

# Comparative Evaluation of Financing Programs: Insights From California's Experience

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Evaluation of energy efficiency financing programs is a nascent area. A recent publication by Berkeley Lab characterizes oversight mechanisms for ensuring that financing initiatives achieve their intended contribution toward energy efficiency goals and reviews early steps toward financing program evaluation in several states.<sup>2</sup> This topic is growing in importance as financing programs are steadily increasing their presence in energy efficiency markets.<sup>3</sup>

This brief builds on Berkeley Lab's previous work<sup>4</sup> by examining proposed criteria for a comparative assessment of multiple energy efficiency financing programs developed through a statewide public process in California. Issues discussed include:

- Attribution of outcomes — such as energy savings — to financing programs vs. other drivers
- Choosing the outcome metric of primary interest: program take-up levels vs. savings
- The use of net benefits vs. benefit-cost ratios for cost-effectiveness evaluation
- How to handle non-energy factors
- How to handle consumer protection factors
- How to handle market transformation impacts
- How to accommodate varying program goals in a multi-program evaluation
- How to account for costs and risks borne by various parties, including taxpayers and utility customers, in cost-effectiveness analysis
- How to account for potential synergies among programs in a multi-program evaluation

Section 1 of this brief describes the stakeholder process used to develop the proposed assessment criteria. Sections 2 and 3 describe issues that arise when considering criteria relevant to evaluating an individual program versus multiple financing programs. Section 4 contains a summary of the final criteria that CAEATFA proposed. Section 5 offers concluding thoughts for financing program evaluation going forward.

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## 1. California's Evaluation Criteria Development Process

In July 2015 the California Legislature tasked the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA)<sup>5</sup> with creating a working group to “develop criteria for a comparative assessment of energy efficiency financing programs in California.”<sup>6</sup> The Legislature’s request focused on the following programs:

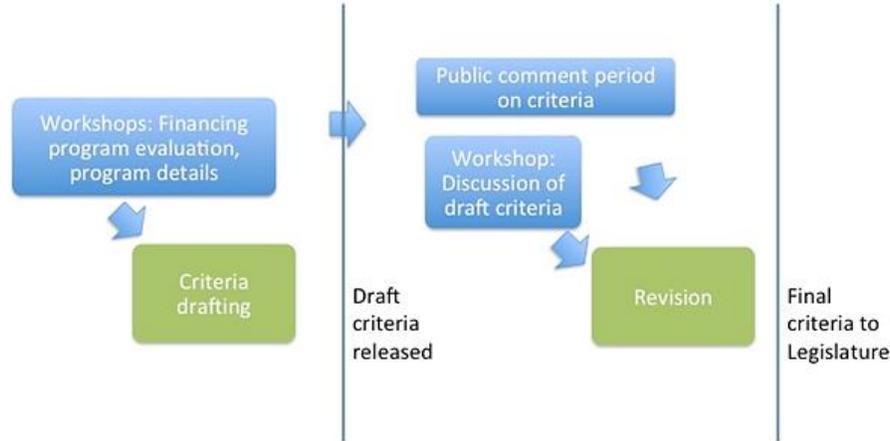
- the offerings from the California Hub for Energy Efficiency Financing,<sup>7</sup> currently under design and piloting at CAEATFA in coordination with the California Public Utilities Commission (CPUC) and the California investor-owned utilities;
- California property assessed clean energy (PACE) programs — some statewide, others local;<sup>8</sup> and
- the commercial on-bill financing program run jointly by the three largest California utilities.<sup>9</sup>

The California Legislature directed CAEATFA to develop these criteria, not to conduct an evaluation. Methodologies for evaluating energy efficiency financing programs are still being developed and refined and may vary across programs. Thus, the report CAEATFA delivered to the Legislature<sup>10</sup> does not propose specific evaluation methods, but instead focuses only on comparative criteria for further discussion and consideration, acknowledging that implementing some of the criteria may pose methodological challenges.

CAEATFA convened a series of public workshops<sup>11</sup> to develop the criteria. The first workshop focused on the SEE Action Network report, “Making It Count: Understanding the Value of Energy Efficiency Financing Programs Funded by Utility Customers”<sup>12</sup> to lay the groundwork for future sessions. At the second and third workshops, stakeholders discussed the administration and evaluation of California energy efficiency financing programs. These three workshops served to both educate stakeholders and inform the evaluation criteria development process. The fourth workshop presented and discussed proposed draft comparative criteria with a working group appointed by the CAEATFA Board. After considering public comments, CAEATFA revised and finalized the criteria and submitted them to the Legislature in July 2016. Figure 1 summarizes the criteria development process.

