Baseline Policy Enhancement in Massachusetts and California

Jonathan B. Maxwell, ERS, College Station, TX
Sue Haselhorst, ERS North Andover, MA
Ralph Prahl, Prahl & Associates, Madison, WI[1]

ABSTRACT

Massachusetts and California tied for first place in ACEEE 2016 State Energy Efficiency Scorecard (ACEEE 2016). They also have made considerable investment in evaluation. It is notable, then, when these two leading states choose to make major policy decisions regarding the same topic at nearly the same time. Both states chose to update their baseline policy in 2016. This paper describes key baseline principles—some of them newly articulated to the energy efficiency community—that have been formalized in the states' respective policy documents. This paper compares and contrasts the policies and provides narrative discussion of the historical context of the changes.

Introduction

Energy efficiency measure baseline decisions directly affect customer incentive levels, forecasted grid load reduction accuracy, shareholder incentives, and – most significant to those that conduct impact evaluations or are affected by evaluation results – savings realization rates. Impact evaluations routinely find that evaluators' different interpretations of baseline compared to those made by implementers is among the most frequent and significant reasons for discrepancies between claimed and evaluated gross savings (see Itron 2015 Figure 1-3, for an example). These typically unwelcome and unexpected differences frustrate implementers and evaluators. Beyond the numeric effect of different characterizations, both groups find that the lack of clear and formal articulation of baseline policy leads to concerns regarding individual bias.

Massachusetts and California invest heavily in evaluation.[2] Their most recent baseline policies strive to increase the predictability and replicability of baseline characterization by defining terms, introducing decision flow charts, articulating core principles, and providing examples of baseline decision-making and allowable exceptions. They should enhance efforts by evaluators to empirically inform baseline assumptions. The similarities and differences found in the two frameworks may inform policymakers in other jurisdictions regarding their own baseline-setting practices.

This paper first describes the policymaking background and context in the two states, briefly summarizes the policies, then reviews their similarities and differences.

---

[1] Mr. Prahl's contributions in this paper are associated with his perspective on Massachusetts, where his engagement on baseline issues has been greater.

[2] California and Massachusetts historically have had high levels of program spending and average to above-average spending on evaluation, as measured by evaluation dollars per kWh saved and evaluation dollars per program dollar spent. MA currently spends about 3% and has budgeted as much as 5% of EE funding on evaluation. CA currently spends 4% and has invested as much as 8% in prior funding cycles. The national median of 12 reporting jurisdictions is 5%. Notwithstanding the cited median, the authors perceive the nationwide average excluding MA and CA to be lower. Because the two spend more than average per kWh saved—almost 100% more than the national average exclusive of the two states—they spend more on evaluation per kWh saved. (References: National overall spending: Molina, 2014, Tables 3 and 5; National evaluation spending: Kushler, 2012, p. 11; MA evaluation spending: MA Joint Utilities, 2015, p. 201; CA evaluation spending 2006–08 and 2010–12: CPUC, 2009, p. 6; CA 2015 evaluation spending: CPUC, 2014, p. 147; CA 2016+ spending: CPUC, 2016, p. 6)

Massachusetts Baseline Policy Developmental Context

While Massachusetts has a long history of energy efficiency program support, a mature technical resource manual (TRM), and over 20 years' worth of evaluation experience including serious consideration of baseline issues on an ad hoc basis and especially in evaluation of custom gas measures, prior to 2016 there was no comprehensive baseline policy guidance. Massachusetts' Energy Efficiency Advisory Council (MA EEAC) consultants had issued guidance on improving savings estimates that featured baseline issues (EEAC Consultant Team 2016), and because the Massachusetts Program Administrators (PAs) claimed savings through the Independent System Operator New England (ISO-NE), its requirements on electric savings claims (ISO-NE 2014) constituted de facto guidance.

The EEAC consultants, evaluation contractors, and PAs recognized the void and commissioned a facilitated working group to remedy this deficit and create a baseline framework. Stakeholders included evaluation contractors (who also acted as facilitators), PA implementation and evaluation representatives, EEAC consultants, and other parties who acted as liaisons to other groups in the state such as residential implementers. Implementation contractors were not directly engaged.

