Cal TF Technical Position Paper No. 4:
Using Best Available Data to Determine Deemed Savings

Overview

One of the challenges in developing new energy efficiency measures in California is determining if the information used to develop deemed values is sufficient to support the criteria outlined by the California Public Utilities Commission (CPUC). The CPUC issued the following guidance for ex ante measure development:

1. Sufficient data must exist to establish "reasonable expected values."[1]
2. "Best available data" should be used.[2]
3. DOE-2 modeling is appropriate for weather sensitive measures.[3]
4. Balance accuracy with the need to enable promising new technologies to enter the investor-owned IOU portfolios.[4]
5. Balance accuracy and precision, cost, and certainty.[5]

The phrase "best available data" lacks a clear definition, which has led to different interpretations and frequent delays in workpaper approval when workpaper developers and the ex ante team differ on what this standard means. Cal TF formed a subcommittee to help establish a consistent interpretation of "best available data" to reduce delay and misunderstandings resulting from differing interpretations of "best available data." The subcommittee considered various existing reference documents to help define and recommend consistent approaches to this requirement, including standards from other jurisdictions as set forth in Technical Reference Manuals (TRMs), the Uniform Methods Project, and the draft evaluation, measurement and verification guidelines (EM&V guidelines) for the Clean Power Plan.[6] The Uniform Methods Project identifies criteria[7] that could be used to refine the definition of "best available data":

- [S]trengthen the credibility of energy efficiency program savings calculations.
- Provide clear, accessible, step-by-step protocols to determine savings for the most common energy efficiency measures.
- Support consistency and transparency in how savings are calculated.
- Reduce the development and management costs of EM&V for energy efficiency programs offered by public utility commissions, utilities, and program administrators.
- Allow for comparison of savings across similar efficiency programs and measures in different jurisdictions.
- Increase the acceptance of reported energy savings by financial and regulatory communities.

[1] Commission Decision 12-05-015, p. 339.
[2] Id. p. 320.
[3] Id. footnote 64.
[4] Id. p. 297.
[5] D 09-09-047 p. 299.
[6] The draft CPP EM&V Guidelines were released August 3, 2015, and published in the Federal Register for 90-day public comment on October 23, 2015. They are still not final.
[7] The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 1, p. 3.

The subcommittee also considered comments and recommendations of TF members on what should be considered "best available data" expressed during consideration of New Measure Workpapers through Cal TF. This Technical Position Paper describes current practice, summarizes the "Best Practices" research described above, and provides recommendations for TF and CPUC Staff consideration.

Current Practice

The Commission has directed workpaper developers to reference DEER as "best available data" when developing non-DEER workpapers or performing other ex ante review[8]. However, using DEER as the default reference for "best available data" poses several challenges. First, even when best attempts are made, it can be difficult to determine what is considered to be the "current" best available data in DEER and associated references. Previously approved values may be superseded or removed, other documents may be posted but not approved, etc Also, it is very difficult to determine source information for specific values in DEER/READi, and even if source information is found, it is often not the original source. As noted in the summary of EUL-RUL analysis for the April 2008 update to DEER prepared by KEMA and posted on the DEER website, "...many EUL sources in the industry are tautological, referring back to other sources." Finally, much source documentation for DEER values is from a 2005 Itron report, which is over ten years old (and draws on many references much older than that). The market has seen significant shifts since 2005. For example, lighting technology advancements have dramatically changed that market (wireless control systems, LED technology, addressable lamps, etc). Also, dozens of new energy efficiency portfolios have been implemented and evaluated across the country in the last decade, creating a wealth of new data on a broad range of measures.

Workpaper developers report that the CPUC staff ex ante team frequently interprets the phrase "best available data" to include data that they do not currently possess, but instead requires an often year-long data collection effort, which delays introduction of new measures by well over a year. Such an interpretation arguably contravenes Commission guidance to:

> *"[B]alance the need for accurate ex ante values with the equally important need to continuously augment the portfolios with new technologies that offer promise. . .We also encourage Commission Staff not to allow "the perfect to be the enemy of the good," in general but especially in determining the ex ante values for new technologies that offer considerable promise . . .*[9]

The challenge of interpreting "best available data" has led to frequent delays and significant contention in the CPUC workpaper review and approval process. In addition, Cal TF staff has observed that the lack of clear guidance has prolonged Cal TF review of new measures in the TF, as TF members are not certain how the standard should be applied, and different TF members can have legitimate disagreements about what the standard means.

