

The Need for a Multifamily Building Energy Efficiency Code, and How We Can Get There

September 28, 2016

EEBA Conference

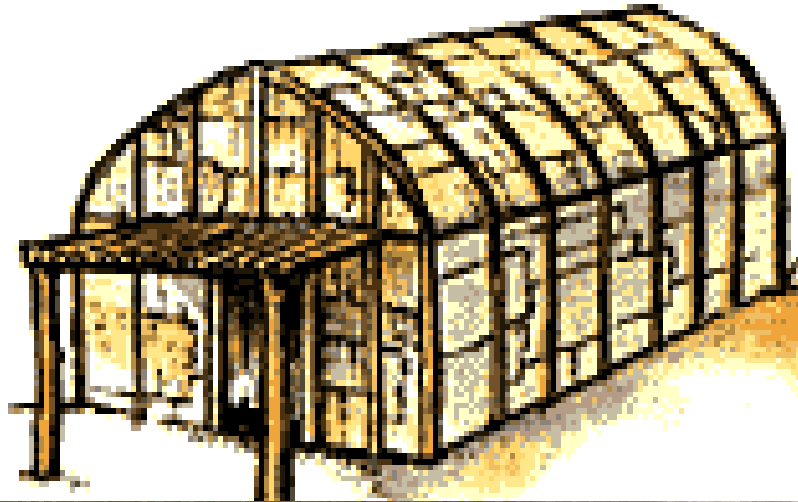
Nehemiah Stone

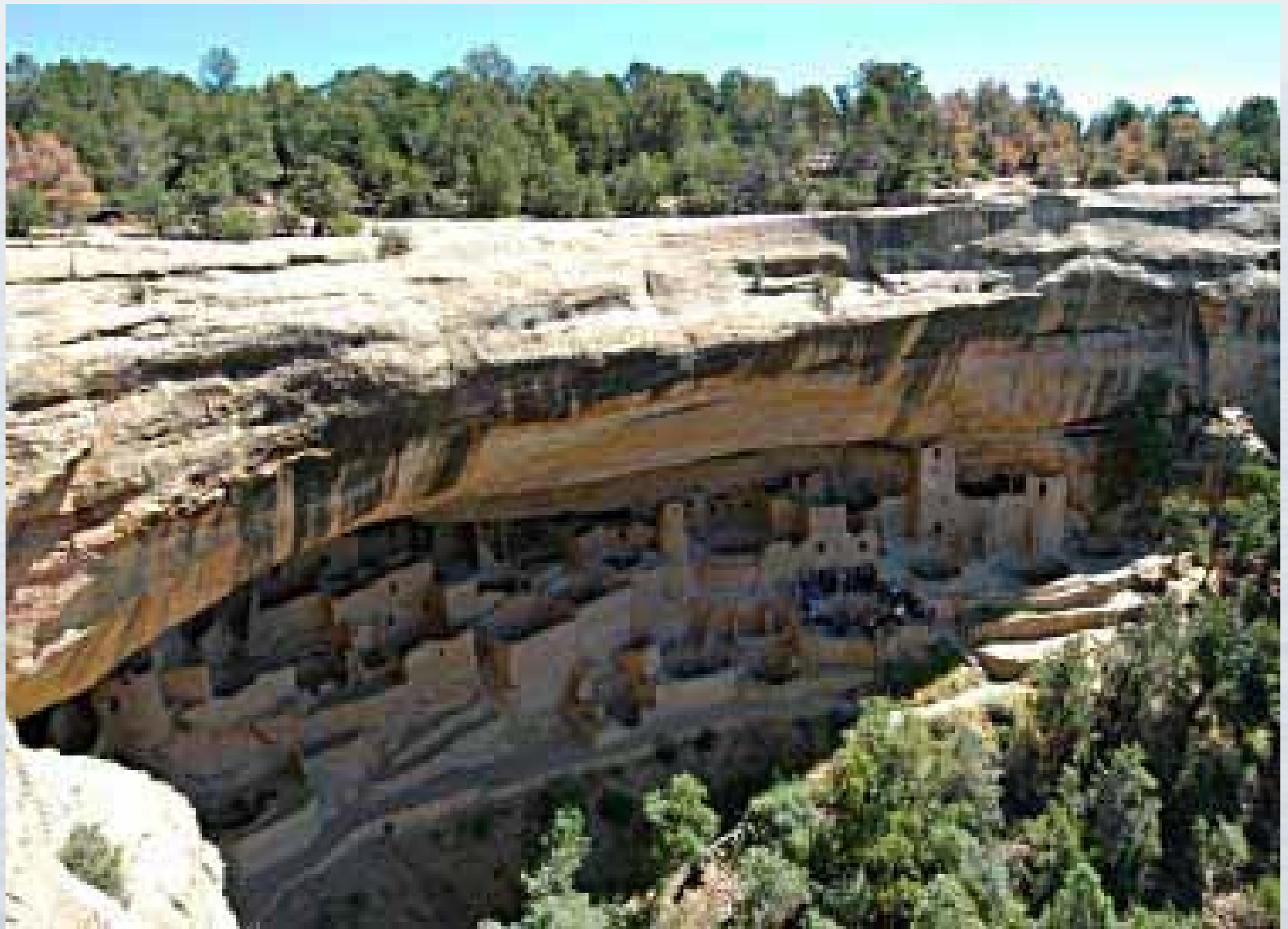
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Big Questions

- Why do we need an energy code specifically for multifamily buildings?
- How do we get there?
- Are there any benefits that might make it a good deal?