Massachusetts Baseline Framework Consolidated Summary

The Baseline Framework (ERS and DNV 2016) objective is to establish overarching principles for commercial/industrial (C/I) evaluators to use statewide when characterizing baseline during gross impact analysis. Implementers are a secondary audience. They are not bound by its policy but obviously are affected by it and likely to abide by its principles to mitigate evaluation risk. Residential baseline policy is envisioned as eventually being incorporated as well, but C/I was prioritized.

The Framework defines the baseline as "the condition that would have existed absent the installed measure." The first methodological distinction to consider when characterizing a baseline is whether or not the measure is unique. If not, the higher of the relevant code, standard, or industry standard practice (ISP) efficiency generally applies. There are context-based exceptions that may modify this general guidance, such as knowledge of general below-code market behavior from recent prior research in combination with the lack of a related PA-sponsored code-compliance program. Because ISP is the standard, the baseline is not defined solely on the basis of being either the least efficient possible, least cost, most commonly installed, or average efficiency options. For unique projects, the measure must be assessed more directly on what the individual customer would have done absent the measure.[3]

The Framework requires that dual baseline principles be considered. Dual baseline recognizes that in the case of early replacement of old working equipment, savings may be greater in the first few years after replacement when the baseline is the preexisting equipment, and lesser in later years, when the old equipment presumably would have failed naturally and replaced with more efficient equipment. The principle already had been incorporated into the TRM and other implementation-side lifetime savings calculation tools for some measures, but it previously has not been in the scope of evaluations to assess. The Framework specifies how to estimate the remaining useful life (RUL) of the replaced equipment (with 1/3 of the effective useful life, or EUL, allowed as a default in most cases) and how to characterize the future baseline for the RUL of the measure. This addition means that evaluators now are required to compute first-year, RUL, and lifetime impacts of programs and measures being evaluated.

With the addition of dual baseline, there are five different EE measure event types:

- New construction or major renovation, including the special subcategory of industrial process expansion

[3] "Absent the measure" is not synonymous with "absent the program." The latter would invite undesired overlap with free ridership assessment.

- Replace on failure
- Add-on measures that are added to existing measures, such as controls
- Early replacement with RUL (dual baseline) consideration
- Early replacement without RUL consideration (e.g., indefinite repair, "immortal" equipment baseline)

The Framework describes and provides examples of each event type, and five logic flowcharts help the reader determine how to characterize the baseline depending on the variations in the application of each. The predominance of flow charts suggests a generally formulaic approach to the decision-making process. However, in the case of determining whether a measure is early replacement or replace on failure (also termed normal replacement, lost opportunity, natural turnover, market opportunity, etc.), the Framework requires that the assessment be made based on a preponderance of evidence (POE). This means that the "greater weight of evidence" for one condition or the other prevails. It provides examples of such and includes illustrative numbers as evidence that likely indicate one condition or the other is true, but leaves ultimate judgment to the evaluator in a non-prescriptive manner. This gives the evaluator flexibility but also adds uncertainty for implementers who are trying to assemble evidence and report savings in a way that aligns with expected future evaluation.

There are several special considerations that the Baseline Framework also addresses:

- Which version of code applies
- How to characterize baseline in fuel switching projects
- When a regressive baseline is allowed (generally it is not, but exceptions are made if the replaced item is restaurant cooking equipment, program-funded, or the system is documented as operating with the replaced item in failed state for more than two years)
- Distinguishing gut rehabilitation from early replacement

The Framework introduces and allows but does not require concurrent evaluation of baselines for customers' measures that have yet to be funded by implementers, and provides consolidated protocols for such engagement with implementation staff.[4] It also describes how evaluators should communicate and report results to the PAs and EEAC. In particular, it describes how PAs should, in principle, account for the new lifetime impact results that will be produced in future evaluations in their reporting systems. It also establishes general guidance for evaluators on expectations regarding the rigor of future ISP studies and a repository for storing them.

