



CALIFORNIA STATEWIDE UTILITY CODES AND STANDARDS PROGRAM



Notes from May 8, 2014 Stakeholder Meeting

Posted May 28, 2014

MEETING INFORMATION

Meeting Date: May 8, 2014

Topics Discussed: Residential Envelope topics: High Performance Attics (HPA) / Ducts in Conditioned Space (DCS), High Performance Walls

Host: California Statewide Investor Owned Utility Codes and Standards Team

ATTENDEES

First Name	Last Name	Contact	Organization
CASE TEAM			
Ken	Nittler	ken@enercomp.net	Enercomp
Marshall	Hunt	mbh9@pge.com	PG&E
Randall	Higa	randall.higa@sce.com	SCE
Bach	Tsan	Bach.Tsan@sce.com	SCE
Dipo	Olatunji	dolatunji@semprautilities.com	Sempra (SoCal Gas)
Christopher	Goff	cgoft@semprautilities.com	Sempra (SoCal Gas)
Abhijeet	Pande	APande@trcsolutions.com	TRC
Cathy	Chappell	CChappell@trcsolutions.com	TRC
Matt	Christie	MChristie@trcsolutions.com	TRC
Josh	Rasin	JRasin@trcsolutions.com	TRC
IN PERSON			
Bill	Pennington	bill.pennington@energy.ca.gov	California Energy Commission
Bob	Raymer	rraymer@cbia.org	California Building Industry Association
Bruce	Wilcox	bwilcox@LMI.net	Wilcox
Dan	Gwiazson	DanGwiazdon@aol.com	Energy Conservation Pros
Dan	Varvais	dan.varvais@bayer.com	BMS
David	Ware	david.ware@knaufinsulation.com	Knauf Insulation
Dennis	Richardson	drichardson@awc.org	American Wood Council
Frank	Nunes	frank@wallandceiling.org	Wall and Ceiling Alliance
Gary	Talbott	gary@5starperinsul.com	5 Star Performance Insulation
George	Nesbitt	george@houseisasystem.com	Environmental/Design/Build



Greg	Mahoney	Gmahoney@cityofdavis.org	City of Davis
Helene	Hardy Pierce	hpierce@gaf.com	GAF
Jon	McHugh	jon@mchughenergy.com	MEC
Karyn	Beebe	karyn.beebe@apawood.org	APA
Linda	Derivi	lderivi@aiacc.org	American Institute of Architects California Council
Linda	Murphy	lindamurphy@ducttesters.com	Duct Testers
Mac	Sheldon	mac@demilec.com	Demilec
Marc	Hoeschele	mhoesch@davisenergy.com	DEG
Marcin	Pazera	marcin.pazera@owenscorning.com	Owens Corning
Mark	Alatorre	mark.alatorre@energy.ca.gov	California Energy Commission
Martha	Brook	mbrook@energy.ca.gov	California Energy Commission
Mazi	Shirakh	mshirakh@energy.ca.gov	California Energy Commission
Mike	Hodgson	mhodgson@consol.ws	ConSol
Mike	Fried	mike.fried@insulfoam.com	Insulfoam
Paul	Traba	paul.traba@paccoast.com	PABCO Roofing
Payam	Bozorgchami	payam.bozorgchami@energy.ca.gov	C.E.C
Raj	Patel	rppatel@dow.com	Dow Chemical Building Solutions
Rick	Canaday	Rcanaday@insulfoam.com	Insulfoam
Rick	Duncan	rickduncan@sprayfoam.org	Spray Polyurethane Foam Alliance
Sid	Dinwiddie	sid.dinwiddie@paccoast.com	PABCO Roofing
Steve	Strawn	stevestr@jeld-wen.com	Jeld-Wen Inc.
Tony	Martinez	tmartinez@consol.ws	ConSol
Tyler	Allwood	tylera@eagleroofing.com	Eagle Roofing Products
ON WEBINAR			
Adrian	Ownby	aownby@energy.state.ca.us	California Energy Commission
Bob	Barks	bob.barks@madera-county.com	Madera County Building
Brandon	De Young	cbd@deyoungproperties.com	De Young Properties
Conrad	Asper	Conrad.Asper@pge.com	PG&E
Daniel	Hamilton	danielh@abag.ca.gov	Bay Area Regional Energy Network
Danny	Tam	dtam@energy.state.ca.us	California Energy Commission
David	Goldstein	dgoldstein@nrdc.org	NRDC
David	Morgan	dmorgan182@surewest.net	RTE
David	Springer	springer@davisenergy.com	Davis Energy Group
Dee Anne	Ross	darenergy@aol.com	Enercomp
Elizabeth	Noll		(Clean Energy Solutions, American Gas Association)
Eric	DeVito	eric.devito@bbrslaw.com	Brickfield Burchette Ritts & Stone, PC
Erik	Emblem	eemblem@jceep.net	Joint Committee on Energy and Environmental Policy
Eurlyne	Geiszle	egeiszle@energy.state.ca.us	California Energy Commission
Garth	Torvestad	garth@benningfieldgroup.com	Benningfield Group
Gary	Smith	gary@gowedge.com	Wedge-It Insulation
Jay	Cruz	Jaycruz@boral.com	Boral roofing Llc
John	Woestman	jwoestman@xpsa.com	Extruded Polystyrene Foam Association (XPSA)
Michele	Friedrich	michele.friedrich@smud.org	SMUD
Reed	Hitchcock	rhitchcock@kellencompany.com	Asphalt Roofing Manufacturers Association



