

California Compliance Software Symposium 2

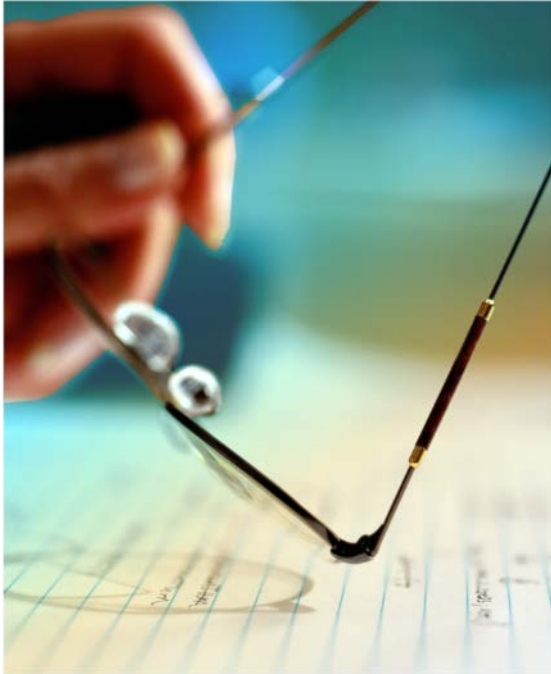
Update on Software Efforts: Multifamily Modeling Analysis

Thursday, July 12, 2018

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Project Overview



- For Southern California Edison
- Timeframe: April to August 2018
- Purpose
 - Highlight differences between CBECC-Res and CBECC-Com in modeling multifamily and mixed use spaces
 - Recommend improvements to ACM and modeling software
 - Inform efforts to redefine multifamily prototypes used for analyzing proposed updates to and compliance with the California Building Energy Efficiency Standards

Developing Prototypes

Types

- 3-story low-rise – Residential character and compliance
- 4-story mid-rise – Residential character, nonresidential compliance
- 8-story high-rise – Nonresidential character and compliance

Geometry

- Same across all prototypes
- Adapted building geometry from high-rise multifamily prototype developed by NORESKO
- Also aligned with multifamily prototypes used by ASHRAE and IECC



What do you think?



Prototype List

	Prototype Description	CBECC-Res	CBECC-Com	Building geometry	Building Characteristics
A1	3 story with common hallway	X		3*8 units; common space	Low-rise
A2	3 story with common hallway		X	3*8 units; common space	Low-rise
B	4 story bldg., 1 st floor commercial and 3 residential floors		X	3*8 units; first floor Nonresidential	High-rise
C1	4 story bldg., (3) residential floors only	X		3*8 units; Crawlspace first floor;	Low-rise
C2	4 story bldg., (3) residential floors only		X	3*8 units; Unconditioned first floor	Low-rise
D	8 story, NR ACM ruleset		X	7*8 units; Nonresidential first floor, parking below grade	High-rise
E	8 story, Res ACM ruleset		X	7*8 units; Nonresidential first floor, parking below grade	Low-rise ^[1]

- A1 and A2 compare how the software treats identical low-rise style buildings
- A1 and B compare similar building types built to prescriptive code requirements (3-story vs 4-story). Both are typical building types.
- A1 to C1 and A2 to C2 show the effect in each software of adding the equivalent of podium parking.
- D and E compare use of nonresidential prescriptive equipment vs. residential prescriptive equipment

Modeling Approach



- Using 2016 code requirements and software
- Match zero percent compliance, meeting low-rise and high-rise prescriptive requirements before adjusting equipment and characteristics to match identified prototypes
 - Eliminate unintended variables
 - Enable compliance comparison in addition to prototype end-use comparisons

Modeling Challenges

CBECC-Res Limitations

- Podium or underground parking
 - Modeled over 9' crawlspace
- Common areas (hallways)
 - Modeled as 0-bedroom dwelling unit without appliances.

CBECC-Com Limitations

- Vented attic
 - Modeled as cathedral
- Radiant barrier
 - Forego
- HERS measures
 - Match HERS-verified specs, as possible
- Fewer than 4 stories
 - Input 4 in number of stories field, model only 3
- Outside calculation needed for roof pitch

Next Steps and Intended Outcomes

Phase I: Analyze CZs 2, 4, 6, 8 & 13

Review outputs and adjust models

- Correct any errors
- Reduce unnecessary variables
- Create opportunities for comparison

Phase II: Analyze all CZs

Compare outputs and identify:

- Differences in treatment of similar prototypes between CBECC-Res and CBECC-Com
- Compare compliance margins (code inequities) between various prototypes

Recommend Improvements for Multifamily Compliance

- Adjustments to ACM
- Code and Standards improvements

What do you think?



- Any questions?
- Comments?

Let's move on to a discussion of...

Updates on Software Efforts: **Building EUI Targets**

Ryan McFadyen

Thank you.

- **Elizabeth McCollum**
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