



Cal TF Modeling Charrette Exercise #1 Results

Overview

The objective of the Exercise #1 breakout session was to identify opportunities to align building energy use modeling use cases and to identify specific points of alignment. Participants were broken out into four small groups, each with a facilitator to guide the group discussions. Each group then used “guided conversations” to congregate around one use case. Each group then identified related use cases that could be harmonized through the alignment of prototypes, rulesets, or common inputs.

Group #1 (facilitator: Armen Saiyan)

Group #1 focused on custom and code compliance as central use cases. These two use cases currently follow unique rulesets and use unique parameters which the group believes need to be better aligned. There is a natural progression for measures [in programs and portfolios]; new measures are often handled in custom programs. Over time, successful measures will become deemed, then as market adoption reaches high levels, a measure often transitions to become a mandatory measure through code compliance. As such, custom and code compliance use cases serve as “book-ends” in the typical measure life-cycle. Aligning or harmonizing rulesets and input parameters for these two would establish a path for the intermediate use cases to be aligned as well.

Any new custom measure could become a “test ground” to see if it could/should be modeled (via simulation) versus using an alternative savings estimation method. The breadth of custom measure analysis tools is great, so simulation modeling is not a given for all measures.

Alignment could be done through rulesets. Whenever a measure is defined in a custom process, the identification and development of common parameters would allow it to be incorporated into a building model.

Standardizing the format of rulesets would allow any process to utilize it, without necessarily standardizing rulesets itself. Emerging technologies is one category that probably could not be rolled into a ruleset, at least initially. Also, need to consider whether other tools can be used (for example, ET tools, industrial process analysis).

Cal TF Staff Summary of Key Action Items of Group #1 Discussion:

1. Standardize ruleset data formats.



2. Characterize which parameters can be standardized across multiple rulesets, and which cannot, because by nature they are unique.
 - a. Examples of data elements that can be standardized across rulesets:
 - i. Data format
 - ii. Code
 - iii. Industry Standard Practice
 - iv. Base case and measure case calculation methodologies, for both deemed and custom measures, if a new measure is similar to an existing measure.
 - v. Acceptable input parameters for base and measure case, for both custom and deemed measures such as hours of operation).
 - b. Examples of data elements that cannot be standardized across rulesets:
 - i. Building prototypes for specific buildings (such as Savings by Design application)
 - ii. Base case and measure case calculation methodologies where a new measure is completely dissimilar to existing measures.
3. For custom, standardize “base case” rulesets with code compliance to extent possible.

Group # 2 (facilitator: Steve Kromer)

Group 2 discussions included NMEC, deemed and custom use cases. The group also discussed prototypes and calibrating models to real data. The concept is that documentation lives with building, meaning model would live from the beginning (codes, LEED, etc.) through later processes (e.g., retrocommissioning, retrofits, etc.) (living model). Many common elements would exist for any building model, including location, common inputs. Idea is that every building will have a model, at least for some time. Discussed ComNet¹ (Charles Eley’s approach to process and data). Alignment challenges would lie both in software algorithms and data underlying them.

Level of detail – in Building Information Modeling (BIM) world there are different levels of development (100, 200, up to 500 level)². Once you have a model, you can calibrate it against

¹ <https://comnet.org/> - this site is focused on standardizing energy modeling for commercial and multifamily buildings.

² The Level of Development (LOD) descriptions are based on AIA Document E202-2008 entitled Building Information Modeling Protocol Exhibit. There are five levels, from conceptual through as-built. In essence, the levels are as follows:

- 100 – Conceptual/Preliminary
- 200 - Approximate geometry (Design/Bid)
- 300 - Precise geometry (Design/Bid/Constructability)
- 400 – Fabrication (Shop Drawing)
- 500 - As-Built/COBie



code, or whatever regulators need. Models need to accommodate greater goals in state, including climate, grid interactive, grid storage, solar, DER, battery, economics, how to modify duck curve, etc.

These days it is more than just how much you save, but *when* you save it that matters. Models should be able to address that, and economics should also be aligned accordingly.

Cal TF Staff Summary of Key Action Items of Group #2 Discussion:

1. Need more model calibration
2. Models should “live” with buildings and be reviewed over time as changes are made to buildings.
 - a. Perhaps develop a proposal for a building model repository that modeling professionals could access.
 - i. What customer and data confidentiality concerns would arise if master building prototype library were created?
 - ii. Could customer/data confidentiality concerns be overcome if program participants were required to authorize storage and access by others of building models as a condition of receiving ratepayer-funded incentives?
3. Modeling needs to address a broader range of issues and goals: climate, grid interactive, grid storage, solar, DER, battery, economics.
4. To be most useful, modeling should provide not just magnitude of savings, but timing (when savings occur).

Group #3 (facilitator: Doug Mahone)

Group 3 discussed deemed, code, and a smattering of other use cases. This group focused on deemed use case versus code development. While it would seem to be similar, they have developed over time under two different commissions. To harmonize, the group looked first at deemed. There is a long history of how deemed measures have developed and modeled, which could be turned into a ruleset. For code development, there is a whole set of modeling assumptions and procedures that could also be reduced into a ruleset. The two commissions need to agree on how to harmonize these two.

Keeping track of common inputs would be useful for ruleset harmonization and use case alignment. Who owns this, and how inputs may be translated to outputs needs to be determined; perhaps Cal TF staff can take that on.



The group discussed difference between deemed measure and custom analysis – it boils down to purpose. The purpose of deemed is to establish values that can be applied broadly to population, recognizing that the actual values in application would vary from the measure average. For custom (and others) we are trying to estimate savings specific to the application under consideration. This creates a natural tension between deemed and custom. If clearly stated rulesets can be developed for these, that would go a long way to resolving use case differences.

Cal TF Staff Summary of Key Action Items of Group 3 Discussion

1. Regulatory Commissions (CEC and CPUC) should work together to develop comment data formats for building prototypes and measures.
2. Rulesets for code compliance and deemed measures should be reviewed and harmonized.
3. Need to have SW library of common rulesets.
4. Review what rulesets can be common among deemed and custom and harmonize them.

Group #4 (facilitator: Roger Baker)

Group 4 discussed code compliance as a central use case. Building design, NC programs, custom programs, and deemed measures were considered to be closely related to code compliance so there should be considerable opportunities to align data format and rulesets across the different programs/initiatives. Building design has logical nexus given how it and code compliance factor into the new building development scheme. From a harmonization perspective, custom analysis has a number of tools and users tend to focus on using their own (often spreadsheet-based) tools because building simulation cannot accommodate the unique characteristics of custom measures. One idea is to design custom tools to output data that can feed into a building simulation model; doing so will preserve the ability of custom tools to be used while incorporating some of benefits into a model for future use.

With respect to deemed measures the CEC has protocols and approved software for code compliance and baseline determination. However, the CPUC hires a consultant to develop, as part of measure estimates, code baselines using different software/platform. This feels redundant. Maybe CEC can help CPUC develop a roadmap to align processes and rulesets to eliminate redundancies.

Cal TF Staff Summary of Key Action Items of Group 4 Discussion

1. CEC and CPUC should work together to align data formats and rulesets where possible.



2. The following uses for building simulation modeling have similarities and should be considered when aligning data formats and rulesets: code development, code compliance, deemed, customer, new construction.
3. The alignment of data formats and data should be performed pursuant to a roadmap that could guide the scope and sequencing of data format and data alignment.