Indigenous Western MF Housing





What Do MF Buildings Look Like Today?



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Need and Purpose

- For the past six years, MF construction outpaced single-family construction.
- 54% of residential new construction was MF in 2015. 57% in 2014.
- There are many unsupported assumptions that SF data adequately describes MF Bldgs.
- Need a much deeper, more focused examination of MF buildings and measures.

Are they “Homes”?

- In the US, 30.2 Million households (29% of all households) live in MF buildings (4.1M or 33% of California households)

<i>Millions of Households</i>			
	Single Family	Multi-family	Total
U.S.	77+	30+	108
CA	8.1	4.1	12.2

- ~30% of new residential construction is MF

So then, Why Not Lump them with “Residential”?

- On average in the U.S.,
 - Single-family households pay ~22% of their monthly income for housing burden (rent or mortgage, plus utilities)
 - Multifamily households pay well over 30% of their monthly income on their housing burden

Why Not Lump them with “Residential”?

- Approximately 86% of single-family homes are owner occupied
- Approximately 88% of multifamily homes are tenant occupied
- Average annual income in SF is \$61,000/yr
- Average annual income in MF is \$31,000/yr

Why Not Lump them with “Residential”?

- Building owners, not tenants, make the decisions that affect efficiency of the envelope or equipment – other than tenant-supplied appliances
- MF households are much more affected by their neighbors actions and choices than SF households
- Central systems, multiple stories, shared walls

Are they “Commercial Buildings”?

- Together, just seven MF companies own >1,000,000 dwelling units
- Bought and sold more like NR buildings than single-family homes [of top 50 owners, 31 increased portfolios and 17 reduced portfolios in 2014]
- Majority are managed by professional management companies [with an average of ~50,000 units per company]
- Many have commercial HVAC equipment and/or central hot water (CDHW)

So then, Why Not Lump them with “Nonresidential”?

- Completely different occupancy schedules
- Different needs for achieving healthy air quality
- People live there!

Current Code Landscape

- A 3-Story building and a 4-Story building of otherwise exactly the same design on the same property, have different code requirements

Applicable Code In California

Measure	3 Stories	4 Stories
Window Area	WFR	WWR
Envelope	Low-rise	Nonres/HR Res
Heating & Cooling	Low-rise	Nonres/HR Res
Ventilation	ASHRAE 62.2	ASHRAE 62.1
Lighting	Low-rise	Low-rise
Water Heating	Low-rise	Low-rise
Modeling	CBECC-Res	CBECC-NR

Modeling Differences Matter

- Can someone explain how these per-square-foot EUIs could BOTH be right???

End Use	Standard Design		Proposed Design	
	HR	LR	HR	LR
Space Heating	21.61	21.55	19.25	18.38
Space Cooling	51.35	30.15	37.24	28.80
Fans	62.93	8.24	70.68	9.14
DHW	33.93	31.88	30.90	29.34
Pumps	0.00	0.00	2.59	0.00
Totals	169.82	91.82	160.61	85.66
% Better than Standard			5.4%	6.7%

TDV Energy Use shown as kBtu/ft²yr of Conditioned Floor Area

Are We Giving Designers Useful Information?



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The Solution

- A multifamily energy code with requirements that vary not by a 3 - 4-story split, but by what actually affects performance
 - Structural constraints (e.g., wind & seismic loads)
 - Building tightness and ventilation measures appropriate to residential IAQ needs
 - Lighting measures aligned with actual multifamily LPDs and schedules
 - And...

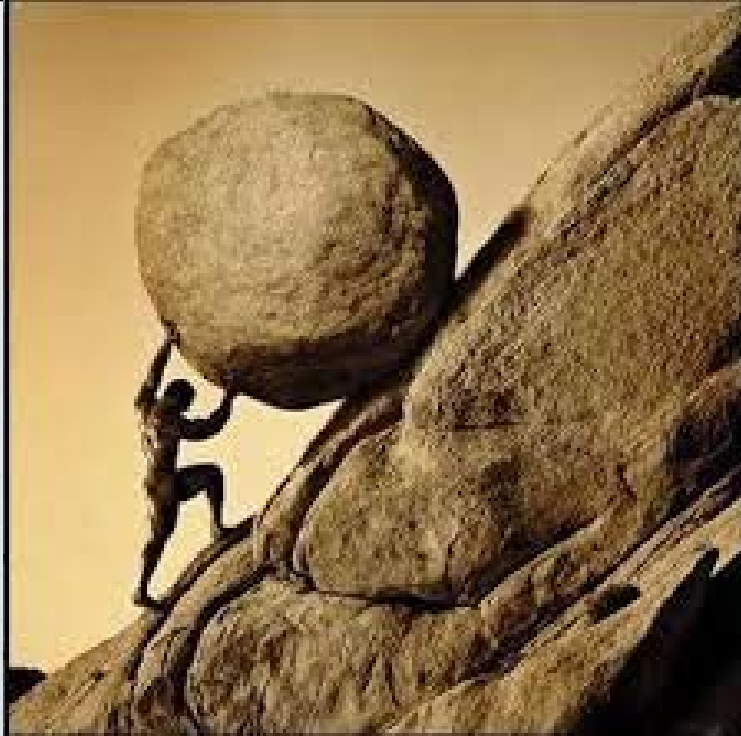
The Solution (continued)

