CABEC Conference 2016

Questions about the 2013 Energy Standards - RESIDENTIAL -

Building Standards Office – Software Tools

Efficiency Division0

CABEC Conference

Lake Tahoe

April 29, 2016

Necessary Resources

- CBECC User Manual (if you use CBECC)
- Energy Standards (a legal document)
- Reference Joint Appendices (climate zone, HERS required measures)
- Residential Compliance Manual (use with caution – not as much review, not legally "approved")
- Blueprint
- CBECC FAQs (whether you use CBECC or not) available under Additional Information www.energy.ca.gov/title24/2013standards/2013_computer_prog_list.html

Resources (continued):

Reference Appendices (RA3 vs RA4)

- The rules for when HERS tests are required.
- If you specify HERS pipe insulation, what does that mean?
- General information, so you're not just clicking things to make it comply.

Alternative Calculation Method (ACM) Reference Manual

- Software guidelines for standard and proposed

Another Useful Tool

www.energy.ca.gov/title24/2013standards

On the software page are links to "Approval/Expiration Dates"

Residential Buildings, 2013 Standards		
Approved versions usable for permit	**Contact Information**	**Additional Information**
CBECC-Res 2013-4b (812) was approved 1/20/2016 for demonstrating performance compliance with the residential provisions of the 2013 California Building Energy Efficiency Standards. CBECC-Res 2013-4 (744) was approved 5/13/2015 and shall continue to be valid for demonstrating compliance with the residential provisions of the 2013 California Building Energy Efficiency Standards. All CBECC-Res 2013 resolutions can be found here.	California Energy Commission Building Standards Office 1516 9th Street, MS 37 Sacramento, CA 95814 ATTN: Dee Anne Ross 916-654-6560 deeanne.ross@energy.ca.gov	CBECC-Res Website Approval/Expiration Dates FAQs Reported Software Issues Support: cbecc.res@gmail.com

programs

Specific Expiration Dates (excerpt)

Program Name	Version	Approval	Expiration*
CBECC-Res			
	3c	02/24/2015	08/01/2015
	4	05/13/2015	
	4b	01/20/2016	
EnergyPro			
	6.5	03/04/2015	08/01/2015
	6.6	05/26/2015	
	6.7		
Right Energy Title 24	1.0	06/18/2014	10/13/2014
	1.1	09/05/2014	08/01/2015

*New permit applications made on or after the listed date must be made using approved software.

Software tips / CF1R issues

- Some things can be fixed within a day
  - Missing information
  - Picking up incorrect information
  - Error 202 / is usually on your end – Wi-Fi problems
- Other things require a software update
  - HERS triggered or not triggered
  - Language of HERS message
  - Special Feature notes

Software Tips (continued)

- Could be a HUGE # of files on your computer
- Likely in a folder with the input file name
  - In Projects folder for CBECC
  - In Results folder for EnergyPro (only if you have manually unchecked delete temporary files)
- Keep RIBD or BLD file / XML file
- Finding errors - I'll tell you how to find errors for yourself in either program at the end

Mini-Split, Multi-Split, VRF

2013 ACM:

Until there is an approved compliance option for ductless heat pumps (mini-split, multi-split VRF systems) they are simulated as a split system equivalent to the standard design with default duct conditions.

- Ductless Mini-Split / no credit / done
- Multi-Split and VRF / no credit / future
- Model minimum efficiency
- If a future release locks down the efficiency, this will make it less painful

Is treatment of mini-splits punitive or generous?

- Findings are that the system will not deliver comfort throughout house unless carefully designed – decision was to not give credit for ductless if not adequately delivering conditioned air.
- Field inspection protocols are designed to provide a guarantee that consumers get the expected performance, but there are no protocols for airflow, fan watt draw.
- The SEER test conditions that give 18 or 21 are the same for mini-split as split. Should they be?

Duplex/Townhome = Single Family – CF1R per Dwelling Unit

- Definitions from 100.1:
- **LOW-RISE RESIDENTIAL BUILDING** is a building . . Occupancy Group:
  - R-3, single family; or
- **TOWNHOUSE** is a single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides.

