CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Notes from 2019 Title 24 Part 6 Code Development Cycle Utility-Sponsored Stakeholder Meeting for Residential Envelope

Posted May 23, 2016

Meeting Information

Meeting Date: March 14, 2017

Topics Discussed: Residential Envelope

Meeting Time: 9:00am – 12:00pm

Meeting Host: California Statewide Utility Codes and Standards Team

Attendees

First Name	Last Name	Contact	Organization
Statewide Utility Codes and Standards Team			
Utility Staff			
John	Barbour	JBarbour@semprautilities.com	SoCal Gas
Kelly	Cunningham	KACV@pge.com	Pacific Gas & Electric
Daniela	Garcia	dgarcia3@semprautilities.com	SoCal Gas
Randall	Higa	Randall.Higa@sce.com	Southern California Edison
Jim	Kemper	James.Kemper@ladwp.com	Los Angeles Department of Water and Power
Chris	Kuch	christopher.kuch@sce.com	Southern California Edison
Dave	Roland	David.Roland@smud.org	Sacramento Municipal Utility District
Chris	Roman	croman@semprautilities.com	SoCal Gas
Codes and Standards Enhancement (CASE) Team Members			
Bill	Dakin	bdakin@davisenergy.com	Davis Energy Group
Alea	German	agerman@davisenergy.com	Davis Energy Group
Heidi	Hauenstein	hhauenstein@energy-solution.com	Energy Solutions
Marc	Hoeschele	mhoesch@davisenergy.com	Davis Energy Group
Jon	McHugh	jon@mchughenergy.com	McHugh Energy Consulting
Vanessa	Morelan	vmorelan@energy-solution.com	Energy Solutions
Ken	Nittler	ken@enercomp.com	Enercomp
California Energy Commission Participants			
Payam	Bozorgchami	Payam.Bozorgchami@energy.ca.gov	California Energy Commission
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Peter	Strait	Peter.Strait@energy.ca.gov	California Energy Commission

Mazi	Shirakh	Maziar.Shirakh@energy.ca.gov	California Energy Commission
Other Participants			
Eric	Adair		Adair Concepts & Solutions LLC
Can	Anbarlilar		Pacific Gas & Electric
Chandra	Apperson		Apperson Energy Management
Sean	Armstrong		Redwood Energy
Alese	Ashuckian		APA
Francisco	Bahamonde		Lennar Ventures
Scott	Blunk		TRC Energy Services
Chris	Bradt		BKi/BayREN
Nick	Brown		Build Smart Group
Dav	Carmas		Housesmart Green Solutions
Chosen	Cheng		EternaTile, Inc.
Matt	Christie		TRC Energy Services
Charles	Cottrell		NAIMA
Abe	Cubano		Owens Corning
Susan	Davison		CalCERTS, Inc.
Brandon	De Young		De Young Properties
Brett	Deschamps		Homes by Towne
Eric	DeVito		SMXB
Sid	Dinwiddie		PABCO Roofing Products
Steve	Dubin		Rmax, Inc.
Nic	Dunffee		TRC Solutions
Jeremiah	Ellis		DuctTesters
Gary	Fabian		GLF
Moe	Fakih		VCA Green
Khosrow	Fallah		County of Marin
Bohdan	Fedyk		NEBB
Michel	Fourcroy		CalCERTS, Inc.
Curtis	Harrington		WCEC
Martin	Heiskell		Rmax, Inc.
Laurie	HIll		Rmax, Inc.
Alex	Hillbrand		National Resources Defense Council
Mike	Hodgson		ConSol
Jay	Hyde		Mogavero Architects
Elyse	Inglese		CertainTeed Insulation
Jenifer	Jackson		Davis Energy Group
Peggy	Jenkins		California Air Resources Board
Soodabeh	Khalifeh		Khalifeh & Associates, Inc.
Russ	King		Benningfield Group
Ron	Kliewer		Southern California Edison
John	Kouba		Malarkey Roofing Products
Dan	Krekelberg		ConSol
Roger	LeBrun		VELUX America LLC
Gregory	Mahoney		City of Davis
Tony	Martinez		ConSol
Shawn	Mullins		Owens Corning
Jay	Murdoch		Owens Corning