Sabaratnam	Thamilseran	sthamils@energy.state.ca.us	California Energy Commission
Bart	Weiland	bartonweiland@live.com	Weiland Consulting
Will	Vicent	william.vicent@sce.com	SCE
Joe	Loyer	jmloyer@energy.state.ca.us	California Energy Commission
Amy	Dreyden	amy@builditgreen.org	Build it Green

MEETING AGENDA

1:00 - 1:15	Introduction: Overview of 2016 Title 24 Development; Summary of stakeholder outreach purpose and procedure
1:15 - 2:45	Residential High Performance Attics (HPA) / Ducts in Conditioned Spaces (DCS)
2:45 - 3:00	<i>BREAK</i>
3:00 - 4:30	Residential High Performance Walls
4:30 - 5:00	Review and wrap-up, next steps

RECAP

- ◆ Overall
 - Comments are requested from stakeholders by June 1, 2014.
 - HPA/DCS and High Performance Walls will require a learning curve for builders. CBIA is trying to get a handle on the costs associated with this, as is the CASE team.
- ◆ High Performance Attics
 - Duct leakage allowance is based on HVAC system size, so smaller “right-sized” systems have harder time meeting lower duct leakage rates.
 - If the goal is to lower the temperature of the attic/roof, higher roof reflectance (cool roof) can achieve that directly, and perhaps more cheaply.
 - Multifamily builders already do DCS. Another option in Single Family may include buried ducts in HPA.
 - CASE team and CEC to follow up with State Fire Marshal to address concerns about Fire Ratings or ability to fight fires associated with specific proposed attic assemblies
- ◆ Ducts in Conditioned Space/Ductless Systems
 - Ductless systems do not currently receive full credit of being ductless compared to ducted system when modeled using 2013 Compliance Software.
 - Clarifications on proposed code language;
 - Refer to “vented” or “unvented attic” – better defined and understood than “conditioned” or “unconditioned”
 - No benefit to insulation of gable walls in a vented attic according to Wilcox. Not confirmed with CBECC-Res modeling as all models to date have used hip-roofs.