CAEATFA’s criteria development process was successful in soliciting stakeholder feedback and helping to resolve issues raised. The workshop discussion of the criteria was robust and constructive, and 11 parties submitted written comments.<sup>13</sup> CAEATFA made substantive changes to the initially proposed criteria in response to stakeholder feedback. Several of these changes are discussed below.

CAEATFA’s report to the Legislature, an invaluable reference for other jurisdictions considering these topics, discusses the proposed criteria and the rationales behind them in detail. This brief does not repeat that discussion, focusing instead on several salient issues that emerged during the criteria development and discussion process. Many of these issues are likely to arise in other states that plan to evaluate the impacts of energy efficiency financing programs, whether for a single program or multiple programs. In part these issues arise because existing evaluation protocols were not developed with financing in mind. They also arise because one popular program type —PACE — is not a utility program, so aspects of traditional utility program evaluation require alteration.



**Figure 1. CAEATFA’s evaluation criteria development process.** Blue boxes indicate public participation and comment steps that informed the criteria; green boxes show the drafting and revision of the proposed criteria themselves.

## 2. Issues for Evaluation of Individual Financing Programs

Six issues that are broadly applicable to financing program evaluation, even when evaluating a single program, were discussed during development of CAEATFA’s proposed evaluation criteria.

### Attribution of energy savings

The criterion for energy savings is savings attributable to financing programs, rather than savings generated by projects supported by those programs.<sup>14</sup> Figure 2 illustrates how energy savings from projects and energy savings attributable to the program differ.

Some stakeholders felt attributing savings to financing was too speculative or difficult methodologically to do or to emphasize, recommending that gross savings play a larger part in the assessment.<sup>15</sup> Other stakeholders emphasized the primacy of attributable savings as the appropriate measure of program impact, and CAEATFA ultimately chose this focus with the understanding that a methodology for this approach has not yet been developed.

CAEATFA discussed gross savings under its “analytic information” criterion. Gross savings results would yield valuable information about how the financed projects are performing even if they do not directly indicate program impact. Gross savings can also help explain net savings findings. For example, if net savings are low but gross savings are high, we would draw different conclusions about the program than if both net and gross savings are low.

Some commenters emphasized that financing is only one aspect of a set of mechanisms that deliver savings, making attribution to the financing itself difficult. CAEATFA’s selected approach is to analyze the energy savings impact of *programs* that include financing — not the impact of the financing alone.

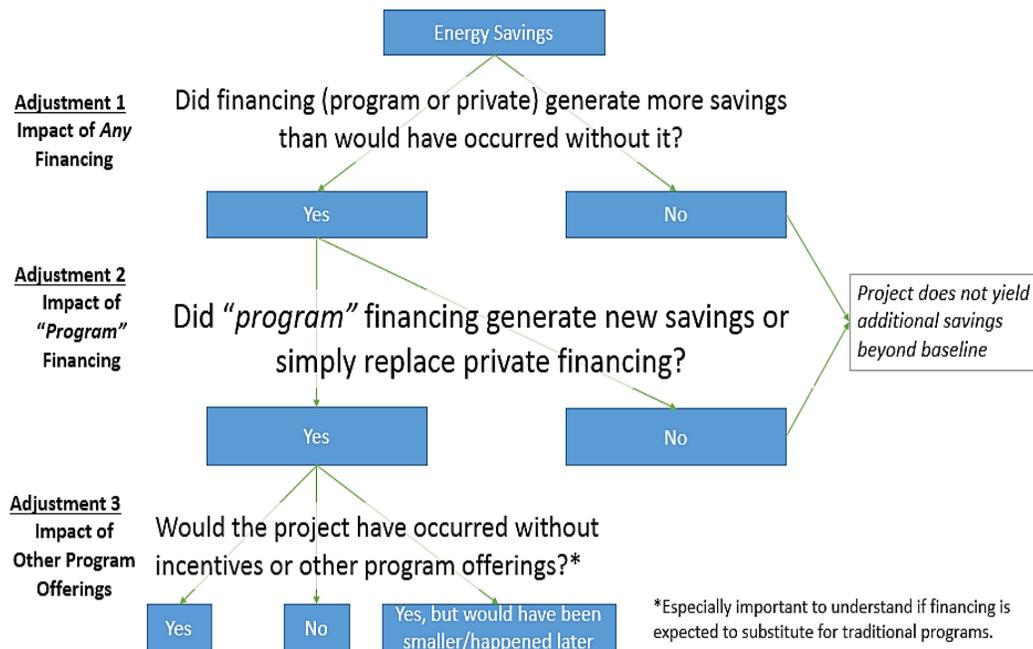


Figure 2. Attribution of energy savings to financing programs. Source: Kramer et al. (2015)