Duplex, Townhome vs Multi-family – How/Why are they different

- Duct Leakage (Section 150.0(m)11 [Ref Appendices Table RA3.1-2] – different
  - Single family and townhomes = 6%
  - Multi-family = 12% Total Duct Leakage
- Ventilation rates (Section 150.0(o))
- Duct location default (ACM Table 2-12)
  - Single family and townhomes = 1 attic, 2 crawl, 3 cond space
  - Multi-family = conditioned space
- Building air leakage testing not allowed for multi-family (ACM 2.2.5.1)

Additions / Are they more difficult?

- This is a new, more stringent code
- No credit for deleted surfaces
- No credit* for improvements until you exceed (see Table 150.2-B):
  - ❖ R-13 walls
  - ❖ R-30 ceiling
  - ❖ 0.40/0.35 windows

*Unless using verified existing conditions

Addition Alone

- Were almost always more difficult
- Standards for new construction apply
- What are the biggest hurdles for addition alone?

500 ft² addition in zone 13 standard design (budget) comparison

Existing + Addition

- R13 Walls
- 25% fenestration

Addition Alone

- R15+R4 Walls
- 20% fenestration

- ❑ If you're asked "can you make it work for the addition alone", they need to understand that it is much more difficult than E+A+A.
- ❑ Don't forget prescriptive (it is very user friendly for a small addition) / fillable forms at www.energy.ca.gov/Title24.

A better fit for your small addition is likely Prescriptive Compliance

- If CZ 10-15 and $\leq$ 300 ft^2 no cool roof
- If Pkg A has radiant barrier, it is always req'd
- R-13 walls ($\leq$ 700 ft^2)
- Fenestration
  - 30% (or 75 ft^2) maximum for $\leq$ 400 ft^2
  - 25% (> 400 to $\leq$ 700 ft2)
  - If in a zone with a 5% limit, can have up to 60 ft^2 west-facing

Alterations

- Almost no reason to model an alteration alone
- No longer get credit for improving the building unless you:
  1. Verify existing conditions or
  2. Exceed*
     A. Mandatory requirements, or
     B. Current prescriptive

*Which one? See next page.

Table 150.2-B

Altered Component	Standard design w/o 3rd Party Verification is based on*
Ceiling, Wall, Floor	Mandatory
Fenestration	0.40 U-factor/0.35 SHGC
HVAC	Package A
Duct Sealing	Alteration requirements
Duct R-value	Proposed / no credit
Water Heating Systems	Package A
Roofing	Alteration requirements

*With verification, credit from existing to proposed reverts to as it was pre-2013.

FAQ Timely Topics

- MF1R
- Plan azimuth vs. orientation
- Saving space on your CF1R if you didn't model overhangs
- Error Code 202
- Finding CSE errors