Statement of Technical Forum Need

A clear definition of "Best Available Data" will benefit the TF, Workpaper Developers and Program Administrators in several ways:

1. Streamline Process - Eliminate time wasted applying different interpretations or attempting to achieve a higher level of certainty than is appropriate depending on the measure
2. Increase Certainty - Create a greater level of certainty of ex-ante values when calculating measure and portfolio performance to limit retroactive adjustments, and

[8] Commission Decision 12-05-015, p. 338.
[9] Id. pp. 339 – 340.

3. Increase Confidence in and Rigor of Values – If standards that are used to developed deemed values are clear and transparent, this will increase confidence in and rigor of the values.
    - Acknowledge the existence and magnitude of error/uncertainty inherent in any method of measure estimate- increase consensus/agreement about level of error.

Objectives

The objectives of this paper are to:

- Define "Best Available Data"
    - Further define "Best Available Data"
- Establish Criteria
    - Establish criteria for when "Best Available Data" met
- Establish Process
    - Propose a process to include appropriate parties to gain agreement on the process and standards by which to define "best available data"
- Establish Approach
    - Establish standards for when ex ante values should be developed using modeling vs. engineering equations vs. field data
- Establish DEER Exceptions
    - Establish standards for when to depart from DEER
- Establish Criteria for Studies
    - Establish criteria for evaluating whether available studies should be considered "best available data", which should include consideration of:
        - Who performed the study (is the study unbiased?)
        - When the study was performed (is the data still current?)
        - Whether the study was statistically significant, including consideration of:
            - Whether the study is applicable to proposed implementation (targeted customers and implementation approach)
- Establish Criteria for "More Data Needed"
    - Establishing criteria for when additional data should be gathered to establish "reasonable expected values", which should include consideration of:
        - Balancing cost of obtaining new information, performing studies, etc vs. value gained
- Establish Process for "Interim Workpaper Approval"
    - Identifying need for "interim workpaper approval process"
- Establish "Dispute Resolution Process"
    - Describing dispute resolution process where consensus cannot be reached
- Establish Plan for "Real Data"
    - Identifying plan for replacing ex ante values derived from models or algorithms with actual data given advent of more granular data analysis enabled by widespread deployment of AMI and likely requirements of the Clean Power Plan EM&V guidelines for counting energy efficiency. It will be important to establish guidelines when drawing on "real data" to make sure it is properly applied and extrapolated for broader performance assessments.

Research

Cal TF staff reviewed the following documents to assess best practices on "best available data," including Technical Reference Manuals (TRMs) across the country, the Uniform Methods Protocol and the draft Clean Power Plan guidelines.

Findings from TRM Review

Cal. TF staff gathered and reviewed over twenty-five TRMs from around the country. Cal TF sought to gather and review all publicly-available statewide TRMs, and also was able to gain access to some non-public TRMs that did not cover entire states. TRMs are "functional equivalents" of DEER in that they are a repository for deemed measures and include key measure parameters needed to perform cost-effectiveness analysis, including savings (kW, kWh and therms), incremental measure costs, expected useful lives, and sometimes net-to-gross ratios. TRMs also often contain front matter explaining the content and approach used to develop the values, and many also contain appendices with information that is used to inform the development of multiple measures, such as building prototypes.

Most TRMs across the country include very limited discussion on data quality and a few say nothing at all. An exception to the limited guidelines for data quality found in most TRMs is the Pacific Northwest Regional Technical Forum that had more detailed guidelines on data quality and study approaches for gathering data that the NW RTF will rely on for savings values. It is important to note that the level of rigor in various states is likely driven by the various levels of accountability assigned to the Program Administrators (i.e. tracking, goals/rate payer protection, incentives, penalties, etc.).