- 10 cfm at 25Pa may be too close to the error range to be a reasonable requirement – CASE team is following up on this. *[Rick Chitwood email to CASE team suggests that a duct leakage to outside test should be performed and tests should confirm <5CFM 25. The ability to test this low of a leakage is dependent on having a 4th ring on the duct blaster fan. It is not currently a standard ring size when buying new equipment, but is available, and should be in the market in greater volumes come 2017]*
- ◆ High Performance Walls
 - CASE team needs to harmonize our approach to cost estimates for QII with CBIA, making sure to include builder overhead etc.
 - QII savings estimate includes attics, may need to parse out benefit for walls.
 - Additional costs need to be incorporated for furring, windows and flashing with increased thicknesses of exterior insulation
 - Biggest issue with exterior insulation/thicker walls is preventing water intrusion, and making sure the wall can dry when it gets wet.
 - Two possible approaches, new window extrusions or additional framing around window opening for structural support. New window extrusions STILL might require additional structural support.
 - Need skilled labor and training to achieve these high performance walls strategies. Need to make sure these walls can be built by “young men in a hurry”. Advocating “keep it simple”

MEETING NOTES

These notes summarize the discussion at the IOU-sponsored stakeholder meeting that occurred on May 8, 2014.

Overview of 2016 Title 24 Development

- ◆ Cathy Chappell (TRC) presented
- ◆ Introductions
- ◆ Comments:
- ◆ **When are comments due? (Mike Hodgson – Consol)**
 - **June 1st deadline for comments**
- ◆ Design changes and verification are not factored into consideration. Two topics today are “special” in comparison to other things looked at in previous cycle. Both require builders to reconfigure design and construction practices. Will require a learning curve. CBIA is trying to get a handle on costs of these measures to provide feedback. (Bob Raymer – CBIA)

High Performance Attics (HPA) / Ducts in Conditioned Space (DCS)

- ◆ Matthew Christie (TRC, on behalf of the Statewide IOU C&S Team) presented
- ◆ Presentation available here: http://title24stakeholders.com/wp-content/uploads/2014/05/Residential-Envelope_DCS-HPA_Stakeholder-Meeting_May8_2014.pdf



Comments and Feedback:

Ducts in Conditioned Space/Ductless Systems

- ◆ George Nesbitt: MF builders are already doing this.
- ◆ **Bob Raymer: need to consider cost of redesign and retraining, CBIA is trying to get a handle on this.**
- ◆ George Nesbitt: Buried ducts may be another option to reduce duct losses that can be combined with HPA to achieve the desired performance
 - Matt Christie: Yes that is an option
- ◆ Jon McHugh: what is the prescriptive R value at the roofdeck?
 - R30 or 38 depending on Climate Zone.
- ◆ George Nesbitt: Issues with semi-conditioned or conditioned attic, raises the question of whether sprinklers are needed in the attic?
 - Bob Raymer: Depends on jurisdiction, sometimes required in garages and attics, but the number of jurisdictions with those requirements is dropping.
- ◆ **George Nesbitt: Using a ductless system changes your base case for modeling comparison; you are compared to a ductless base case, so your compliance margin gets tight even though your energy use drops. This becomes a disincentive for ductless systems.**
 - Martha Brook (CEC): 2013 Standards trying to keep standard design consistent – ducted system, Air Handler in the vented attic. Treading carefully through the ductless system options. Need field data. Can't give compliance credit for some designs yet because need field verification protocols established. Working with manufacturers, but it isn't done.
 - Matt Christie: In 2013 Standards, you can get credit for HPA or DCS packages, but no credit for ductless systems yet.
 - George Nesbitt: Just talking about ducts or no ducts, not the specs of the system itself. It is easy to verify if the system is ductless, other things are not.
 - Michele Friedrich: We have performance data for ductless mini-splits that were installed in the Maydestone.
 - Matt Christie: 26-lot new construction homes with ductless systems are not seeing the savings (as compared to T24 baseline) expected in the compliance software because the CEC software uses a ductless system as the base case for comparison.

High Performance Attics

Slide 29 – Vented Attic

- ◆ Bob Raymer: What is your concern on Fire Rating?
 - Matt Christie: We have heard from tile roof product manufacturers that there is concern about maintaining the Class A fire rating in specific assemblies, particularly in wildfire zones.
- ◆ Jon McHugh: R-value required for Ducts in Conditioned Space?