### Market take-up vs. savings

Some stakeholders wanted to start with the premise that better access to financing is necessary for clean energy deployment. These stakeholders advocated assessing the market take-up of available financing rather than the energy savings generated.<sup>16</sup> This approach assumes that financing programs are consequential for energy savings. If they are in fact consequential, a well-designed attributable savings analysis will reveal the savings. The final criteria retain the primacy of energy savings analysis, rather than market take-up.

### Net benefits vs. benefit/cost ratios

Benefit/cost ratios — benefits divided by costs — are commonly used for evaluating cost-effectiveness of energy efficiency programs. However, there are many reasons that *net benefits* — benefits minus costs — is a more revealing metric.<sup>17</sup> Figure 3 illustrates the difference between the two metrics. While both metrics matter, especially when seeking to understand program outcomes, net benefits are most clearly related to desirable policy outcomes as they measure the total value produced by the program.

CAEATFA recommends considering net benefits as well as benefit/cost ratios of financing programs. This topic elicited little reaction from working group participants and in public comments.

	Program A	Program B
Program Costs	\$800,000	\$1,500,000
Program Benefits	\$2,000,000	\$3,000,000
Benefit/Cost Ratio	2.5	2.0
Net Benefits	\$1,200,000	\$1,500,000

Figure 3. Benefit/Cost Ratio vs. Net Benefits. Source: Adapted from Kramer et al. (2015). The figure illustrates that one program (Program A) may have a higher benefit/cost ratio, while another (Program B) has greater net benefits.

### Role of non-energy benefits

The preliminary draft of the criteria presented at the working group session<sup>18</sup> noted that, in theory, the cost-effectiveness tests should consider non-energy benefits of the programs — for example, energy security, job creation, environmental benefits, improved indoor air quality, safety improvements and noise reduction.<sup>19</sup> However, in practice, these benefits are valued inconsistently. Some commenters felt that non-energy benefits are not the main policy goal, or are not the main goal of the comparative criteria the Legislature tasked CAEATFA with developing. Others contended that methods to assess non-energy benefits are generally too speculative to warrant their inclusion in cost-effectiveness calculations.<sup>20</sup> On the other hand, some parties noted that non-financial benefits that relate specifically to the financing — for example, the speed of completing a financing transaction — may well be very important to consumers and should be considered somehow.<sup>21</sup> CAEATFA's final criteria make only passing reference to non-energy benefits, with no explicit recommendation as to what, if any, non-energy benefits should be considered specifically for energy efficiency financing programs, recognizing that programs have varied and distinct public policy goals.

### Role of consumer protection considerations

Many evaluations of energy efficiency programs do not consider consumer protection. However, financing programs prompt additional consumer protection concerns since they impose future payment obligations. Failure to meet these obligations may have a variety of customer impacts — including service disconnection, collection activities, credit impacts, or repossession of assets that secure payments — depending on the design of the financing program.

This issue provoked a range of reactions. Some parties argued that consumer protection considerations should not receive much weight,<sup>22</sup> while others felt they should be emphasized more.<sup>23</sup> Some felt the draft proposed criteria addressed consumer protections appropriately. In general, commenters coming from a lending or housing perspective felt consumer protection should receive more weight, while those focused on energy outcomes felt they should receive less emphasis. As California's Assembly Bill 2693<sup>24</sup> and three recent class-action lawsuits<sup>25</sup> filed against PACE programs (two in California, one in Florida) over consumer issues attest, consumer protection will likely grow in importance as energy financing programs become more widespread.