Nancy	Nelson		OAG Architects, Inc.
George	Nesbitt		Environmental Design/Build
Jose	Nieves		Rmax, Inc.
Marcin	Pazera		Owens Corning
Bob	Raymer		California Building Industry Association
Rebecca	Rice		NORESCO
Jim	Robinson		Knauf Insulation
Gina	Rodda		Gabel Energy
Gary	Romes		Knauf Insulation
Scott	Rowe		Knauf Insulation
Glenn	Savage		LG Electronics
Brian	Selby		Selby Energy, Inc
Nehemiah	Stone		Stone Energy Associates
Lindsay	Stovall		American Chemistry Council
Jeremy	Susac		Lennar Ventures
Gerry	Tortorice		Sunstreet
Garth	Torvestad		ConSol
Patti	Van Guilder		A+ Green Energy
Dan	Varvais		Covestro
Jon	Vencil		DNV GL
Kevin	Vilhauer		Milgard Manufacturing, Inc.
David W	Ware		Knauf Insulation
Kyra	Weinkle		NORESCO
Brant	White		ConSol
Mark	Wiese		CalCERTS
Bruce	Wilcox		Bruce A Wilcox, P. E.
John	Woestman		Extruded Polystyrene Foam Association (XPSA)
Zoe	Zhang		California Air Resources Board

Meeting Agenda

Time	Topic	Presenter
9:00 – 9:15	Introduction	John Barbour (SDG&E) Kelly Cunningham (PG&E)
9:15 – 9:55	Residential High Performance Walls	Alea German (Davis Energy Group)
9:55 – 10:35	Residential High Performance Attics (HPA)	Marc Hoeschele (Davis Energy Group)
10:35 – 11:15	Residential High Performance Windows and Doors	Ken Nittler (Enercomp)
11:15 – 11:55	Residential Quality Insulation Installation (QII)	Bill Dakin (Davis Energy Group)
11:55 – 12:00	Review and wrap-up, next steps	Kelly Cunningham (PG&E)

**The listed time for each topic is tentative and subject to change*

Key Takeaways and Action Items

1. **Overview**
    a. No key takeaways or action items.
2. **Residential High Performance Walls**
    a. Alea German will research costs and availability of weep screeds to accommodate proposed exterior insulation thicknesses. *(Update: This was completed and reported in the draft CASE Report.)*
    b. Bob Raymer will provide Mazi Shirakh information on urban State Responsibility Areas (SRA) or Local Responsibility Areas (LRA).
    c. Utility CASE Team will follow up with Nancy Nelson regarding the implementation of high performance walls. (*Update: Conference call was held between DEG and Nancy on March 16, 2017).*
    d. Alea German is to discuss market penetration of high performance walls with Jeremy Susac, Nancy Nelson, and Bob Raymer. *(Update: Conference call was held between DEG and Bob Raymer and Mike Hodgson. Alea followed up with Jeremy Susac, but he did not respond.)*
    e. Alea German is to discuss multifamily prototypes with Nehemiah Stone.
    f. Alea German to research fire code issues related to 1.5 inch of continuous insulation.
1. **Residential High Performance Attics**
    . Changes in CBECC-Res below deck modeling implemented immediately prior to the March 14, 2017 webinar will require simulations and cost-effectiveness calculations to be updated for the draft CASE Report. The changes will improve below deck insulation performance and cost-effectiveness by eliminating a degradation term reflecting batt compression.
    a. Stakeholders expressed it is important that QII procedures provide increased clarity for below deck inspection protocols.
    b. The market is still coming up to speed with the HPA technology. A few builders have successfully implemented HPA, while some have not yet tried it. Moving forward, improved training and tools are needed for the building community.
2. **Residential High Performance Windows and Doors**
    . The Utility CASE Team will consider the issue of high SHGC windows in heating Climate Zones 1, 3, 5, and 16.
    a. The Utility CASE Team will verify whether there is a need for exemption on proposed door performance for doors that need fire protection.
3. **Residential High Quality Insulation Installation**
    . Bill Dakin will discuss areas needing clarification in the insulation procedures and reference appendices with George Nesbitt.
    a. Bill Dakin will reach out to other stakeholders to get input on QII issues.

Meeting Notes

Overview of 2019 Title 24 Development

- Kelly Cunningham (PG&E) and John Barbour (SDG&E) presented.
- Presentation available here.

Comments and Feedback

Residential High Performance Walls

- Alea German (Davis Energy Group) presented.
- Presentation available here.