- George Nesbitt: Prior to 2013, no. But I think there is a minimum R-4.2 req, which helps prevent condensation for A/C. But hard to get R-4.2 because the prescriptive requirement is R-6, so that is what supply houses generally provide.
- ◆ Mazi Shirakh (CEC): For DCS, do ducts need to be sealed?
 - Matt Christie: Yes, and there is still value in sealing ducts – having it leaking in a web truss or plenum does no good. Maybe a lower bar for duct sealing. Hopefully warehouses continue to stock R-4.2
 - George Nesbitt: Only get full credit for DCS if ducts are also tested and verified.
- ◆ Mazi Shirakh: In the registries (CalCerts) have CF4R with final numbers for duct leakage tests
 - Linda Murphy: No requirement to provide numbers, just pass fail.
 - Greg Mahoney (City of Davis bldg. inspector): Might report duct leakage number on CF6R.
 - George Nesbitt: Leakage rate is based on size, so lower sized (right-sized) HVAC makes it harder to get better leakage numbers. Penalized if you right-sized, get a benefit for over-sizing – higher target.

ISSUES

- ◆ Slide 37: Bob Raymer: Above deck insulation with air barrier membrane, how does this work?
 - Helene Pierce (GAF): Air barrier membrane should be on under-decking, deal with moisture generated by interior (occupant). Air permeable vs water permeable, not the same thing.
 - Frank Nunes: Barrier could also be a water resistant barrier.
 - Marcin Pazera (Owens Corning): Sheathing can be an air barrier, joints between OSB, OSB is an air barrier, think of it as a system, that is how it needs to be addressed – as an assembly.
 - Matt Christie: The intention is not to prescribe assemblies, but propose performance requirements. There are options that do work, we need to hear what works and what doesn't.
 - Helene Pierce (GAF): Could do R6 above deck
 - Rick Canaday (Insulfoam): Illustration could also be for a wood deck exposed to the outside. Have installed polyiso above the plane.
 - Gary Talbot: Could also do exposed ceiling rafters with tongue and groove or foamboard above deck.
 - George Nesbitt: Could also do spray foam on a flat, unvented roof deck.
- ◆ Reed Hitchcock (ARMA) – this is a good opportunity for CEC and consultants to come together to come up with many ways to achieve this goal. Evaluate and put forth many options that will work. Provide different alternatives for different products.
 - Mazi Shirakh: The idea is to give options for builders.
Slide 37: Mac Sheldon: This is a highly effective insulation systems.
 - Could be a SIPS panel roof.
Slide 38 – Bob Raymer: Example of air impermeable insulation?
 - EPS, XPS, open cell foam thicker than 5.5 in, closed cell foam thicker than 2 in.
Slide 40 – Deck Insulation – Interaction with Roofing Products



- ◆ Tyler Allwood (Eagle Roofing products): We promote the idea of a cool roof, where the air runs beneath the tile and up the deck. Working with insulation companies to do testing with added insulation above the deck. Even with counter battens, still might not be enough airflow.
- ◆ Mac Sheldon: BCS published 10% number for reduced service life due to higher shingle surface temp.
 - Bruce Wilcox: We have not discussed roof reflectance – it is a direct way to lower the roof temp.
 - Mazi Shirakh: Opportunity for roof deck insulation and reflectance. Will have performance data. May be most cost-effective and least disruptive. Tile roofs above 0.30 are almost no increased cost.
 - Abhijeet Pande: We are looking into multiple options.Slide 43: Fire Rating info
- ◆ Sid Dinwiddie (Pabco roofing): Has the state fire marshal looked into how these products affect their ability to fight a fire?
 - Bob Raymer: The BSC is going to be initiating a joint State agency discussion to discuss feasibility and other unintended consequences
 - Mazi Shirakh: Similar measure was in 2013 Stds, they had some concerns, but there was nothing that jumped out.
 - CASE team to follow up with CA State Fire Marshall explicitly.Slide 46: Clarification: bullet point iii: Use vented or unvented attic rather than conditioned or unconditioned.
 - Dave Ware: What is the value of insulating the gable walls in vented attic?
 - Bruce Wilcox: When we looked at this before, there was no benefit to insulating the gable wall.
 - This is not recently confirmed with CBECC-Res modeling as all models to date have used hip-roofs.
 - Marshall Hunt: 10 cfm at 25Pa may be within the error range.
 - **The CASE team is following up on these edits to the proposed code language**