Four follow-on tasks have been initiated since the Framework's completion and are ongoing at the time of this paper's submittal. The topics are as follows:

- The mechanics of incorporating evaluation lifetime savings impacts for dual baseline measures into reporting systems
- Expansion of details regarding the ISP methods, storage location, and execution for initially identified candidate measures
- Protocols to ensure that free ridership and evaluation adjustment of baseline do not double-penalize programs
- Training on the Framework principles for PA technical reviewers and third-party implementers

[4] In Massachusetts, concurrent evaluation means the review of custom measures by evaluators during the customer's application process, prior to incentive approval by the PA. Concurrent evaluation topics can include baseline characterization, review of planned M&V, computational approach, assumptions, and other variables. This paper is concerned only with the baseline characterization aspect.

California Baseline Policy Developmental Context

As the bibliography to this paper attests, California energy efficiency is legislated in a highly regulatory process.[5] Most of the definitive cited documents were issued by the state legislature, the CPUC, or CPUC Energy Division Staff. Interpretations are proposed, opposed, and decided through legislative bills and formal commission decisions. Stakeholders have long been given audience and it appears that forums for implementation-side perspectives are increasing, but in the authors' perspective, California's method has been more contentious and frustrating for many parties than in other states. The fact that state legislators are specifying baseline definitions in bills—likely in response to constituent (i.e., investor-owned utility, or IOU, or implementer) pleas—indicates that some stakeholders do not feel their perspectives are being duly considered.

The most recent baseline review in California was prompted at least in part by Assembly Bill 802 (AB 802), which declared that "existing conditions" must be considered applicable as much as possible, implying more so than in the past, and directed the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) to change policy accordingly.[6] To respond to this mandate while respecting their ultimate objective of accounting for actual program impact to the California Independent System Operator (CAISO) and the public, the CPUC issued a Decision (CPUC Decision 16-08-019, 2016). This document translated a portion of the AB 802 directive into policy. The commission then ordered its Energy Division staff to commission a stakeholder working group to generate consensus solutions for CPUC consideration and issuance of more detailed policy, including detailed interpretation of "Table 1" described in the next section.

With a historical track record of baseline policy and specification already in existence and selective mandated positions being ordered, the CPUC Energy Division formed a working group to address measure-specific baselines and update the Preponderance of Evidence (POE) policy (CPUC ED 2014) that is used to determine whether measures have a replace on failure or preexisting condition baseline ("Track 1" issues). The objective of achieving stakeholder consensus was met on several issues but was not possible on others, including several major ones. The stakeholder group process led to a final report of recommendations and documented opinions on policy (ERS 2016) that CPUC Energy Division staff considered when writing updated guidance (CPUC ED, 2017). This does not represent an end. "Track 2," initiated at about the time of this paper's drafting, seeks to resolve some of the non-consensus Track 1 issues and issues that required more consideration from the CPUC Energy Division staff to update industry standard practice guidance and the custom review process.

California Baseline Framework Consolidated Summary

No single California document consolidates all the baseline principles. Policy is distributed through the Commission decisions and Energy Division deliverables described above and others including the Energy Efficiency Policy Manual (CPUC 2013). The single most impactful recent description can be found in the CPUC's August 2016 Decision "Table 1: Adopted Default Baseline Policy for All Sectors," replicated below as this paper's Table 1 (CPUC Decision 16-08-019, 2016). As shown, California covers the residential sector as well as C/I, and upstream and midstream programs as well as downstream. A subsequent table (Table 1.1 in CPUC Energy Division 2017) slightly modifies the below.[7]

[5] Mackin provides an excellent overview of baseline policy framework and recent history of its development in California (Mackin 2015).

[6] Per CA AB 802 Sec. 3(d), Section 25303 of the Public Resources Code is amended to read "The commission, in consultation with the Public Utilities Commission, shall make all reasonable adjustments to its energy demand forecasts conducted pursuant to Sections 25301 and 25302 to account for its findings of market conditions and existing baselines" (California State Assembly 2015).