Comments and Feedback

1. Patti Van Guilder (A+ Green Energy): How does this apply to additions?
    a. Alea German (Davis Energy Group, Utility CASE Team): There are some exceptions for additions. If you are extending an existing wall, you can retain the existing wall dimensions (e.g., 2 x 4). The 2019 proposal does not change this exception. If you are building, and the wall is not an extension, then the 2019 requirements would apply.
2. Payam Bozorgchami (CEC): Does this affect the wall that separates the garage from living space?
    a. Alea German (Davis Energy Group, Utility CASE Team): It does not. The draft code language clarifies that issue. This applies to exterior walls.
3. Nancy Nelson (OAG Architects, Inc.): What type of foam are you using in your analysis?
    a. Alea German (Davis Energy Group, Utility CASE Team): The cost-effective analysis uses $1\frac{1}{2}$ inch, with a total of R7.5. That equates to R5 per inch. A 0.43 U-factor can be obtained from different insulation types and thicknesses.
4. Mike Hodgson (ConSol): A typical expanded foam does not give R5 per inch, what foam are you using?
    a. Alea German (Davis Energy Group, Utility CASE Team): We applied graphite enhanced expanded polystyrene foam (GPS), that gives R5 per inch, and R7.5 for $1\frac{1}{2}$ inches.
    b. Meeting Participant: That would also apply to extruded polystyrene (XPS).
    c. Nancy Nelson (OAG Architects, Inc.): As well as Polyiso, which is approximately R6 per inch.
5. Nancy Nelson (OAG Architects, Inc.): On the technical barrier regarding window and door waterproofing, we are seeing window manufacturers starting to offer products that address thicker exterior insulation.
    a. Alea German (Davis Energy Group, Utility CASE Team): Yes, there is a lot of innovation in the industry.
6. Nancy Nelson (OAG Architects, Inc.): Graphic on slide 10 – continuous foam is not continuous all the way to the rough opening.
    a. Alea German (Davis Energy Group, Utility CASE Team): That will need to be clarified in the code, and the compliance software currently does not recognize that lack of exterior insulation.
    b. Nancy Nelson (OAG Architects, Inc.): Thermal buck is a good alternative.
7. Brian Selby (Selby Energy, Inc.): If you put $1\frac{1}{2}$ inches of foam with one coat of stucco, it is difficult to find a weep screed to accommodate that thickness. I could only find a weep screed that is $1\frac{1}{2}$ inch. You would need $1\frac{7}{8}$ inches. This is potentially a market barrier.
    a. Alea German (Davis Energy Group, Utility CASE Team): We did finds some costs for it, we will consider the availability of it more offline.

   b. Action Item: Alea German will research the costs and availability of weep screeds to accommodate proposed thicknesses. *(Update: This was completed and reported in the draft CASE Report.)*

8. Brian Selby (Selby Energy, Inc.): Were coplanar surfaces taken into consideration for the cost-effective analysis? Would those surfaces also need to be insulated?
   a. Alea German (Davis Energy Group, Utility CASE Team): No, they were not, nor in the cost impact. The focus is on the conditioned space. From a practicality standpoint, those areas may need the same characteristics as the rest of the wall from aesthetic and coplanar aspects.
9. Meeting Participant: There is a challenge with achieving this requirement and achieving fire-rated walls. The exterior walls need to be one-hour fire rated.
   a. Jay Hyde (Mogavero Architects): That does not seem to work for fire rated walls.
   b. Steve Dubin (Rmax, Inc.): There are continuous insulations that have several UL fire rated assemblies.
   c. Nick Brown (Build Smart Group): Stucco manufacturers' International Code Council reports list fire rated assemblies. Over three stories, you need to look for NFPA-285 rated assemblies.
   d. Alea German (Davis Energy Group, Utility CASE Team): That has not come up as a barrier, nor is it something I have seen in typical construction. I will consider that further.
10. Bob Raymer (CBIA): About $\frac{1}{3}$ of the California falls into variety of wild and urban State Responsibility Areas (SRA) or Local Responsibility Areas (LRA). There are more stringent wall requirements for that, and is where a lot of production housing is going. I will share with Mazi.
    a. Alea German (Davis Energy Group, Utility CASE Team): Great, we can have a discussion later and see what it means in terms of proposal.
    b. Action Item: Bob Raymer will provide Mazi Shirakh information on SRAs and LRAs.
11. Nancy Nelson (OAG Architects, Inc.): My understanding is that QII will be a mandatory measure, is that correct?
    a. Alea German (Davis Energy Group, Utility CASE Team): The proposal is for QII to be prescriptive, which we will discuss later in today's presentation.
12. George Nesbitt (Environmental Design/Build): We have always allowed tradeoffs between water heating, cooling, and heating budgets. Adjusting the budgets may result in a trade that does not include high performance walls.
    a. Gina Rodda (Gabel Energy): It will be difficult if you also want to trade away the high performance roof.
    b. Mazi Shirakh (CEC): True, there are other compliance options. The primary barrier is the PV tradeoff. Trading away both high performance walls and attic will be hard.
13. Nancy Nelson (OAG Architects, Inc.): At least half of our production builder clients in Northern California are already implementing high performance walls.
    a. Utility CASE Team will follow up with Nancy Nelson regarding the implementation of high performance walls. *(Update: Statewide CASE Team held a call with Nancy Nelson on 3/16.)*
14. Brian Selby (Selby Energy, Inc.): The biggest concern is the comparison of cost-effectiveness between 2016 to 2019. There have been a lot of opportunities to trade away high performance walls. It seems a bit optimistic. It seems more reasonable to compare to 2013 requirements since that is more common.