- A building performance analysis tool designed for multifamily buildings:
 - Includes the kinds of HVAC equipment used in MF
 - “Maps” equipment consistently regardless of number of stories
 - Consistent leakage and ventilation requirements
 - Consistent metrics where appropriate (e.g., W_{WW} or WFR) regardless of number of stories
 - Appropriate and accurate CDHW algorithms

The Path

- Work to have ICC adopt a MF IECC section, and to have the California Energy Commission adopt a MF Compliance Manual. The former in 2016, the latter in 2019.
- Develop a building performance tool for the MF code.
- Update as needed.

How it Feels at Different Times

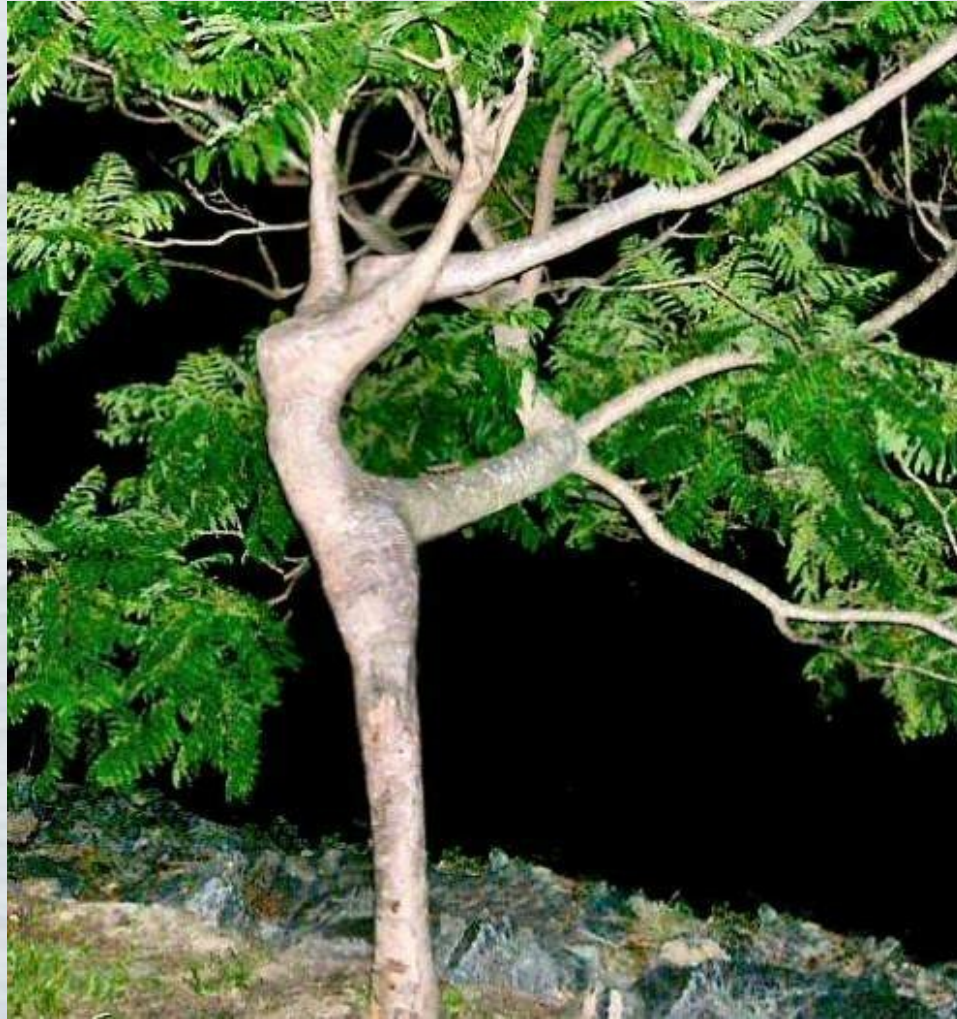


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Team/Supporters, So Far

- New Buildings Institute
- Energy Foundation
- Build It Green, Association for Energy Affordability, Redwood Energy
- PG&E and SCE
- California Energy Commission (in principle, though not yet *committed*)

So, If We Do This Right...



*...even
Nature
will
rejoice!*

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Contact Info

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Thanks!