Follow Up Items

- ◆ CEC Workshop will be July 17 (confirm at CEC website: <http://energy.ca.gov/title24/2016standards/prulemaking/documents/>)
- ◆ Josh Rasin sent out presentations to all attendees
- ◆ The CASE team is following up on edits to the proposed code language
- ◆ CASE team to follow up with CA State Fire Marshall explicitly.
- ◆ CBIA and CASE team to follow up on estimate “soft costs” (training and design) associated with meeting the proposed requirements.



Residential High Performance Walls

- ◆ Matthew Christie (TRC, on behalf of the Statewide IOU C&S Team) presented
- ◆ Presentation available here: http://title24stakeholders.com/wp-content/uploads/2014/05/Residential-Envelope_High-Perf-Walls_Stakeholder-Meeting_May8_2014.pdf

Comments and Feedback:

- ◆ Dennis Richardson (AWC): Is 2013 prescriptive requirement of $U=0.065$ or less regardless of CZ?
 - Yes
- ◆ Dennis Richardson: Include furring in cost estimates?
 - Not explicitly, but a learning curve is priced in for thicker insulation
- ◆ Steve Strawn: Also cost component related to windows and flashing.
- ◆ How are you addressing air barriers? Doesn't seem to be included here
 - Matt Christie: Not explicitly being addressed here, but there may be air sealing benefits depending on assembly and materials chosen.
- ◆ Mac Sheldon: One type of polyurethane represented in the Costs table. Another type of polyurethane foam available with different costs, will provide comments on the others.
 - **CASE team to follow up directly**
- ◆ Matt Christie: The 2x6@16ocR21+4 assembly will receive a \$1000 incentive from CAHP¹ in the coming program year (total incentive for QII, DCS/HPA, high perf [condensing or tankless] water heater, 3 ACH@50)

Slide 18 – QII

- ◆ Bob Raymer: QII for spray foam?
 - Matt Christie: Not sure which types of insulation, but can get credit for QII spray foam.
 - Savings and costs presented represent QII for fiberglass batt insulation.
- ◆ Jon McHugh: Is this a conservative estimate, or best guess?
 - Matt Christie: Conservative
- ◆ Helene Pierce: Cost estimate for CBIA is not 2013\$, it was for the 2013 code. the CBIA 2013 is confusing as listed, state that it is for 2013 CASE, but is from 2010-11.
 - **CASE team to update and clarify**
- ◆ Mike Hodgson: – include a cost of testing, builder overhead in QII cost estimate?
 - **The CASE team to review the cost formula with CBIA to harmonize methodology for cost of QII**

Outstanding Questions

- ◆ Jon McHugh: Are there other construction techniques not mentioned here today (generally 2x4 or 2x6)?