   a. Alea German (Davis Energy Group, Utility CASE Team): Good point, but guidelines require a comparison between current and the proposed code.
   b. Brian Selby (Selby Energy, Inc.): The incremental costs will be far greater, because the building industry is still at 2013 methods rather than 2016.

15. Moe Fakih (VCA Green): Costs do not appear to include labor and do not seem to consider added production time.
    a. Utility CASE Team will follow up with stakeholder after the meeting.
16. Bob Raymer (CBIA): Major production builders are not doing high performance walls. We have a bill going through congress that will mandate solar. Edison will not be offering their CAHP incentive program anymore. It will be difficult to get industry up to speed.
    a. Nancy Nelson (OAG Architects, Inc.): Taylor Morrison has been using 2 x 6 high performance walls, same with DeNova, Meritage, and Standard Pacific Homes.
    b. Gina Rodda (Gabel Energy): I have seen the builder resistance.
    c. Patti Van Guilder (A+ Green Energy): None of our builders want to add exterior foam.
    d. Dav Carmas (Housesmart Green Solutions): I only see custom home builders, and I do not know anyone who can do or understand high performance anything.
    e. Moe Fakih (VCA Green): We hear resistance every day.
    f. Alea German (Davis Energy Group, Utility CASE Team): I appreciate all the feedback, and will follow up offline.
       i. Jeremy Susac (Lennar Ventures): I would like to be part of that conversation.
       ii. Action Item: Alea German is to discuss market penetration of high performance walls with Jeremy Susac, Moe Fakih, Dav Carmas, Gina Rodda, Nancy Nelson, and Bob Raymer.
    g. Matt Christie (TRC Energy Services): Shea, Taylor Morrison, KB, G.J. Gardner, DeYoung, Meritage, Granville, Wathen Castanos, Ponderosa Homes, & Pardee all have experience in HPW and HPA through the CAHP Master Builder initiative. To varying degrees and success. We are producing a case-study brochure to share their collective experience and challenges.
    h. Martin Heiskell (Rmax, Inc.): It is standard to use foam on exterior walls in the Northeast. Change is difficult, but not impossible and not as expensive as one thinks. The Foam Sheathing Committee has a lot of resources about testing and installation methods that can help produce good results and assemblies.
       i. Utility CASE Team will follow up with stakeholder after the meeting.
17. Mike Hodgson (ConSol): Workforce Instruction for Standard Efficiency (WISE) assessment states conservatively that 90 percent of the market is still 2 x 4 wall framing. That assessment is being updated this year, hopefully by the end of March.
    a. Utility CASE Team will follow up with stakeholder after the meeting. (Statewide CASE Team coordinating with ConSol to get the market and builder cost data as it becomes available.)
18. Steve Dubin (Rmax, Inc.): Inches are being referred to for continuous insulation, and that can minimize what product is being referred to. For example, 1.5 inch is R7.5 for one type of foam, would it better to make references to R-Values instead of inches?
    a. Alea German (Davis Energy Group, Utility CASE Team): One challenge in our cost-effectiveness analysis is that we need to look at a model wall. We are required to use 2016 code requirements as the baseline, especially to identify costs.

b. Steve Dubin (Rmax, Inc.): Just as a builder would look at lumber costs, insulation occasionally has price fluctuations. This could result in skewed cost-effectiveness results.
    i. Utility CASE Team will follow up with stakeholder after the meeting.