### Role of market transformation

Market transformation for energy efficiency is “the strategic process of intervening in a market to create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of all cost-effective energy efficiency as a matter of standard practice.”<sup>26</sup> The role of market transformation in energy efficiency financing programs received a great deal of discussion in CAEATFA's development of comparative criteria. Nearly all commenters agreed that market transformation is an important goal of financing programs. However, there was substantial discussion and different perspectives about how and whether it should be addressed within the proposed criteria. Evaluating market transformation impacts of financing programs is even more nascent than other financing evaluation criteria.<sup>27</sup> The original draft of the primary criteria<sup>28</sup> did not include market transformation due to the significant challenges of conceptualizing and measuring the impact of financing programs on energy efficiency markets. In particular, where multiple financing programs are available in the same sector, separating market transformation impacts of individual programs is a significant challenge. Some parties agreed with leaving market transformation off the list of primary criteria, while others did not. In the end,

CAEATFA added market transformation to the list of primary comparative criteria. Even though market transformation is a nascent evaluation area, the criteria list partly serves to drive evaluation methodology in the right direction.

### 3. Issues for Comparative Evaluation of Financing Programs

The issues discussed in this section arise when analyzing a market that features multiple financing programs. These issues are not germane to evaluation of individual financing programs.

#### Varying program goals

One complication of comparing multiple energy efficiency financing programs is that program goals may differ. While all of these programs seek to save energy (and lower utility bills) and increase the deployment of energy efficiency measures, there often are other goals — for example, water efficiency, renewable energy deployment, deployment of non-energy measures such as seismic retrofitting, or increased job growth/economic activity. Further, programs may seek to influence the market differently, such as focusing on attracting investor capital vs. encouraging customer-level participation, or emphasizing local economic development or specific targets such as low-income customers. The CAEATFA criteria focus largely on energy impacts as an important common ground on which all financing programs can be assessed. However, energy impacts do not comprehensively measure success because they are rarely the only expressed purpose of financing programs. And it is not necessarily appropriate to evaluate programs against goals that they did not set, even if other financing programs have those goals.

#### Varying levels and sources of public and utility customer support

Different programs receive different levels of support from public or utility customer sources, and that support comes in different forms. In California, for example:

- The utility on-bill financing program lends capital raised from customers through system benefit charges at zero interest.
- The California Hub for Energy Efficiency Financing pilots facilitate private capital, in some cases backed by utility customer-funded loan-loss reserves.
- PACE programs predominantly use private capital routed through publicly authorized usage of a special assessment district, with a state-funded loss reserve to de-risk mortgage holders.<sup>29</sup>