Metal roof/floor workaround - Joint Appendix

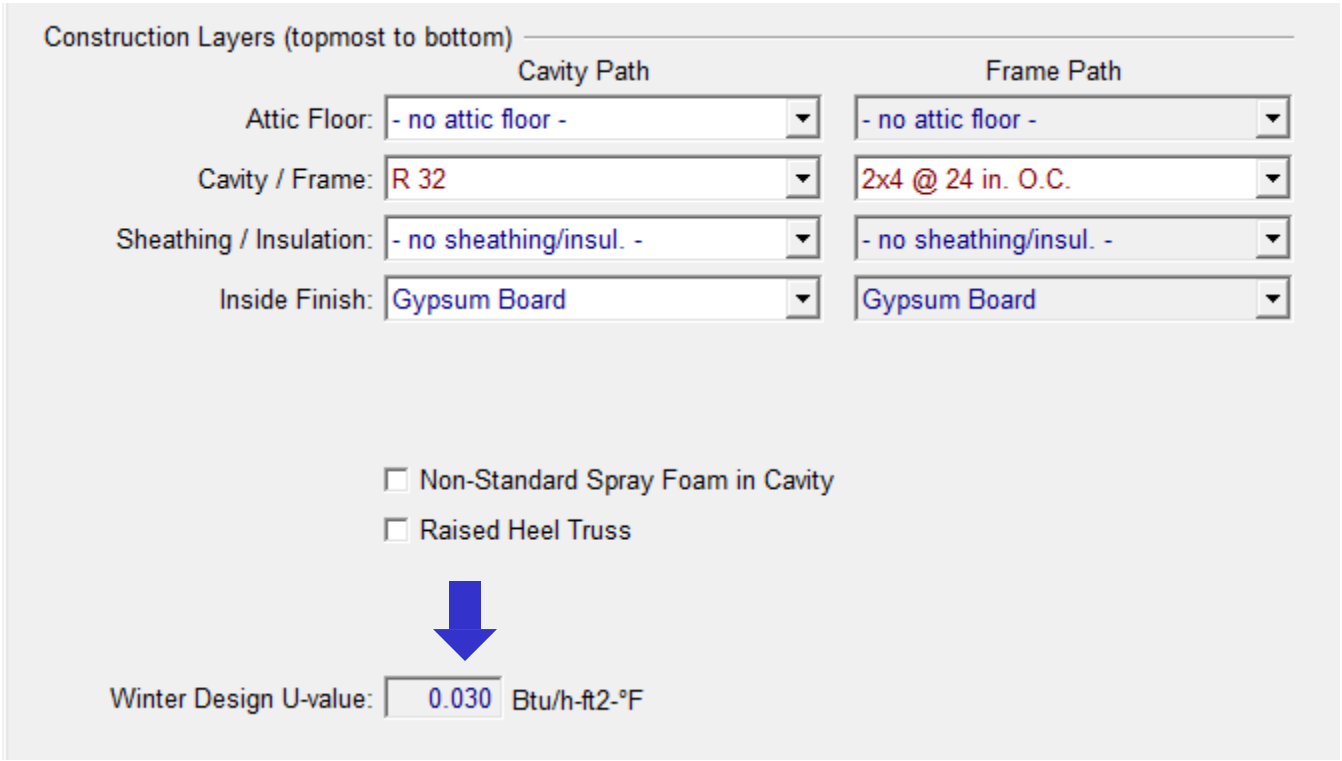
- Metal roof and metal floor (alternative to not building a building). Find the U-factor.

Table 4.2.4 – U-factors of Metal Framed Attic Roofs

R-25	**19**	0.047	0.043	0.040	0.037	0.035	0.034	0.032	0.028
R-30	**20**	0.039	0.036	0.034	0.032	0.031	0.030	0.028	0.025
R-38	**21**	0.030	0.028	0.027	0.025	0.025	0.024	0.023	0.021
R-44	**22**	0.026	0.025	0.024	0.022	0.022	0.022	0.021	0.019

- Model a wood frame assembly with equal or higher U-factor.

For example, R-38 is 0.030, so . . .



Don’t forget about mandatory max. U-factors in 150.0

Workaround for an E+A+A not attached to the house

Assuming it is an addition

- Add some wall connecting the two
- Surfaces between two conditioned spaces do not appear on the CF1R (so no one will know what you did to get it to run)

What is a party surface?

- Separates two conditioned spaces
- Other space not part of the current model
- For example:

1. Addition Alone
2. Multi-family between dwellings

My Tips

- Pay close attention to your CF1R.
- Know if something makes a difference or not (refrigerant charge, EER verification) before including it.
- Are all of your garage walls facing left?
- Are your angled walls facing the right orientation?
- What are your standard design values.
- Where is the building out of compliance.