19. Patti Van Guilder (A+ Green Energy): I am very interested in the additions provisions, making them reasonable and cost-effective.
    a. Utility CASE Team will follow up with stakeholder after the meeting.

Residential High Performance Attics (HPA)

- Marc Hoeschele (Davis Energy Group) presented
- Presentation available here.

Comments and Feedback

1. Brian Selby (Selby Energy, Inc.): With regards to air space (the amount of space between roofing material and roof deck), does the software automatically select based on roof material?
    a. Marc Hoeschele (Davis Energy Group, Utility CASE Team): Yes, that is the case. Bruce or the Energy Commission can confirm.
        i. Bruce Wilcox (P.E.): Yes, that is the case.
    b. Brian Selby (Selby Energy, Inc.): I do have concerns with the energy consulting community. They are unaware of the purpose and how its interpreted. The compliance analysis needs to consider the impact of design changes, such as HPA on in-field compliance.
    c. Nancy Nelson (OAG Architects, Inc.): I agree it is time consuming educating and getting stakeholders up to speed on the alternative methods and the various new products coming out. We need to take advantage of WISE. I have seen a lot of progress. For, example the successful forum in Sacramento last month.
2. Bob Raymer (CBIA): Compared to what we were doing three years ago, most of the outreach was in regards to compliance with the standards in effect. For example, we are going to El Dorado to speak about 2019 Standards with 20 builders. We are jumping over 2016 Standards and going right to 2019 Standards.
    a. Jon McHugh (McHugh Energy Consulting, Utility CASE Team): Can you explain your rationale? Is it the PV tradeoff issue?
    b. Bob Raymer (CBIA): We are trying to get them to take the code changes seriously and get some feedback. In 2013 it was hard to get comments for 2016, we are desperately looking for feedback.
3. Dav Carmas (Housesmart Green Solutions): What is the logic for removing the PV tradeoff in 2019? It seems like a bad idea in the real world.
    a. Matt Christie (TRC Energy Services): The PV output is needed to reduce the remaining load to ZNE. If PV is counted as efficiency as a tradeoff to a better envelope you are either double counting, or would need significantly oversized PV to reach ZNE.
    b. Chosen Cheng (EternaTile, Inc.): What were the builders' reasons for needing the PV tradeoff?
    c. Utility CASE Team will follow up with stakeholders after the meeting.
4. Nehemiah Stone (Stone Energy Associates): At the start of the 2019 CASE process, there were two other multifamily prototypes developed that represent significant portions of multifamily new

construction. Were HPW and HPA analyzed with just the one eight-unit prototype, or all three? They might be cost-effective in more climate zones.

   a. Alea German (Davis Energy Group, Utility CASE Team): I am not aware of the other two multifamily prototypes. The analysis only used the one eight-unit multifamily prototype that has been used over the previous code cycles. Can you give me more info on the prototypes offline?
   b. Nehemiah Stone (Stone Energy Associates): Yes.
   c. Action Item: Alea German is to discuss multifamily prototypes with Nehemiah Stone.