A few examples of how data quality is addressed in various TRMs is outlined below:

Mid-Atlantic TRM- TRM contents reflect consensus agreement and best judgment of project sponsors, managers and consultants on information that was most useful and appropriate to include within the time, resource and information constrains of the study. Criteria used in the process of reviewing assumptions and establishing consensus include: credibility, accuracy and completeness and cost efficiency. The TRM includes engineering equations for most measures because they convey information clearly and transparently and are widely accepted in the industry. Unlike simulation models, they can also provide flexibility for users to substitute locally specific information.[10]

Efficiency Vermont- Data assumptions are based on Vermont data, where available. Where Vermont data was not available, data from neighboring regions is used, including New York, New Jersey and New England, where available. In some cases engineering judgment is used.[11]

Pennsylvania- Standard input values are based on the best available measured or industry data, including metered data, measured data from other state evaluations (applied prospectively), field data, and standards from industry associations. The standard values for most commercial and industrial measures are supported by end-use metering for key parameters for a sample of facilities and circuits.

For the standard input assumptions for which metered or measured data were not available, the input values (e.g. delta watts, delta efficiency, equipment capacity, operating hours, coincidence factors) were

[10] Mid-Atlantic Technical Reference Manual version 4.0, June 2014, pp. 10, 12-13, 15.
[11] Efficiency Vermont, Technical Reference User Manual (TRM) 8/9/13, p. 7.

assumed based on best available industry data or standards. These input values were based on a review of literature from various industry organizations, equipment manufacturers and suppliers. [12]

Delaware- Whenever possible savings estimates and other assumptions are based on Delaware specific or Mid-Atlantic data. They also note that the TRM presents a combination of engineering and simulation models. Engineering equations were judged to be desirable because they convey information clearly and transparently and are widely accepted in the industry. Finally, they point out that the equations provide flexibility and opportunity for users to substitute locally specific information if/when available.[13]

Northwest Regional Technical Forum (NW RTF) - The RTF uses estimates of parameters from studies performed by other agencies in estimating measure savings if certain conditions are met. The RTF must diligently review a study before approving the use of these values in the estimation of measure savings. A diligent review will include, but is not limited to understanding the characteristics of the sample studied, the study's data collection methods and analysis methods, and the variability of the parameter estimates across the study sample. A diligent review will consider whether the sample is applicable to measures delivered in this region and if not, whether it is feasible to normalize the results for application to this region.[14] The process also addresses diligent review of relevant data sources and estimation methods and the preparation of complete and transparent documentation of methods and data sources.[15] The RTF also addresses requisite skill level for the analyst or support team responsible for developing a unit energy savings (UES) measure. They also require the sources used in estimating input parameters or defining model(s) to be cited and accessible. When using statistical samples to estimate UES, the population sampled must be representative of likely future participants. For some parameters, which are not primary determinants of measure savings, the RTF may rely on consensus opinion from a panel of experts in lieu of primary data collection.[16]

Massachusetts - Data assumptions are based on Massachusetts Program Administrator data where available. Where Massachusetts-specific data is not available, assumptions are based on, 1) manufacturer and industry data, 2) a combination of the best available data from jurisdictions in the same region, or 3) credible and realistic factors developed using engineering judgment.[17]

Texas- In their guiding principles related to developing TRMs, there is an emphasis on providing documentation of all sources used to develop proposed savings values, inputs, and algorithms. They site survey data that suggests users and stakeholders tend to discount the value of TRMs when reference sources are not available. They also plan to provide clear guidance about the criteria and levels of savings documentation required for new or revised measures. This guidance should include criteria for deciding when a measure should be deemed, derived through a savings algorithm or excluded from consideration as a TRM measure because of high variability in onsite operating conditions or interactions with other energy-using systems.[18]

Illinois- The TRM presents engineering equations for most measures. This approach is desirable because it conveys information clearly and transparently, and is widely accepted in the industry. Unlike simulation model results, engineering equations also provide flexibility and the opportunity for users to