[7] The next section covers some aspects of the table contents, but this paper does not address the table details cell by cell. The reader is referred to CPUC (2016) and CPUC Energy Division (2017) for such discussion.

Table 1: CPUC Decision 16-08-019 Adopted Default Baseline Policy for All Sectors (CPUC "Table 1")

Alteration Type	Delivery	Savings Determi-nation	Shell & Bldg System and Add-On Equipment	Behavioral, Retro-commissioning, & Operational	Normal Replacement	Accelerated Replacement and Repair Eligible
New construction, expansions, added load	Any	Any	Code	N/A	Code	N/A
Existing buildings, including major alterations	Upstream & Midstream	Any	Code	N/A	Code	N/A
	Down-stream	Calculated	Existing	Existing	Code	Dual
		Deemed	Existing	Existing	Code	Dual
		Normalized Metered Energy Consumption	Existing	Existing	Existing, Program Design	Existing
		RCT/ experi-mental	Existing	Existing	Existing	Existing
Non-building projects, including industrial and agricultural processes	Any	Any	N/A	Existing	Standard Practice	Dual

Details of California's policy relative to Massachusetts are described in the following sections.

Summary of Similarities and Differences

Table 2 summarizes the similarities and differences in approach to baseline characterization between the two states. Overall, the states define baseline similarly. California's framework reflects a broader scope to date, but they are converging. Major differences can be found in the development process, with California being more regulatorily-driven, and in the scope and application of concurrent/ex ante review process. In Massachusetts, such scope is limited to gross topics and is more advisory in nature, whereas in California the scope also includes early free ridership screening and the ex ante evaluation team's conclusions are binding to the implementer. These are big differences.

Table 2: Massachusetts and California Baseline Characterization Policy Similarities and Differences Summary

Baseline Topic	Massachusetts	California
Scope		
Sectors covered	Commercial & industrial (so far)	All
Program types covered	All	All
Alteration types covered	All	All
Technology-specific baseline repository	Planned	Yes, through workpapers
Measure-level specification	Not In scope	Being defined
Development		
Catalyst for change	EEAC consultants	Legislation
Key documents	Baseline Framework ISP Repository (planned)	CPUC decisions POE guidance Measure-level report Measure workpapers
Final guidance mechanism	Stakeholder group report	CPUC decision
Definitions		
Key terms defining first-year savings	Codes, standards, ISP, existing conditions	Codes, standards, ISP, existing conditions
Dual baseline consideration?	Yes – New for evaluation scope	Yes
Regressive baseline allowance	No, but 3 exceptions	No
Baseline if ISP materially exceeds the applicable code or standard?	ISP, with exceptions specified	In discussion
Level of specificity	More generalized	More application/ technology specific
Concurrent / Ex Ante Savings Review		
Preferred term	Concurrent	Ex Ante
Gross baseline characterization in scope?	Yes	Yes
Hours of use/loading/FLH in scope?	No	Yes, but not binding
Free ridership in scope?	No	Yes
Spillover in scope?	No	No
Is concurrent/ex ante baseline characterization binding to ex post evaluator?	Yes, absent extraordinary new information	No, but reversal rarely if ever occurs
Is implementer obliged to use evaluator/ex ante team baseline in application?	No	Yes
Is implementer obliged to use evaluator FR assessment?	N/A	Yes
Who selects projects for review?	TBD	By ex ante review team
Who pays for any added implementation-side time?	Implementation	Implementation
Who pays for any added evaluation-side time?	Evaluation (PAs)	Evaluation (CPUC)

Similarities

The two states' baseline policies have much in common. Perhaps most significantly, the over-arching baseline principles defining baseline are largely the same. Readers no doubt will find much in common with policies articulated in other jurisdictions:

- Building codes and equipment efficiency standards generally define baseline for new construction and replace-on-failure when they are relevant. When they are not, ISP defines the baseline. Both states have important exceptions to the general rule. The Massachusetts exceptions are that if both a code/standard and an ISP apply and the ISP reflects a higher efficiency, ISP is the baseline. Conversely, if both apply and ISP is lower, the code/standard applies if there is a relevant code compliance or similar program, and ISP applies if not. California recently has added more specific exceptions for excluding measures from the new construction/replace on failure category and moving them to retrofit regardless of replaced equipment age relative to its EUL.
- For add-on type measures, such as variable frequency drives (VFDs) and added insulation, the preexisting condition is the baseline.
- For retrofits or replacement of working equipment, the dual baseline must be considered and usually applies.
- Industrial capacity expansion is treated like new construction. The post-project production rate governs.