5. Jeremy Susac (Lennar Ventures): What percentage of homes are built using HPA and HPW and what are the costs documented?
   a. Utility CASE Team will follow up with stakeholder after the meeting.
6. Matt Christie (TRC Energy Services): With QII becoming more vital as either a tradeoff or potentially a prescriptive measure in 2019, I have concerns about the clarity and training on QII protocols for roof deck and attic floor insulation in various HPA, ducts in conditioned space, or sealed attic solutions.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
7. Patti Van Guilder (A+ Green Energy): As an energy analyst it should not be my job to explain construction materials or techniques, and yet that is what you are asking for the small builder or homeowners.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
8. Jose Nieves (Rmax, Inc.): Currently the Home Innovation Research Labs, Inc. and the Department of Energy are working on a project with window manufacturers and foam manufacturers for techniques of installing windows over thicker foam sheathing.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
9. George Nesbitt (Environmental Design/Build): What happened to buried ducts and ductless systems?
   a. Marc Hoeschele (Davis Energy Group, Utility CASE Team): I know there is a buried duct approach in the current performance method. It does require a duct design and HERS verification. Bruce Wilcox and the CEC are working on an updated approach for ductless mini-split systems that will offer some credit if eligibility criteria are met.
10. Michel Fourcroy (CalCERTS, Inc.): Underdeck batts would likely fail QII requirements.
   a. Nehemiah Stone (Stone Energy Associates): Michael, why?
   b. Michel Fourcroy (CalCERTS, Inc.): Too much labor is required to install without defect (voids, compressions, and gaps).
   c. Brandon De Young (De Young Properties): Our insulation installers do a great job at underdeck batts/wiring install.
   d. Gina Rodda (Gabel Energy): Brandon, where do you work in California?
   e. Brandon De Young (De Young Properties): Fresno/Clovis area.
   f. Matt Christie (TRC Energy Services): The Fresno/Clovis market has been amazing. Other builders in the area are saying the same thing as Brandon from what we have seen in program implementation.
   g. Utility CASE Team will follow up with stakeholders after the meeting.
11. George Nesbitt (Environmental Design/Build): Although the cost estimates may be low for now, they may better reflect the cost when it is more common to do HPA. Just as low-E windows were very expensive in the past; they have become standard.

   a. Utility CASE Team will follow up with stakeholder after the meeting.
12. Jay Hyde (Mogavero Architects): Was there a comparison of radiant barrier versus HPA?
   a. Marc Hoeschele (Davis Energy Group, Utility CASE Team): Radiant barrier is a measure that can be modeled with some HPA configurations. It was not individually modeled as an alternative as it does not provide the same level of impact.
13. George Nesbitt (Environmental Design/Build): Attic blown insulation failures are not usually about settling, it is under blowing depth to start with.
   a. Utility CASE Team will follow up with stakeholder after the meeting.

Residential High Performance Windows and Doors

- Ken Nittler (Enercomp) presented.
- Presentation available here.

Comments and Feedback

1. Roger LeBrun (VELUX America LLC): Those U-factors are ridiculous to be applied to skylights.
   a. George Nesbitt (Environmental Design/Build): The U-factor for skylights are higher.
   b. Roger LeBrun (VELUX America LLC): Fenestration benefits from skylights are much higher than for windows.
   c. Roger LeBrun (VELUX America LLC): 15 to 25 windows verses one 4 x 4 skylight? That does not seem right.
   d. George Nesbitt (Environmental Design/Build): Skylight areas should be greatly limited.
   e. Roger LeBrun (VELUX America LLC): George, are you thinking about plastic bubble skylights?
   f. George Nesbitt (Environmental Design/Build): Bubble skylights are obsolete.
   g. George Nesbitt (Environmental Design/Build): Skylights can have a U-factor of 0.55?
   h. Roger LeBrun (VELUX America LLC): 0.55 for skylights is limited to 16 square feet, and if you use one square foot more, the 0.55 drops to 0.30 for all 17 square feet.
   i. Utility CASE Team will follow up with stakeholders after the meeting.
2. Nehemiah Stone (Stone Energy Associates): For Climate Zone 16 (or 1, 3, or 5) did you consider a minimum solar heat gain coefficient?
   a. Ken Nittler (Enercomp, Utility CASE Team): The energy use increases when you switch between Climate Zones 1, 3, 5, and 16.
3. George Nesbitt (Environmental Design/Build): I have two quick comments on windows.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
4. Matt Christie (TRC Energy Services): For the high performance door, would those 25 percent to 50 percent glazing products, newly described as windows, be subject to window mandatory minimums and prescriptive comparisons or some new category of window-door hybrids?
   a. Utility CASE Team will follow up with stakeholder after the meeting.
5. Gina Rodda (Gabel Energy): I find the high performance windows become more of barrier for multifamily, how was that addressed in these measures?
   a. Alea German (Davis Energy Group, Utility CASE Team): Gina, do you find high performance windows a barrier in low-rise multifamily?