[12] Pennsylvania Public Utility Commission, Technical Reference Manual, June 2015, p. 8.
[13] Delaware Technical Reference Manual April 30, 2012, pp. 7-8.
[14] Regional Technical Forum, Roadmap for the Assessment of Energy Efficiency Measures, June 17, 2014, p. 4.
[15] Id. p. 14.
[16] Regional Technical Forum, Guidelines for the Estimation of Energy Savings, June 17, 2014, pp. 7-9
[17] Massachusetts technical Reference Manual, August 2013, p. 5.
[18] Public Utility Commission of Texas, Approach to Texas TRM, June 12, 2013, p. 3-4.

substitute local, specific information for specific input values. Furthermore, the parameters can be changed in TRM updates to be applied in future years as better information becomes available,[19]

Key principles from the nationwide TRM review related to "Best Available Data" fall into three main categories:

Substantive Factors:

- Diligent review/approval process for third party data
- Actual data, modeled or engineering equations? Higher weight given to actual data
- Is data appropriate for the application being assessed
- Source of the data (who collected or provided)
- Where and when was data gathered, local or regional source preferred
- Level of rigor and statistical significance required for studies

Process:

- TRM is developed through a public, collaborative process allowing for various parties to comment and have input while allowing any differences of opinion to be clearly memorialized.

Form:

- TRM is well documented, publicly accessible, and savings values are reproducible
- Source information is readily available
- Users can run their own calculations with locally specific or updated input values

While most jurisdictions have rather limited discussion of data quality, data rigor and quality is generally validated through a public, transparent peer review process so that experts can review and comment on data and resulting values. Furthermore, resulting values and measures are documented in easy-to-use TRMs that clearly link the measure, savings values and other measure parameters and source documentation so that professionals who wish to use and understand the information know how it was derived and can independently validate and/or update it. The combination of high-level standards, a public, transparent peer review process, and documented, public Technical Reference Manuals is the approach generally used to ensure data quality and rigor in other jurisdictions.

CPUC Guidance

D 12-05-015 Guidance Decision for '13-'14 EE Portfolio: Within this document the CPUC states that the utilities are expected to use DEER assumptions, etc unless the Commission staff agrees with their proposal for such replacements.[20] It also recognizes that for certain new measures research will be required to develop reasonable ex ante values and that it may be desirable (and necessary) to allow new additions before all research can be completed. In that regard, the Commission directs staff to balance the need for accurate ex ante values for new measures with the equally important need to continuously augment the portfolios with new technologies that offer promise.[21] It calls on Commission Staff and the utilities to collaborate to perform the necessary research for new measures while those measures are being piloted.[22] The Commission further outlines it's recognition for the need to be flexible by stating that "the perfect [should not be] the enemy of the good," in general, but especially in determining ex ante

[19] Illinois Statewide Technical Reference manual for Energy Efficiency Version 4.0, February 24th, 2015, p. 57.
[20] Commission decision 12-05-15, p. 331.
[21] Id. p. 339.
[22] Id. pp. 339-340.

values for new technologies.[23] The guidance outlined in D 12-05-015 would be more feasible if a collaborative process as described in the objectives was established going forward.

UMP Guidance

The Uniform Methods Project is an initiative funded by the US Department of Energy (DOE) to develop measurement and verification protocols for determining energy savings for commonly implemented program measures. These protocols do not provide stipulated values for energy savings, however, their widespread use would provide a common analytic foundation for determining "deemed" values while still allowing for the use of inputs appropriate for a project's particular circumstances[24]. Even though the focus of the UMP is on ex-post savings as opposed to ex-ante deemed values, many of the specific goals still apply to the objectives of this paper:

- Offer guidelines that help strengthen the credibility of energy efficiency program savings calculations.
- Provide clear, accessible, step-by-step protocols to determine savings for the most common energy efficiency measures.
- Support consistency and transparency in how savings are calculated.
- Reduce the development and management costs of EM&V for energy efficiency programs offered by public utility commissions, utilities, and program administrators.
- Allow for comparison of savings across similar efficiency programs and measures in different jurisdictions.
- Increase the acceptance of reported energy savings by financial and regulatory communities.