¹ CAHP – California Advanced Homes Program <http://californiaadvancedhomes.com/>



- SIPS and Mass Walls.
- ◆ High density wall insulation currently available
 - Highest common practice: R-7/in for polyiso.
 - Loose fill, higher density: R-5/in.
- ◆ 2" of rigid insulation – impact on windows
 - Bob Raymer: Added costs for dies to retool. There is an issue with manufacturers, plus huge market for existing buildings.
 - Steve Strawn (Jeld–Wen): Industry has been working on installation issues. Talking about whole systems, they all have to work together. The farther you move the window out in the wall, the more likely you will have moisture issues. Rather than rebuild the window frame (at \$50k-\$100k a die), industry has been looking at ways of attaching windows to walls sheathed with foam plastic insulation. Either increase rough opening and stud out, or picture frame out around the window to provide structural attachment. Tested methods, 90% way through developing a standard practice for these walls, hope to publish this summer.
 - Frank Nunes: That was a transition when one coat systems came out in the early 70s, transitional change for window manufacturers to develop a frame to accommodate 1" exterior. Ended up becoming more cost-effective to develop new frames.
 - Steve Strawn: Primary concern is water intrusion. Tested 145mph rain, (for Florida) to make sure it all works. Farther you move a window out in the wall and away from conditioned space, more likely to develop condensation issues. 7.5 pounds per square foot tested.
 - Rick Canaday: Can also do 2" exterior insulation with 45 degree bevel at the window, 2" on the wall, but 1" at bevel. And make sure weather barrier behind the foam.
 - Frank Nunes: Need test value of the assembly.
 - Bob Raymer: Big picture issue is Jan 2017, relatively short period of time. Glad there are alternatives, but will there be enough training and motivation to be ready for builders to use 2" of rigid?
 - Steve Strawn: That is our hope, developed installation guidance in reaction to 2012 IECC. This is a best practice, rather than a standard.
 - Jon McHugh: What 2012 IECC std?
 - Requirement for R21 or R13 +8 or +10.
 - Steve Strawn: Also need to deal with water management. Best practices show to always use weather barrier, even with foil-backed taped products, contrary to some claims.
 - How many builders would use 2" and would it justify providing a new product?
 - Steve Strawn: Question is whether demand would justify developing the product, and there are structural considerations.
- ◆ Additional benefits and barriers
 - Mac Sheldon: Pay primary attention to robustness of these walls, secondary concern is energy. Need to make these walls able to be built by young men in a hurry, even if we lose some R values. Put our money in the attic and the air supply (air sealing?)



- Linda Murphy: Any studies that show how hard it is to do these building strategies would be great. Need skilled labor to achieve these strategies, and training.
 - Matt Christie: We want to engage with the trades to figure out why they can't do this yet, and how can we help them get ready to do this.
- Dennis Richardson: On the topic of keeping it simple, 2" of foam can be attached to an extended jack stud at the door or something that is fairly simple and could be put in place with plywood or extending the jack. The devil is in the details, and we're willing to work with whomever.
- ◆ George Nesbitt: Involved in passiv haus movement, going to more insulation and removing thermal bridges. Going to bigger walls is a problem. Without rainscreens, higher possibility of stuff rotting. Exterior insulation is potentially more robust. Thicker walls, with more insulation still need to be able to dry when they get wet.
- ◆ Raj Patel (Dow): Need to look at hygrothermal behavior in wall systems.
- ◆ Dave Ware: Any programs to catalog and encourage builders for these higher performing roof, ceilings and walls strategies?
 - Matt Christie: One effort by the IOU programs, C&S, and ZNE team is to do ZNE production homes in combination with a consulting team to consult builders and help them achieve ZNE on demonstration lots. Builders required to share data as part of participation in the program.
 - Randall Higa (SCE): Getting ready to publish a study that used all HPA, DCS and High performance walls measure. We have energy data, monitoring of the house, energy simulation runs, and cost data. Should be ready in a few weeks.
 - Marc Hoeschle (DEG): DEG and PG&E are doing an ET study with advanced builders (5) collecting detailed data. For some of these builders, this is their first foray into advanced homes.
 - Matt Christie: And the IOU programs are hoping to encourage this type of approach but not collect the same minutiae of detail.
- ◆ Linda Murphy: Agree with Mac, get feedback from builders on how difficult it is. Contractors don't have skilled labors.

Follow Up Items

- ◆ Josh Rasin sent out presentations to all attendees
- ◆ The CASE team to review the cost formula with CBIA to harmonize methodology for cost of QII.
- ◆ CASE team to follow up on polyurethane foam costs.