California and Massachusetts baseline policies have procedural similarities with each other as well:

- Both require that evaluations consider baseline characterization independently as part of third-party ex post impact evaluations.
- Both have a baseline policy framework formally articulated in writing. The policies guide decision-making with the following:
    - Logic: A combination of flowcharts and more flexible POE-based assessment for the early/normal replacement decision-making
    - ISP research protocols, although the contents of such vary
    - Fuel switching policy
    - Regressive baseline policy
    - Evidentiary standards and documentation guidelines
- Both desire acceleration of the timing of gross impact evaluation so that it occurs closer to the time of project completion.

Differences

"The devil is in the details" applies to baseline characterization more than perhaps any other aspect of gross impact evaluation. And as soon as one compares the details of the two states' baseline policies, substantive differences emerge in all areas: definitions, procedures, and application of results. Policy development itself has differed as well.

General Differences

Overall, California's policy is more explicit (outside of POE) and binding. History is part of the reason for this. Starting in about 2010, the California IOUs, regulators, and evaluation contractors markedly increased the rigidity of standards applied to baselines and other aspects of impact evaluation. Poor gross and net evaluation results from the 2006–08 program cycle in part drove this. For example, in California a systematic ex ante review—

which involves an evaluator-type baseline review prior to application acceptance—was initiated during this period to reduce the likelihood of poor realization rates and free ridership factors in later ex post evaluation. This progressive step is becoming more common throughout North America,[8] but what makes California's approach aggressive is that the ex ante team findings are binding to the implementer regarding baseline characterization; the implementer cannot choose to disregard the interpretation at their later peril—and the findings must demonstrate an absence of free ridership.[9]

California's approach overall is more specific as well. Massachusetts has just now established a policy framework and is starting to build a repository of ISP baselines. The Framework includes dozens of examples but is not comprehensive. California, in contrast, is specifying baselines for specific technologies (LED fixtures versus LED lamps, or behavioral versus retrofit program types, for example). This difference is likely to gradually disappear over time as MA's repository grows.

California's approach has several strengths: It protects ratepayer funds down to the individual project level and, absent excessive administrative costs, should increase cost-effectiveness. The higher degree of specificity should lead to greater certainty even if it triggers initial contentiousness. On the other hand, those administrative costs can, in fact, be high, and ex ante engagement has proven to delay development of some efficiency projects.

Definition Differences

As noted above, the general definition is essentially the same in the two states. There are differences, however:

- In California, the non-regressive exceptions noted for Massachusetts do not apply.
- In California, shell and "building system" retrofits explicitly use an existing condition baseline without dual baseline, regardless of other considerations. Measures that fit into the "building system" category continue to evolve. While Massachusetts evaluators may come to this same conclusion on individual assessments, its framework and budding repository do not yet classify measures as such.
- California does not emphasize the unique/non-unique distinction as much as Massachusetts
- Repairs generally are not eligible for incentives due to the baseline being considered functional operation in either state, but in response to AB 802 the CPUC intends to allow exceptions for repairs that improve efficiency by more than 20% and those that are "non-routine." This has not been finalized. Massachusetts does not address this topic.

Procedural Differences

The largest procedural differences can be found in the ex ante/concurrent review process, but there are other differences as well.