Finding Errors

- If your input file is Ductless
- Look for files named:
  - Ductless – Prop.err
  - Ductless – Std.err

In what folder

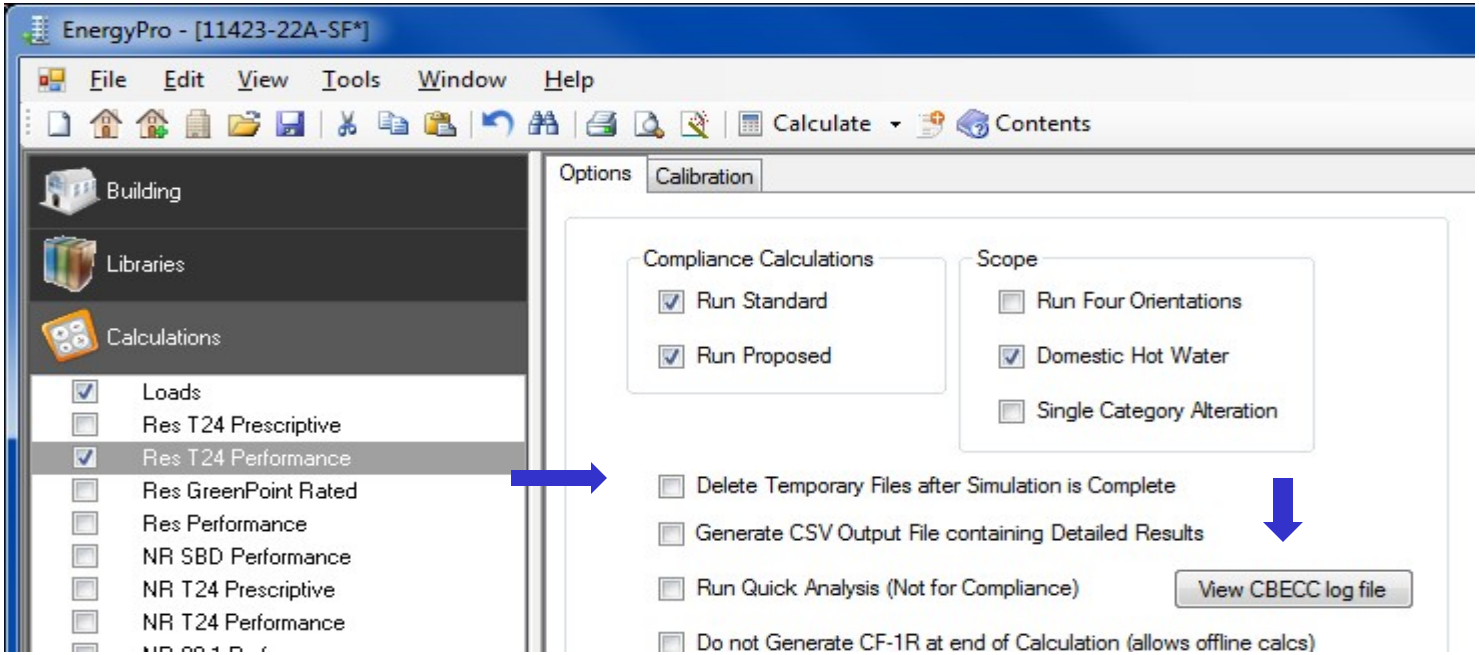
- Ductless – Comp13 [**in Projects**]
- Ductless ResT24Perf [**in Results**]

