



## Cal TF Modeling Charrette Exercise #2 Results

### Overview

The objective of Exercise #2 was to develop an inventory of issues and concerns and possible solutions that will aid in the forward progress of modeling in California.

Each facilitator manned one of three “stations” positioned in the auditorium. Each station was assigned one of three “topics”:

- Goals/Metrics – How will success be measured as it pertains to aligning modeling needs in California?
- Desired Future State for CA Modeling Ecosystem – How should the ecosystem look in 5,10,20 years? What issues would prevent California from achieving this future state?
- What are the future uses of, opportunities for, and emerging needs associated with modeling in California? What issues and challenges arise from these new uses, and how can they be addressed?

The attendees of the charrette were free to visit any or all of the stations to provide their input related to each station’s topic. The facilitators documented issues and asked clarifying questions to ensure an understanding of the issue, and categorized concerns to minimize redundancy.

After collecting all issues, each facilitator presented the list of issues to the participants, and then the auditorium audience collectively prioritized the issues based on a show of hands. Each participant was asked to limit votes to no more than five items per topic list. Items with higher total votes were perceived by the audience to be more deserving of resource focus.

### Goals/Metrics

Votes	Issue
23	Data format and Data Aligned (where possible) and Multiple Tools Approved for Multiple Use Cases; Ratepayer-funded building prototypes are retained centrally and reviewed/used over time. <ul style="list-style-type: none"><li>• Alignment and standardization completed pursuant to a Roadmap</li><li>• Who Does What?<ul style="list-style-type: none"><li>○ Commissions</li><li>○ CalTF</li><li>○ Industry</li></ul></li></ul>
23	Reference Library of Prototypes <ul style="list-style-type: none"><li>• With documented inputs</li></ul>



Votes	Issue
19	Eliminate Duplicate Effort
7	Tools that can Do: <ul style="list-style-type: none"> <li>• Different Rulesets</li> <li>• Different Use Cases</li> </ul>
4	Soft Convergence between Tools [Outputs close, do not need to be identical]
4	Only One (1) Model per Building [in CA]
2	Modeling [is done] Only When Necessary
1	Reference Library of Prototypes <ul style="list-style-type: none"> <li>• Public Database</li> </ul>
1	Automated Updates [to models] as Parameters Change
1	Useable by non-engineers
1	Modeling Activity is Cost-Effective

### Desired Future State

Votes	Issue
20	Open Source & With Good Documentation <ul style="list-style-type: none"> <li>• Publicly Funded</li> </ul>
16	Coordination w/National [Entities] <ul style="list-style-type: none"> <li>• IECC/ASHRAE</li> </ul>
14	Standardized Model Outputs/Reports/Metrics <ul style="list-style-type: none"> <li>• Ideally # per-area/unit</li> </ul>
12	Estimates Have Uncertainty Attached
10	Any Software Can Be Used For Any Analysis Type <ul style="list-style-type: none"> <li>• Must Pass Some Test for Approval</li> </ul>
6	More Robust Operational/Schedule-Driven Datasets
5	Have Industry-Accepted Level of Detail Definitions
4	Tools are Interoperable
3	Stable Baseline (like [ASHRAE] 90.1 App.G Addendum BM) <ul style="list-style-type: none"> <li>• Mainly for new construction</li> </ul>
3	Make Sure Models are Based on Ground Truth
2	ANSI-like Process to Get Review & Acceptance
1	Standards are Written in Code Instead of English
0	Good Information on Existing Component <ul style="list-style-type: none"> <li>• Faults, maintenance level, etc.</li> </ul>
0	BEM is Still a Useful and Relevant Tool <ul style="list-style-type: none"> <li>• Not replaced by cheap solar and batteries</li> </ul>
0	So user-friendly that non-engineers can use BEM
N/A	Consolidated Set of Prototypes <ul style="list-style-type: none"> <li>• Maybe input files, maybe raw inputs</li> <li>• Updated w/AMI data</li> <li>• In a single repository</li> </ul>



## Future Uses, Opportunities, Emerging Needs

Votes	Issue
20	Zero Net Energy <ul style="list-style-type: none"> <li>• Generation, storage, emerging tech</li> <li>• Electric heating baseline (2019 code)</li> </ul>
13	Non-Energy Benefits <ul style="list-style-type: none"> <li>• Monetize NEB               <ul style="list-style-type: none"> <li>○ Health impacts</li> <li>○ GHG</li> <li>○ Productivity</li> </ul> </li> <li>• Impact Cost-effectiveness</li> </ul>
12	Model to Follow Life of Building <ul style="list-style-type: none"> <li>• Input/output standard               <ul style="list-style-type: none"> <li>○ Future remodel</li> <li>○ Calibrate and track usage, drift, night usage                   <ul style="list-style-type: none"> <li>▪ Tie to building automation, continuous commissioning</li> <li>▪ Dashboard</li> </ul> </li> </ul> </li> </ul>
10	Behavioral Effects <ul style="list-style-type: none"> <li>• How to Include, manage               <ul style="list-style-type: none"> <li>○ OHM-connect, existing program in CA</li> </ul> </li> <li>• How to keep track, verify</li> <li>• Can connect = personal assistant (Siri, etc)</li> <li>• Use modeling to connect to community – make easy</li> </ul>
9	Microgrids/Safety/Resiliency <ul style="list-style-type: none"> <li>• Wildfire impact mitigation</li> <li>• Model at scale</li> <li>• Storage/islanding</li> </ul>
7	Scaling – Planning for Community Level <ul style="list-style-type: none"> <li>• City planning, traffic</li> <li>• BIM</li> <li>• Connect to lifestyle</li> <li>• Large impact potential for community, larger GHG impacts</li> </ul>

## Cal TF Staff Summary – Actionable Items

The highest priority action items relate to standardizing and aligning data formats and rulesets across multiple use cases, reducing duplicative efforts (and costs), fostering inter-agency (CEC and CPUC) coordination, and developing a master library of well-documented and (where possible calibrated) building prototypes. The work should be conducted pursuant to a roadmap and should involve input from all key actors: the regulatory agencies, Cal TF, PAs, implementers and other industry stakeholders.