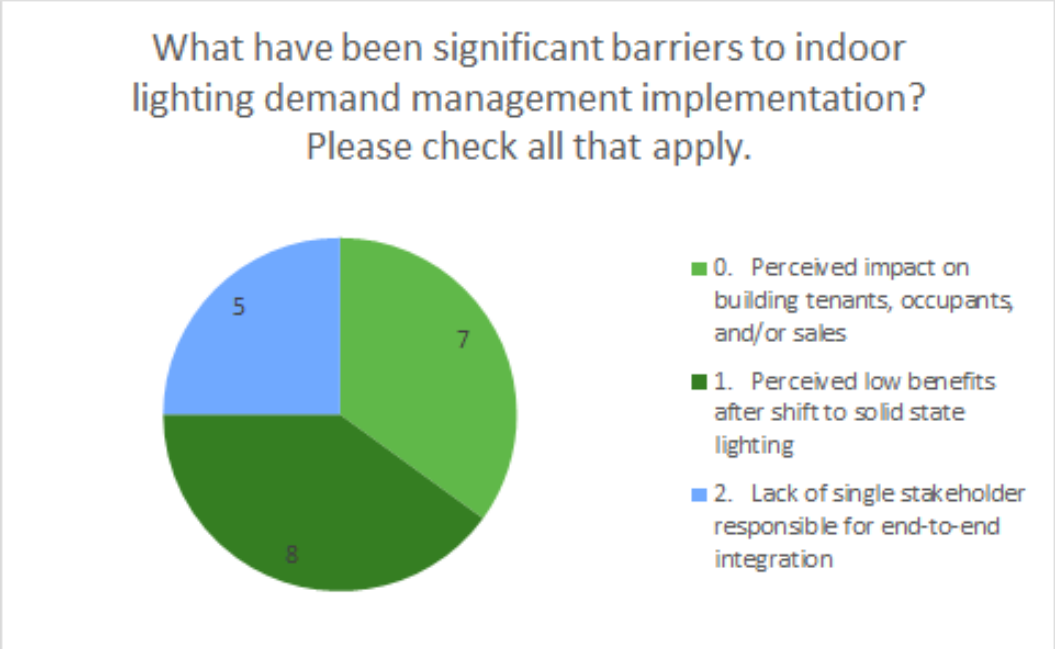
Poll 4:


Do you agree with adding compressor capacity control (with thermostat feedback of temperature change) to acceptance testing of automated demand responsive controls? *(Upon receipt of an OpenADR signal, HVAC controls can either adjust thermostat setpoints
3
11
0. Yes, allow compressor speed control.
1. No, do not allow.

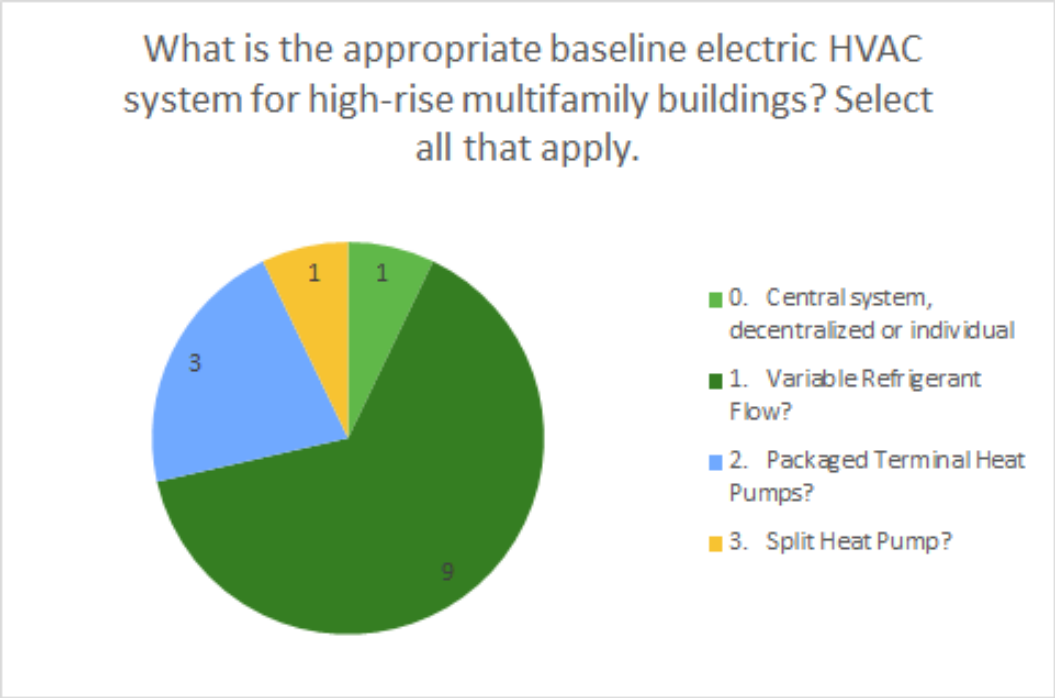
Poll 5:


How many market actors (working with variable speed HVAC equipment) would consider engaging the compressor capacity limiting instead of thermostat setpoint adjustment to comply with the 4 degrees temperature reset requirement for demand responsive control
4. 0-5 percent of market actors
3. 6-25 percent of market actors
2. 26-50 percent of market actors
1. 51-75 percent of market actors
0. 76-100 percent of market actors
0
1
2
3
4
5
6

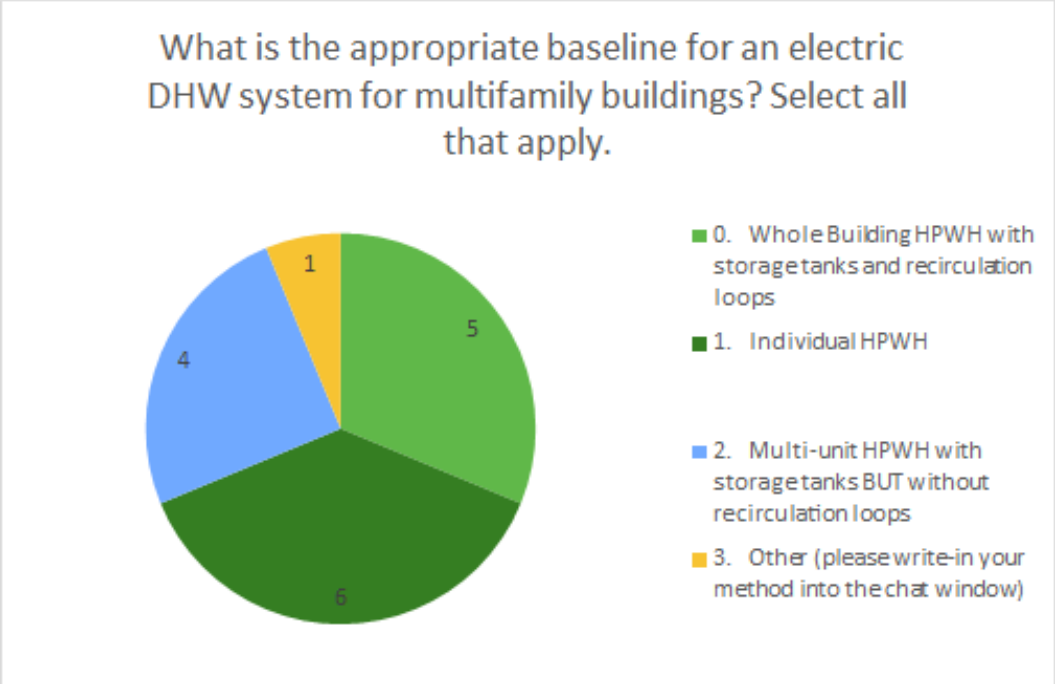
Poll 6:


What have been significant barriers to indoor lighting demand management implementation? Please check all that apply.
5
7
8
0. Perceived impact on building tenants, occupants, and/or sales
1. Perceived low benefits after shift to solid state lighting
2. Lack of single stakeholder responsible for end-to-end integration

Poll 7:



Poll 8:



Other:

- Bruce Severance: VRF integrated hot water tank with VRF heat recovery (as other baseline).