CBECC

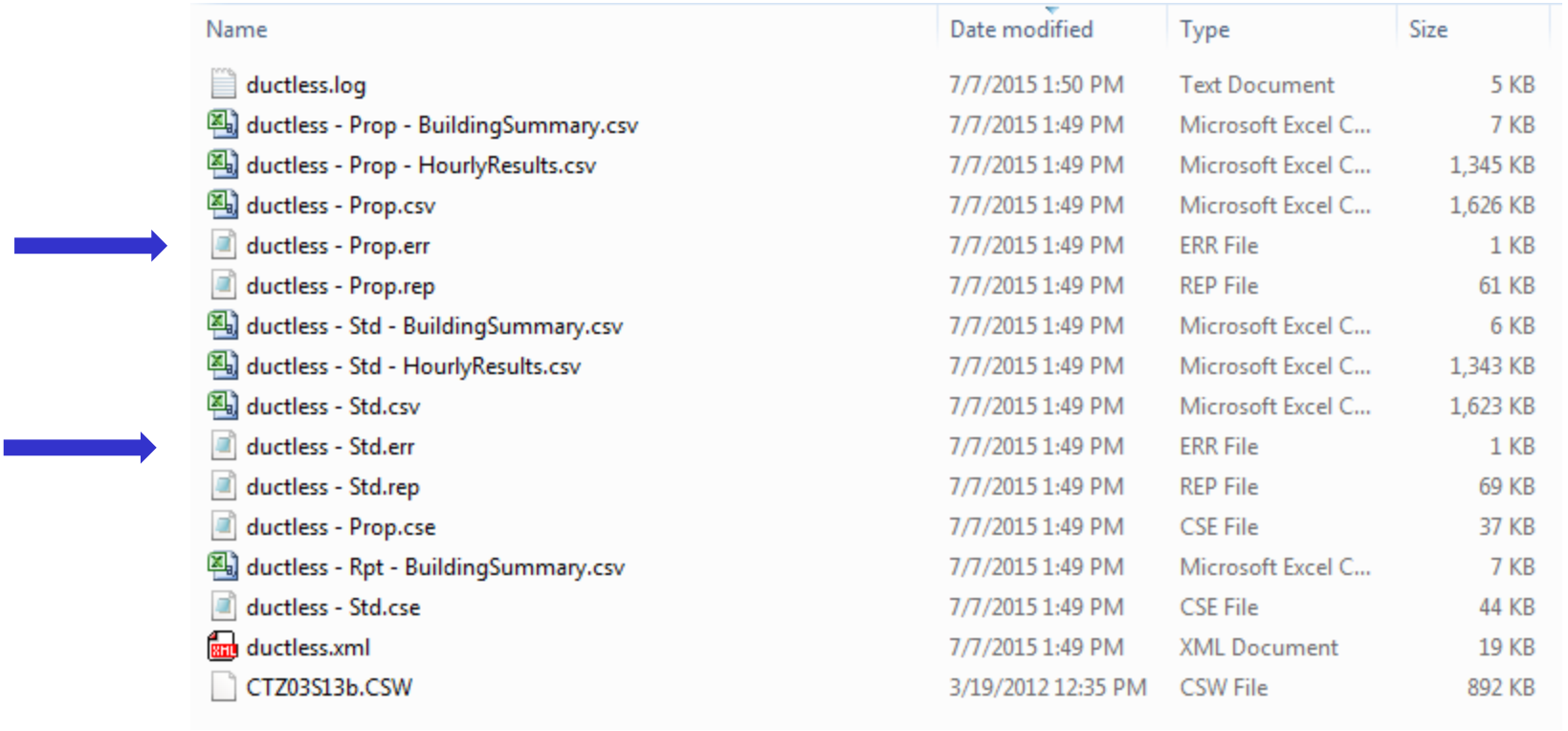
EnergyPro

EnergyPro

- First, uncheck delete temporary files
- Also note “view CBECC log file”