With regard to gathering survey data to support estimates of gross measure savings, they detail the four error categories, and provide guidance for addressing each. Of the four categories: sampling errors, nonresponse errors, coverage errors and measurement errors, measurement errors present the most common and problematic error type.

CPP Guidelines[25]

The US EPA has issued draft guidelines for the Evaluation Measurement and Verification (EM&V) Guidance for Demand-Side Energy Efficiency (EE) associated with the Clean Power Plan (CPP). There is a strong focus on best-practice EM&V approaches and the proper use of deemed savings values. The guidelines recognize the many Technical Reference Manuals (TRMs) in use across the United States and refer to them as a "term of art". This characterization as a "term of art" suggests that although the US EPA recognizes the various TRMs as a valuable tool in evaluating energy efficiency programs at the state level, there needs to be more *rigor, structure and consistency* if they will be relied upon to determine savings associated with the CPP. They highlight how methodologies for estimating savings and the actual values vary widely. They further recognize that some TRMs include information based on prior-year evaluations, including rigorous metering and analysis while many others have values based on computer simulations or engineering algorithms. Finally, they encourage efforts to improve the quality and documentation of TRMs so they can support higher-quality savings values for compliance with the

[23] Id. p. 340.
[24] The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 1, p. 2.
[25] Evaluation Measurement and Verification (EM&V) Guidance for Demand-Side Energy efficiency (EE) U.S. Environmental Protection Agency, DRAFT FOR PUBLIC COMMENT, August 3, 2015, citations throughout see pages 8,9,15-17,23

EPA's emissions guidelines. The CPP Guidelines contain several useful principles that can be used to further define "Best Available Data", including:

- Use Actual Data and Widely Accepted Methods: The guidelines emphasize applying deemed savings when estimates have been developed from data sources (such as prior metering studies) and analytical methods that are widely considered acceptable.[26]
- Consider How Measures is Being Implemented: Consider the measure and purpose, and whether the data is applicable to the situation under which the measure is being implemented.[27]
- Not All Measures Should be Deemed: Deemed values should be reserved for *relatively simple, well-defined efficiency measures*[28] where there is *little uncertainty in average savings*[29] [emphasis added].
- Measure Should be Clearly Defined, Well-Documented and Public: Values should be based on measure definition, applicability, conditions, assumptions, calculations, and references that are well documented in work papers that are publicly available.[30] The EPA's final emission guidelines include a number of safeguards and quality-control features that are intended to ensure the accuracy and reliability of the claimed EE savings.
- Measures Should Be Developed Through Joint and Collaborative Research: The guidelines encourage participation in collaborative and joint research to improve the breath and quality of values.[31]
- EUL Values Should Be Updated Every Five Years: With regards to persistence studies, they suggest such studies should be conducted at least every five years.[32]

Summary Observations: Best Practices Research

1. Current "Best Practice" for Ensuring Data Quality and Rigor For Deemed Values Is Through High-Level Guidelines, Public and Collaborative Peer Review Process and Easy-to-Use Documentation

   Data quality receives varying degrees of scrutiny across the TRMs published in the United States. While some TRMs don't even address the issue explicitly, many have fairly high level requirements addressing the regional preference of the source but don't necessarily address the actual quality of the data directly. The NW RTF goes the furthest in defining what a diligent review requires before data from other studies can be used. It also requires all methods and supporting data sources to be clearly documented so that results can be reproduced by members of the RTF and others.[33] In Texas, they identify a best practice as ensuring that that the evaluation method being used is based on using actual data. Furthermore, they recognize that pursuit of perfect or more accurate savings estimates has a real cost. They recognize that such costs need to be considered against the benefits of using a consistent approach to developing ex-ante savings estimates, which may be less accurate but are reasonable and not systematically biased up or down.[34] One thing that seems common is that even though there may not be firm

[26] Id. p. 8.
[27] Id. p. 8.
[28] Id. p. 15
[29] Id. p. 9.
[30] Id. p. 17.
[31] Id. p. 23.
[32] Id. p. 23.
[33] Regional Technical Forum, Roadmap for the Assessment of Energy Efficiency Measures, June 17, 2014, p.14.
[34] Public Utility Commission of Texas, Approach to Texas TRM, June 12, 2013, p. 3-3.

definitions for each TRM to follow regarding data quality, there does appear to be a vetting process for discussing the values used. Furthermore, all TRMs linked measures, measure documentation and generally, measure documentation sources so to make it clear how measure parameters were derived.