   b. Gina Rodda (Gabel Energy): Yes, I do. My multifamily buildings typically want more flexibility with fenestration features, such as storefront, or corner window configurations you typically do not see with single family.
   c. Alea German (Davis Energy Group, Utility CASE Team): In my experience, low-rise multifamily projects are installing similar windows that I see in single family, at least for the apartments. I do agree with your comment about storefront, and thank you for sharing what you are typically seeing. We will make sure Ken is aware.
6. Nancy Nelson (OAG Architects, Inc.): Even under the current standards, going to ultra-high performance window with a U-factor of 0.20, you can use as high-performance attic trade off. I have been told costs are 20 percent more, but they seem to be closer to 40 percent, which is still far less than an attic alterations or solar. It is viable option.
   a. Ken Nittler (Enercomp, Utility CASE Team): I agree, windows move the compliance impacts much faster.
   b. Matt Christie (TRC Energy Services): Along Nancy's current comment, triple pane low U-factor windows also get you great California Advanced Homes Program incentives.
   c. Mazi Shirakh (CEC): We are surprised by the costs of ultra-low U-factor windows. There was a manufacturer that presented at the forum a few weeks ago, and is working with the state utilities to provide incentives for windows. I am glad Nancy mentioned there is a builder willing to try it.
7. Matt Christie (TRC Energy Services): Multifamily needs its own code. Our persistently lumping it in, crossing residential and nonresidential codes has long been problematic in real-installation practice.
   a. Gina Rodda (Gabel Energy): I agree.
   b. George Nesbitt (Environmental Design/Build): There are not two energy codes, residential and nonresidential. There are sections of the code that cover one or the other or both. Yes, multifamily apartments do not belong in the nonresidential portion. Multifamily could use a specific chapter.
   c. Utility CASE Team will follow up with stakeholder after the meeting.
8. General Question: How will proposed code change impact skylights?
   a. Ken Nittler (Enercomp, Utility CASE Team): The proposal does not address current treatment for skylights. We are not changing anything from 2016 Title 24, Part 6 code.
9. Meeting Participant: Is that statewide average weighted by construction rates across the climate zones?
   a. Ken Nittler (Enercomp, Utility CASE Team): Yes, that is correct.
10. George Nesbitt (Environmental Design/Build): I think it should be more clear that solar heat gain coefficient affects heating and cooling, and that a higher coefficient is not always better.
   a. Ken Nittler (Enercomp, Utility CASE Team): It did not seem appropriate to switch to a low solar heat gain in those mild areas. It is a significant complexity, and would take a big education effort to get into impacts on heating and cooling.
11. Matt Christie (TRC Energy Services): With performance modeling using 0.5 solar heat gain coefficient in those zones, you essentially have a minimum in practice. That becomes the comparison case for all performance modeled homes.
   a. George Nesbitt (Environmental Design/Build): Matt, only in Climate Zone 1, 3, 5, and now 16 would there be a performance path using 0.5 solar heat gain coefficient. All other climate zones use the package requirement of 0.3.
   b. Utility CASE Team will follow up with stakeholder after the meeting.

Residential Quality Insulation Inspection (QII)

- Bill Dakin (Davis Energy Group) presented.
- Presentation available here.

Comments and Feedback

1. Dav Carmas (Housesmart Green Solutions): Does the 24 percent of single family QII uptake from the CalCerts data include CF-3Rs, or it is just on the CF-1R?
    a. Bill Dakin (Davis Energy Group, Utility CASE Team):CF-3r.
2. Patti Van Guilder (A+ Green Energy): Is that 24 percent what you put into the calculation, or 24 percent that actually had QII finalized?
    a. Bill Dakin (Davis Energy Group, Utility CASE Team): That means 24 percent of new construction homes that went through CalCerts included QII measure in their permit application. For multifamily it was 13 percent.
3. Matt Christie (TRC Energy Services): As commented before; for this proposal to be functional the QII language and protocols regarding HPA, sealed attics, and various DCS-style applications need serious thought, upgrade and attention. Iterative field training during the course of a HERS QII inspection is valuable and vital.
    a. Utility CASE Team will follow up with stakeholder after the meeting.
4. Gregory Mahoney (City of Davis): It is important for building inspectors to ensure that HERS verification is occurring at frame stage rather than waiting until the final inspection for HERS documentation.
    a. Utility CASE Team will follow up with stakeholder after the meeting.
5. Dav Carmas (Housesmart Green Solutions): My experience of QII is that it may be on the CF-1R ,but no one on the build team knows what it means so it gets ignored.
    a. Kelly Cunningham (PG&E, Utility CASE Team): Dav, what on the CF-1R form could be improved? We welcome your feedback, and would value a marked-up version of the form with your suggestions.
6. Gina Rodda (Gabel Energy): I feel the CF-1R should have not only the HERS measures noted, but a project schedule of how and when the HERS Rater needs to be engaged to be successful. This is atypical to what we typically see on a CF-1R, but due to it being vital that a schedule be a project requirement, I think it is needed.
    a. George Nesbitt (Environmental Design/Build): Every QII has failed, even with installers who say they have done QII.
    b. Gina Rodda (Gabel Energy): I also think that there needs to be HERS verification milestones included throughout the project, not just one upload to the HERS provider at the end of the project to capture when inspections are done.
    c. George Nesbitt (Environmental Design/Build): HERS insulation inspection should be mandatory. QII should be prescriptive?
    d. Utility CASE Team will follow up with stakeholders after the meeting.
7. Ron Kliewer: HERS inspections could be partial instead of for the total house. That way every house would at least get some visual inspection, even when no tests are performed. This could keep costs the same.