Directory with error files



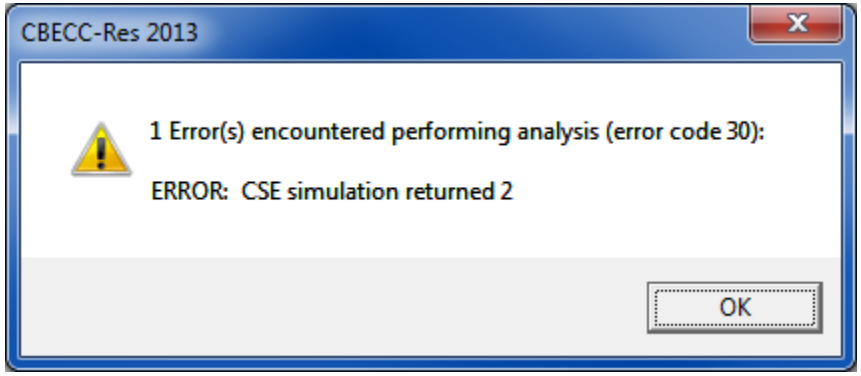
Name	Date modified	Type	Size
ductless.log	7/7/2015 1:50 PM	Text Document	5 KB
ductless - Prop - BuildingSummary.csv	7/7/2015 1:49 PM	Microsoft Excel C...	7 KB
ductless - Prop - HourlyResults.csv	7/7/2015 1:49 PM	Microsoft Excel C...	1,345 KB
ductless - Prop.csv	7/7/2015 1:49 PM	Microsoft Excel C...	1,626 KB
ductless - Prop.err	7/7/2015 1:49 PM	ERR File	1 KB
ductless - Prop.rep	7/7/2015 1:49 PM	REP File	61 KB
ductless - Std - BuildingSummary.csv	7/7/2015 1:49 PM	Microsoft Excel C...	6 KB
ductless - Std - HourlyResults.csv	7/7/2015 1:49 PM	Microsoft Excel C...	1,343 KB
ductless - Std.csv	7/7/2015 1:49 PM	Microsoft Excel C...	1,623 KB
ductless - Std.err	7/7/2015 1:49 PM	ERR File	1 KB
ductless - Std.rep	7/7/2015 1:49 PM	REP File	69 KB
ductless - Prop.cse	7/7/2015 1:49 PM	CSE File	37 KB
ductless - Rpt - BuildingSummary.csv	7/7/2015 1:49 PM	Microsoft Excel C...	7 KB
ductless - Std.cse	7/7/2015 1:49 PM	CSE File	44 KB
ductless.xml	7/7/2015 1:49 PM	XML Document	19 KB
CTZ03S13b.CSW	3/19/2012 12:35 PM	CSW File	892 KB

Contents of a CBECC log file

2016-Mar-25 11:37:06 - **Warning:** . . .

2016-Mar-25 11:37:06 - **Error:** Distribution system 'Wall Heat1-dist' - system type *DuctsAttic is not valid when* attic area above conditioned rooms < 10% of total conditioned area evaluating rule: Rule 372, 60, 'Rules_ModelChecks.rule' Line 894: Check for valid distribution system type'

Contents of an ERR file



CONSTRUCTION "cc-R13 R4 Stucco Wall "
^

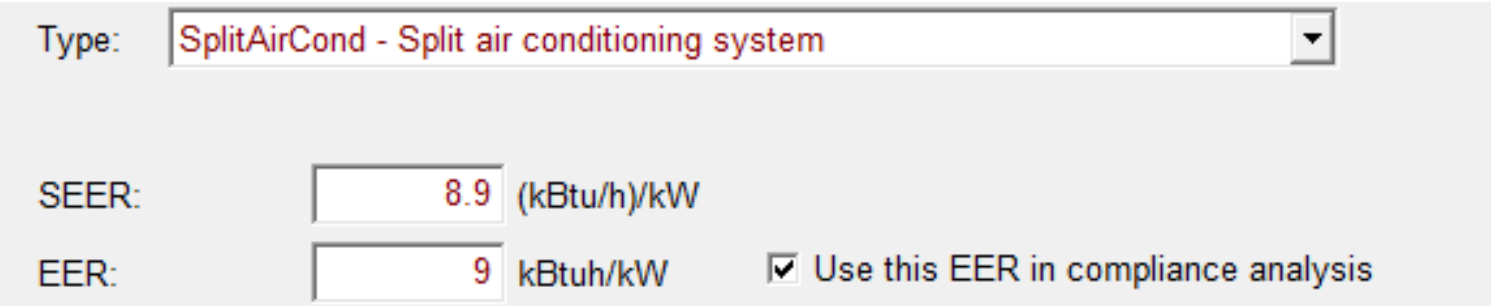
C:\CBECC-RES 2013 PROJECTS 4\ File name - COMP\ - PROP.CSE(628): **Error:**

S0228: ***duplicate construction name*** 'cc-R13 R4 Stucco Wall'

Look for word Error.

Another ERR file

- - - - - - - - - -
C:\CBECC-RES 2013 PROJECTS 4\File name - COMP\ File name - PROP.CSE(1913): Error:
RSYS 'rsys-Ex System': rsSEER (8.9) must be > rsEER (9)
- - - - - - - - - -
C:\CBECC-RES 2013 PROJECTS 4\File name - COMP\File name - PROP.CSE(1964): Info:
S0214: No run due to error(s) above



Time for Questions