2. Definition of "Best Available Data" Needs to Be Further Refined; Several National Documents Can Be Useful in Refining Definitions and Approach

   The CPP, in particular, highlights how methodologies for estimating savings and the actual values vary widely. Some deemed values are based on prior-year evaluations, including rigorous metering and analysis, while many others have values based on computer simulations or engineering algorithms. Improving the quality and documentation of TRMs is important so they can support higher-quality savings values for compliance with the EPA's emissions guidelines and other important objectives, such as increasing the confidence in the values by financing and regulatory communities.

3. Determining "Best Available Data" Requires Balance and Should Not Unduly Impede Innovation; and Recognition that Further Data Can Be Gathered Through Implementation

   CPUC policy is that the "perfect should not be the enemy of the good" – new measures should be introduced even when the data is not perfect. However, if existing data is not sufficient to establish "reasonable expected values," there needs to be a plan to gather more data through implementation or early EM&V.

Cal TF Proposal

Based on the Best Practices Research, Commission Guidance and both TF and subcommittee discussions, Cal TF offers the following recommendations:

- Define "Best Available Data"
  - "Best Available Data" should be established by considering substantive, process and form considerations, as follows:
    - Substantive Factors: Substantive factors to consider:
      - Real data, modeled or engineering equations?
      - Is data appropriate for circumstance to which it will be applied?
      - Where and when was data gathered?
      - Was study rigorous? Statistically significant.
      - Does the data contain errors, including: sampling errors, nonresponse errors, coverage errors and measurement errors.
      - Who collected or provided the data?
      - Is the data biased and unduly conservative or optimistic?
    - Process: Reviewed through a public, collaborative process where differences of opinion can be clearly memorialized.
    - Form: Well-documented, reproducible with readily-accessible sources. All measure parameters should be clearly linked to the measure.
- Establish Criteria
  - Criteria that "Best Available Data" should meet (from UMP):

        - Offer guidelines that help strengthen the credibility of energy efficiency program savings calculations.
        - Provide clear, accessible, step-by-step protocols to determine savings for the most common energy efficiency measures.
        - Support consistency and transparency in how savings are calculated.
        - Reduce the development and management costs of EM&V for energy efficiency programs offered by public utility commissions, utilities, and program administrators.
        - Allow for comparison of savings across similar efficiency programs and measures in different jurisdictions.
        - Increase the acceptance of reported energy savings by financial and regulatory communities.
- Establish Process
    - Propose a process to include appropriate parties to gain agreement on the process and standards by which to define "best available data."
        i. Leverage the Cal TF which is already established with representation from key players in the state along with industry leaders from across the country to lead this effort. By adding CPUC Staff to this effort, can ensure a balanced and thorough process is developed that will ensure ratepayer funding is optimally deployed.
        ii. Ensure accessibility and transparency of "best available data" so it can be used unilaterally across California by posting on the Cal TF website
        iii. Recognize the need and allow for the engagement of other parties that may add value to the process beyond those on the Cal TF (CPUC Staff, IOUs, POUs, interested third parties and industry professionals).
- Establish Approach
    - Establish standards for when ex ante values should be developed using modeling vs. engineering equations vs. field data
        - Establish a base criteria for when modeling of measures is required (e.g. HVAC measures)
        - When utilizing modeling, ensure that the process (equations, inputs, etc.) is transparent so others can follow and duplicate, run variations, etc
        - Consider the magnitude of the measure in the overall portfolio
        - Consider the level of certainty gained before modeling a measure along with the associated cost
        - Consider the magnitude of the potential interactive effects from a measure and set a threshold above which modeling should be considered
        - To the extent possible and reasonable, use field/evaluation data to establish or adjust ex-ante values
        - Cal TF will look to further develop these concepts in a measure complexity paper next year
- Establish DEER Exceptions
    - Establish standards for when to depart from DEER
        - Current guidance (from CPUC) has been interpreted to mean if it's in DEER, it represents the "best available data", regardless of what other data may be available. It certainly makes sense to use DEER as the first source for data based on its long history and broad content. It may be that history though that suggests other sources should be evaluated. With the multitude of DEER versions, it can be difficult to identify what the most current data for a specific measure is. It is also unclear what level of public review and comment went into