- In California's ex ante review process, the review team selects measures for review; in Massachusetts' concurrent review process, engagement is designed to be optional for PAs and measure selection is at the PAs' discretion.
- In California, the ex ante review scope and POE assessment includes free ridership. If the measure is identified as a free rider, it is rejected. Free ridership is not in the scope of Massachusetts concurrent review. This is arguably not directly a gross baseline issue but it is closely aligned with it and procedurally intertwined.

[8] NYSERDA has such procedures for their Industrial and Process Efficiency (IPE) program, for example (ERS and West Hill Energy, 2015).

[9] But not unique. For example, some Ontario Independent Electricity System Operator (IESO) programs are known to assess free ridership and consider it prior to approving individual application incentive levels.

- California is introducing three different tiers of required rigor for its early retirement/normal replacement POE decision-making in custom measure evaluation, including fast-track options for some measure-program combinations (CPUC Energy Division 2017), to reduce applicant burden. More rigor is required of projects with bigger incentives. Separate unique procedures are being introduced for deemed measures. Massachusetts has introduced a more general POE requirement to begin with.
- A more systematic POE scoring system has been proposed for use in California to reduce uncertainty of outcomes. It has not been accepted as of the time of this paper but appears to be on track for eventual adoption in some form.

Differences in Application of Results

There are two major differences between the jurisdictions regarding the application of the results. In Massachusetts, lifetime savings impact evaluation is in scope for evaluators through use of dual baselines. The results, effective lifetime savings realization rates, are being computed for educational purposes only in 2017 and 2018, and are planned to be applied to lifetime tracking savings estimates starting in 2019. California does not have an equivalent evaluation procedure.

In California the ex ante review team's baseline characterization is binding to implementers. If a reviewer concludes that the baseline and proposed measure conditions are the same, for example, the measure cannot go forward. In contrast, in Massachusetts the evaluator's concurrent review baseline characterization is non-binding. It, of course, would be prudent for the implementer to use the same characterization as the evaluator, especially for large savers likely to be selected in later evaluation samples and because PA performance incentives are based on evaluated not tracking gross savings, but they are not required to do so.

Policy Development Differences

Policy development in Massachusetts has been more straightforward and collaborative than in California. The absence of the state legislature involvement in technical matters, the predominant delegation of oversight responsibility by the state of Massachusetts from the Office of Energy & Environmental Affairs to the EEAC and its consultants in 2008, the generally higher evaluated results, and the PAs generally reaching portfolio level goals and earning associated incentives all has contributed to this. It remains to be seen if, in the face of increasing savings goals and strains on cost-effectiveness, this can be maintained.

It also has been simpler. Creating a new policy that is focused on C/I and predominantly on downstream programs in Massachusetts is a lesser challenge than changing existing policy for all program types, all sectors, all measure types, and at a high degree of specificity in California.

In California, the stakeholder groups engaged in the process have included third party implementation contractors, professional associations that advocate policy positions as a core responsibility, the Office of Ratepayer Advocates, and others. This is an excellent investment for the long-term, but it makes initial policy development a bigger challenge.

Conclusion

Two leading states have separately concluded it is worth investing in the effort required to establish and maintain formal policies regarding baseline characterizations. It has been a major effort for each. Even after the surge in effort in the last year, both recognize that follow-up activity will be required to keep the policies current and gradually inculcate the states' efficiency communities regarding their messages.

Massachusetts and California's new and updated policies have much in common regarding the technicalities of baseline definitions. They have significant differences regarding administration of the policy that suit each state's history and future needs.

The authors recommend that other jurisdictions maintain such policies, especially those that are finding evaluated gross realization rates that vary widely or are consistently low in part due to differing baseline characterizations between implementers and evaluators.

References

ACEEE, *The State Efficiency Scorecard*, 2016. Available at http://aceee.org/state-policy/scorecard.

CPUC (California Public Utilities Commission), *Decision 09-09-047, Decision Approving 2010 To 2012 Energy Efficiency Portfolios and Budgets*, October 1, 2009. Available at http://docs.cpuc.ca.gov/PUBLISHED/GRAPHICS/107829.PDF.

---, *Energy Efficiency Policy Manual, version 5*, July 2013. Available at http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/EEPolicyManualV5forPDF.pdf.