   a. George Nesbitt (Environmental Design/Build): Almost every blown in attic has failed to meet depth, QII or not.
   b. Ron Kliewer: The installers hardly ever account for the settled density of the insulation.
   c. Utility CASE Team will follow up with stakeholders after the meeting.
8. Patti Van Guilder (A+ Green Energy): How about two levels of QII? One level for checking insulation level, level two for full blown air sealing?
   a. Gina Rodda (Gabel Energy): I agree.
   b. Dav Carmas (Housesmart Green Solutions): I agree with the multi-level QII approach. But, reasonable will not pass QII, maybe it should.
   c. Utility CASE Team will follow up with stakeholders after the meeting.
9. Mike Hodgson: What is the cost of QII for multifamily?
   a. Bill Dakin (Davis Energy Group, Utility CASE Team): One hour of labor per apartment unit, $710 HERS Rater cost testing.
10. George Nesbitt (Environmental Design/Build): I think HERS inspection should be mandatory for insulation.
   a. Bill Dakin (Davis Energy Group, Utility CASE Team): Our proposal is not to make it mandatory, since most builders still are not using QII.
   b. George Nesbitt (Environmental Design/Build): They need to be inspecting that R-Value they claim is there. Even installers that claim they have passed, generally fail.
   c. Bill Dakin (Davis Energy Group, Utility CASE Team): I would like to discuss offline and you can point out areas where you feel the insulation procedures and reference appendices are not clearly articulated.
   d. Action Item: Bill Dakin is to discuss areas needing clarification in the insulation procedures and reference appendices with George Nesbitt.
11. Dav Carmas (Housesmart Green Solutions): There is a huge gap between the code and what people actually do.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
12. Matt Christie (TRC Energy Services): RESNET already has this type of multi-tier QII method established. National production builders are familiar with the concept, and functional language already exists to be borrowed from.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
13. Charles Cottrell (NAIMA): I would not be in support of mandatory QII inspection. We do support good installation practices. The first step is to make sure the building inspector is doing his/her job.
   a. Utility CASE Team will follow up with stakeholder after the meeting.
14. Gina Rodda (Gabel Energy): There is a lack of success with QII is because the info is hidden, and contractors might not have access. We need to look at tools, practice, and training for these stakeholders.
   a. Bill Dakin (Davis Energy Group, Utility CASE Team): We agree. Energy Code Ace has a training slide deck and program for QII.
   b. Chris Meyer (CEC): We agree and understand that as we put a bigger emphasis on QII, the information must be clear and easy to follow.
   c. Gina Rodda (Gabel Energy): We need to look at ways to give stakeholders more info.
   d. Bill Dakin (Davis Energy Group, Utility CASE Team): The CF-1R?

e. Gina Rodda (Gabel Energy): The CF-1R is the first step in engaging QII.
f. Greg Mahoney (City of Davis): We are trying to keep the length of the forms in check, if there is a checklist needed, that would be great.
g. CEC: I like idea of best practices that can be used in conjunction with training.

15. Patti Van Guilder (A+ Green Energy): I think that the QII should be part of the plans.
    a. Ron Kliewer: I agree, Patti.
    b. Utility CASE Team will follow up with stakeholder after the meeting.
16. Michel Fourcroy (CalCERTS, Inc.): Making QII a prescriptive requirement will definitely increase its frequency using performance approach.
    a. Utility CASE Team will follow up with stakeholder after the meeting.