current DEER data. It also appears that for many measures, new versions of DEER defer to much earlier versions as the "best available data", resulting in many of the references being well over 10 years old. Finally, it is difficult to reproduce values from DEER since it is not clear what algorithms are being used to generate outputs from inputs.

        - Determining "well-documented" should not require follow-up inquiries to ex ante team. Documentation should be "stand-alone."

- Establish Criteria for Studies
    - Establish criteria for evaluating whether available studies should be considered "best available data", which should include consideration of:
        - Who performed the study (data collection and analysis methods, is the study unbiased?)
        - When the study was performed (is the data still current?)
        - Whether the study was statistically significant, including consideration of: sample size, measurement error, confidence levels (uncertainty and precision)
        - Whether the study sample data is applicable to proposed implementation (targeted customers and implementation approach)
        - Include different thresholds for level of statistical rigor based on potential measure impact (i.e. low, normal, high, interim)
- Establish Criteria for "More Data Needed"
    - Establishing criteria for when additional data should be gathered to establish "reasonable expected values", which should include consideration of:
        - Balancing cost of obtaining new information, performing studies, etc vs. value gained
- Establish Process for "Interim Workpaper Approval"
    - Identifying need for "interim workpaper approval process"
        - An Interim Workpaper (IWP) is for measures where Cal TF has affirmed the workpaper but has noted that there is not sufficient data to establish "reasonable expected values." Instead of delaying introduction of the measure into the portfolio while the WP Developer collects additional information, the IWP process allows measures to be offered based on an Interim Workpaper until a full workpaper is approved. The purpose of the Interim Workpaper (IWP) process is to facilitate "the need for accurate ex ante values with the equally important need to continuously augment the portfolios with new technologies that offer promise."
- Establish "Dispute Resolution Process"
    - Describing dispute resolution process where consensus cannot be reached
        - Use existing – needs to be defined.
- Establish Plan for "Real Data"
    - Identifying plan for replacing ex ante values derived from models or algorithms with actual data given advent of more granular data analysis enabled by widespread deployment of AMI and likely requirements of the Clean Power Plan EM&V guidelines for counting energy efficiency.
        - This should draw from CPP guidelines, where possible. Use Martha Brooks-led Cal TF subcommittee starting up in 2016.
        - The US EPA has issued draft guidelines for the Evaluation Measurement and Verification (EM&V) Guidance for Demand-Side Energy Efficiency (EE) associated with the Clean Power Plan (CPP). The EPA's final emission

guidelines require that all EE providers demonstrate that they will apply best-practice EM&V approaches.[35]

- Points of emphasis related to deemed savings values include:
  - Ensure values are based on EE measure definition, applicability conditions, assumptions, calculations, and ***references that are well documented in work papers that are publicly available***[36]
  - Values are quantified as the most likely averages of electricity savings and other factors that determine such values over the lifetime of the EE measure, such as average occupancy, typical weather, typical operating hours and ***EUL***[37]
  - Values are developed by independent, third parties and, whenever possible are based on empirical techniques such as RCTs and quasi-experimental design[38]
  - ***Values are updated on a going forward basis***.[39]

Conclusion: Developing the process for addressing "best available data" as outlined in this paper will meet TF needs of streamlining the WP development, review and approval process and increase the confidence in and rigor of values.

Date Issued	
Prepared by:	
Approved by:	
Prior Versions	

[35] Evaluation Measurement and Verification (EM&V) Guidance for Demand-Side Energy efficiency (EE) U.S. Environmental Protection Agency, DRAFT FOR PUBLIC COMMENT, August 3, 2015, p. 1.
[36] Id. p. 17.
[37] Id. p. 17.
[38] Id. p. 17.
[39] Id. p. 17.