---, *Decision 14-10-046, Decision Establishing Energy Efficiency Savings Goals and Approving 2015 Energy Efficiency Programs and Budgets*, October 24, 2014. Available at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M129/K228/129228024.pdf.

---, *Regulating Energy Efficiency: A Primer on the CPUC's Energy Efficiency Programs,* February 2016. Available at http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/Fact_Sheets/English/Regulating%20Energy%20Efficiency%200216.pdf.

---, Decision 16-08-019, *Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings*, August 18, 2016.

CPUC ED (California Public Utilities Commission Energy Division), *Early Retirement Using Preponderance of Evidence*, Version 1.0, July 16, 2014. Available at http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5325.

---, *Resolution E-4818: Measure level baseline assignment and preponderance of evidence guidance to establish eligibility for an accelerated replacement baseline treatment*, March 2, 2017. Available at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M178/K154/178154007.docx.

California State Assembly, Assembly Bill No. 802, CHAPTER 590, October 28, 2015. Available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB802.

EEAC (Energy Efficiency Advisory Council) Consultant Team, Memo on Improving Savings Estimates for C&I Custom Projects – DRAFT, to the EEAC, Date: February 15, 2016. Available at http://ma-eeac.org/wordpress/wp-content/uploads/MA-CI-Custom-Methods-memo.2016.03.04.pdf.

ERS, *T1 Working Group Report: Measure-Level Baseline and Preponderance of Evidence for determining an accelerated replacement dual baseline treatment*, December, 2016. Available at http://www.cpuc.ca.gov/general.aspx?id=4130.

ERS and DNV GL, *Massachusetts Commercial/Industrial Baseline Framework, Final Report,* prepared for the Massachusetts Program Administrators and Energy Efficiency Advisory Council, April 26, 2017. Available at

http://ma-eeac.org/wordpress/wp-content/uploads/MA-Commercial-and-Industrial-Baseline-Framework.pdf.

ERS and West Hill Energy, *Industrial and Process Efficiency Program Impact Evaluation (2010-2012) Final Report*, April 20, 2015. Available at https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2015ContractorReports/2015-Industrial-and-Process-Efficiency-Program-Impact-Evaluation.pdf.

Itron with assistance from ERS, Energy Metrics, Michaels Engineering, and Katin Engineering Consulting, *2013 Custom Impact Evaluation Industrial, Agricultural, and Large Commercial Final Report*, submitted to California Public Utilities Commission, July 17, 2015. Available at www.calmac.org/publications/IALC_2013_Report_Final_071715.pdf.

ISO-NE (ISO New England Inc.), *ISO New England Manual for Measurement and Verification of Demand Reduction Value from Demand Resources, Manual M-MVDR*, rev. 6, Effective Date: June 1, 2014. Available at https://www.iso-ne.com/static-assets/documents/2017/02/mmvdr_measurement-and-verification-demand-reduction_rev6_20140601.pdf.

Kushler, Martin, Seth Nowak, and Patti Witte, *A National Survey of State Policies and Practices for the Evaluation of Rate Payer-Funded Energy Efficiency Programs*, Report U122, ACEEE, February 2012. Available at http://ilsagfiles.org/SAG_files/Subcommittees/IPA-TRC_Subcommittee/6-16-2015_Meeting/NEBs_Sources/ACEEE_2012%20report.pdf.

Mackin, Dina, *Baseline Policy Framework*, CPUC Workshop on Energy Efficiency Baselines, April 28, 2015. Available at http://www.cpuc.ca.gov/general.aspx?id=4130.

Massachusetts Joint Utilities, *2016-2018 Massachusetts Joint Statewide Three-Year Electric and Gas Energy Efficiency Plan*, April 30, 2015. Available at http://ma-eeac.org/wordpress/wp-content/uploads/2016-2018-DRAFT-Electric-Gas-Energy-Efficiency-Plan.pdf.

Molina, Maggie, *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, Report U1402, ACEEE, March 2014. Available at http://aceee.org/research-report/u1402.