Getting To Zero National Forum 2016

No More Easy Refills: The Move from Prescriptions to Performance Codes

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History: Origin of Title 24 and Standard 90.1

- 1973: The Oil Crisis
- 1974: Gov. Ronald Reagan signs the Warren-Alquist Act into law
  - Establishes an Energy Commission to be an independent agency for load forecasting
  - Establishes cost-effectiveness requirements for efficiency standards
- 1975: ASHRAE Standard 90
- 1978: First California building energy efficiency code

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The Problem

- Energy standards' intent – ensure use of energy efficient building components
  - Insulation levels
  - HVAC systems
  - Lighting systems
- Based on positive economics over the life cycle
  - Why?
- Only addresses building components
  - Excludes geometry
  - Excludes occupant behavior
  - Excludes process loads
  - Excludes operation and maintenance
- Performance approach – gives designers greater flexibility
  - Goal was performance equivalent to prescriptive approach

3

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The Problem

- Prescriptive requirements have reached their limit
- Prescriptive requirements cannot <u>effectively</u> achieve net zero energy buildings
- Renewable energy required to further reduce energy
  - Outside scope of traditional codes
- Performance approach only addresses a subset of building features

4

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Options?

- Continue on current path
  - More and more effort for smaller and smaller gains
- Require performance approach
- Revise the prescriptive approach
- Come up with something completely different

5

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Get Rid of Prescriptive Approach

PROS

- Allows setting energy targets as desired
- Allows design team to innovate and optimize
- Simplifies the code

CONS

- Problematic for additions and, especially, alterations
- Overkill for small or simple buildings

6

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Performance Approach Problems

- Must develop baseline for comparison
- For any feature of the baseline that is set "equal to proposed," no credit available for improved design.
  - Geometry and (in Title 24) orientation
  - Window to Wall Ratio (up to 40%)
  - Occupancy
  - Plug loads and process loads
  - Schedules
- But, how to set baselines?

7

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Performance Approach Problems

- Performance approach - comparison to a baseline
- "Baseline" really means "Target"
- How can we set targets that allow buildings to get credit for "equal to proposed" characteristics?
- Set an EUI based on the building type and location
- But, now we have fairness issues
  - Two businesses may have inherently different internal loads
  - Different occupant density standards

8

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Revise the Prescriptive Approach

- Traditional prescriptive requirements apply to all buildings
- Identify measures that are cost effective, but not necessarily appropriate for all buildings
  - PV systems – X kW per Y square foot of roof
- Provide alternates that can be used instead
  - Increased HVAC efficiency (avoids Federal preemption)
  - Decreased lighting power
  - Et cetera

9

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Revise the Prescriptive Approach

- Difficult to balance tradeoff options
  - Will energy savings of increased HVAC efficiency approximate energy from PV system?
  - Does it matter?
- Not effective for achieving specific energy goals, such as net zero
  - Prescriptive renewable requirements will overshoot or undershoot net zero, usually by a large margin
- Still problematic for alterations
  - Scope may not include HVAC or lighting, so options become infeasible

10

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RECOMMENDATIONS - PRESCRIPTIVE APPROACH

- **Some sort of prescriptive compliance option is needed**
- **Limit when it can be used**
  - Alterations – defined scope
  - Defined small projects
- **Set aggressive requirements**
- **Options for tradeoffs**
  - May not be necessary based on the limited alterations scope above
  - Small projects – easier, but not easy

12

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Recommendations - Performance Approach

- **Require use of performance approach**
  - All new buildings (except for defined small buildings)
  - All additions
  - All alterations beyond a certain scope
- **Simplify modeling, such as automatic baseline generation**
  - Makes application to smaller buildings more reasonable
- **Set aggressive energy targets**
  - Will drive use of renewables
- **Decrease energy targets to zero over time**

13

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Recommendations - Performance Approach

- **Identify and minimize "equal to proposed"**
- **Fixed baseline** – may need to be set arbitrarily
  - Window to wall ratio
  - Geometry
- **Set energy targets based on building type**
  - "Baseline" implies a reasonable design – "Target" is just a yardstick
  - Drives energy model to meet that target, but not necessarily the building

14

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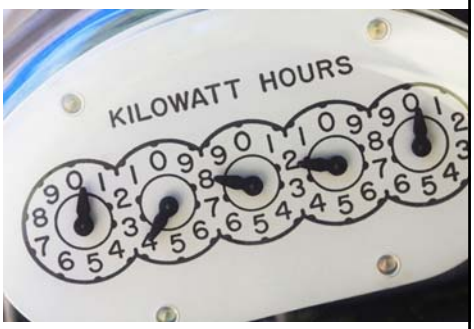
Recommendations - Net Zero

- **A net zero requirement simplifies many of the problems**
- **Focus on actual energy use**
- **How?**



15

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QUESTIONS?

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