

Technical Position Paper #10  
Recommendations for Improving  
Building Energy Modeling in California



**ROGER BAKER**  
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# Overview

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- Summarizes the modeling charrette held at PEC in May
  - Overview and background
  - Current modeling landscape
  - Improving the California modeling ecosystem
- Identifies issues, concerns, and recommendations raised during the charrette
- LADWP presented case study of grid-level building modeling
  - Conducted in partnership with SCG
  - Modeling performed by NREL

# Improvements for the CA Building Energy Modeling Ecosystem

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## Seamless Integration

Seamless integration of models, prototypes, rulesets, and processes must be successful.

## Create Single Library of Prototypes

Publicly available and transparent  
Clear designation of “ownership”  
Clear designation of update protocols & responsibilities

## Develop Interoperable Rulesets

Aligning common elements across rulesets can reduce use-case specific rules by 80%

## Minimize Redundancies

Eliminate duplicate expenditures and efforts

## Develop Roadmap

Short, mid, and long-term goals  
Clear designation of responsibilities to execute strategies

# Desired Future State

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## Coordinate w/ National Entities

Coordination at the national level will ensure a stable future state for modeling & cement California leadership in national modeling arena. (Example: ICC)

## Standardize Outputs

Standardizing output will lead to easier navigation & will promote model and output sharing across use cases.

## Include Uncertainties

Providing uncertainties as part of the output will increase understanding of the model precision and supports transparency.

## Expand Tools for Any Use Case

Establishing criteria and allowing any qualified tool to be used will promote software evolution in the private sector.

# Future Opportunities

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## ZNE / Decarbonization

ZNE and Decarbonation are underlying policy objectives in CA

Ensuring that modeling can incorporate ZNE and decarbonization will ensure BEM aligns with current policy objectives.

## Non-Energy Benefits

Non-energy data outputs from building modeling can support NEB estimates.

Examples include power-based carbon reduction, health benefits (through air change and temperature profile management), etc.

## Persistent Models

Maintaining a building model throughout the its lifetime could save resources and support long-term policy initiatives.

Examples include:

- Title 24 new building model
- Building continuous commissioning & calibration
- Future energy efficiency/renewable energy retrofit on building
- Title 24 building remodel

# Roadmap

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## Mid Term

- ✓ Establish a single reference library of building prototypes
- ✓ Identify path forward toward regulatory convergence
- ✓ Develop interoperable rulesets that can apply to multiple use cases
- ✓ Use modeling to replace current “single point” measure savings with savings ranges

## Long Term

- ✓ Explore dynamic model development
  - LADWP grid-based modeling*
  - Behavioral effects*
  - Machine learning to improve models over time*

## Short Term

- ✓ Develop framework for common prototypes and rulesets
- ✓ Identify a path to reduce redundant modeling efforts

# CalBEM Feedback

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- TPP 10 was presented to one of the working groups at CalBEM on November 14.
  - In addition to national entities, coordination with regional entities should be used.
  - Language regarding open-source software in the TPP should be modified, as practitioners note that proprietary software often is more flexible for designers than existing open-source applications.
  - The practitioners in the audience felt that some low-ranking issues in the “Desired Future State” category should receive greater priority.
    - ✦ Have industry-accepted level of detail definitions
    - ✦ Tools are interoperable

# CalBEM Feedback

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- The structure of CalBEM 2019 was different from prior symposia
  - Three working groups were established
  - Problems and opportunities were discussed within each group
  - Action items were agreed upon, with commitments from participants to move issues forward
- Some items identified in TPP 10 were independently raised at CalBEM, with action items and participants identified to move those items forward.
  - Ruleset alignment
  - Prototype development
  - Engagement with national entities
- CalTF Staff to meet with SCE in Q1 2020 to align work efforts and ensure success in tackling issues raised both at CalBEM and in Charrette



# Next Steps

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Provide your  
feedback.



Form Cal TF  
Subcommittee in  
Q1 2020.

- Refine recommendations
- Develop Prototype Framework and high-level Ruleset Framework
- Coordinate with SCE

# Questions?