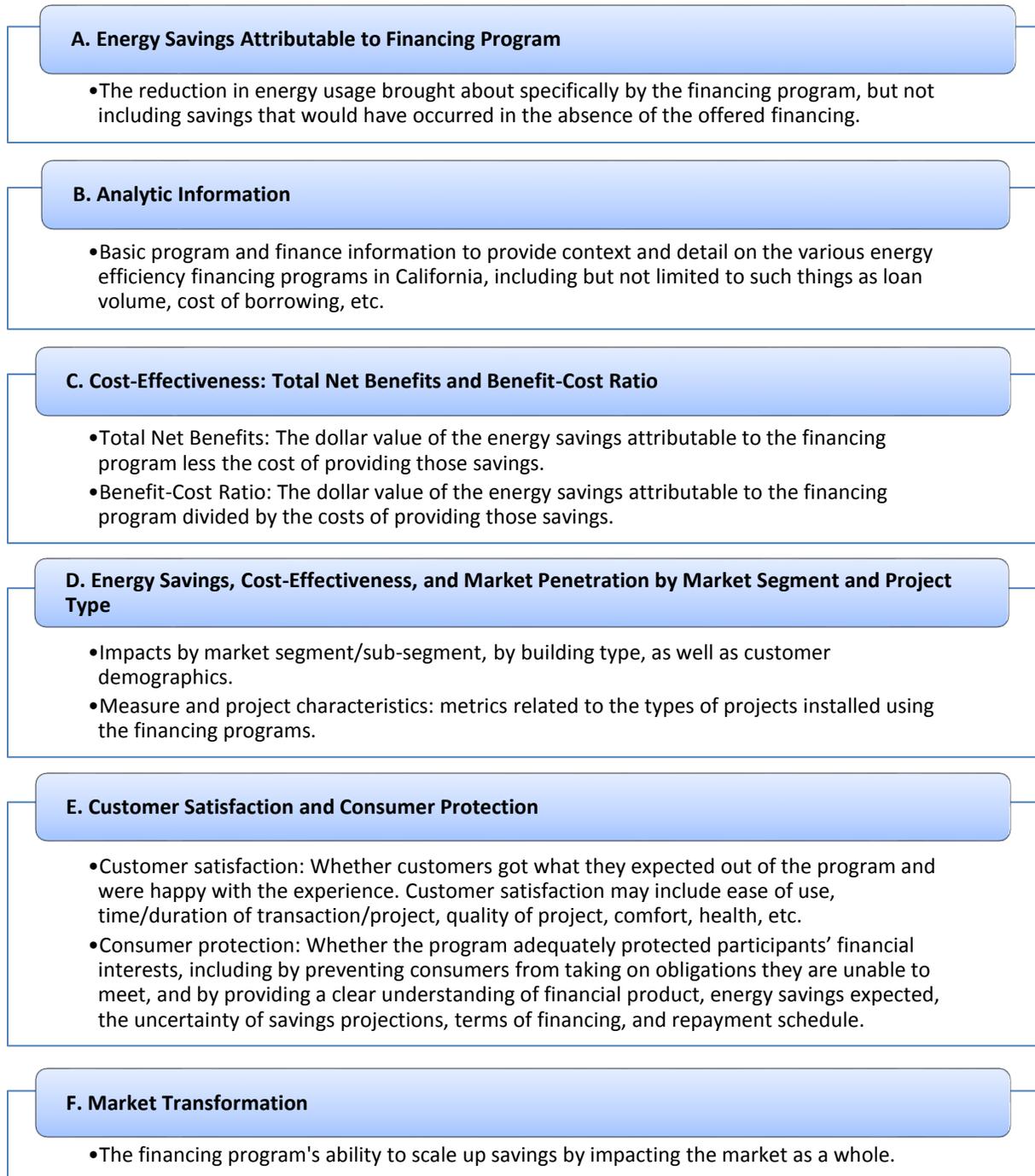
A well-executed cost-effectiveness analysis will address and account for these different types of support. Such an analysis must also have a clearly defined perspective. Cost-effectiveness tests sometimes take the utility customers' perspective, but it makes little sense to evaluate PACE programs — which are supported by private and potentially other public resources, not utility customers — from that perspective. Utility customers are not equivalent to the public at large; utility customer costs should not be directly compared to public costs, unless using a cost-effectiveness test that makes this comparison appropriate, such as the total resource cost test or societal cost test.<sup>30</sup> Moreover, some of these supports are more readily quantified than others. In particular, valuing the usage of special assessment districts by PACE programs will require breaking new methodological ground, and accounting for risk-based supports such as loan-loss reserves is also relatively novel.

### Accounting for potential program complementarity

A comparative assessment of financing programs might be assumed to suggest that these programs would be evaluated relative to each other, in order to identify the most effective programs and potentially eliminate less effective ones. While this is a potential outcome, it is important not to presume it. As the CAEATFA report notes, where multiple programs exist, they may in fact be complementary and not compete with each other. This may be the case if different programs serve different sectors, appeal to different types of customers within a sector, or effectively support different measures or projects. Even where multiple programs serve the same market, they may turn out to be complementary. Rather than setting out to rank multiple programs, a helpful comparative assessment should evaluate the logic of the full existing portfolio of programs. The evaluation might suggest how different programs' outcomes can inform each other or identify gaps in the market that no program is serving well, potentially pointing toward expansion of current offerings or introduction of additional programs.

## 4. Summary of Proposed Criteria

Figure 4 summarizes the criteria proposed in the final CAEATFA report.



**Figure 4. Summary of Proposed Comparative Criteria.** Source: Adapted from CAEATFA (July 2016)

## 5. Conclusion

These are early days for evaluation of energy efficiency financing programs. Yet such evaluation is critical to ensuring the effective use of public and utility customer resources for these programs. Early efforts like CAEATFA's criteria development process — and any future assessment that makes use of them — are valuable first forays and may help serve as models for other states considering assessments of individual or multiple financing programs.

Evaluations of energy efficiency financing programs must make a number of choices about scope and perspective, as illustrated in this brief. For example:

- What methodologies can be used to determine energy savings attributable to financing programs?
- Are non-energy benefits in scope?
- How should consumer protection be considered?
- How should costs and benefits be assessed when they are spread across multiple parties, including non-utility sources of support?

There may not be clear answers to all of these questions. CAEATFA's process of public engagement to draw out a variety of stakeholder perspectives helped define the best ways to proceed within California's specific context. Evaluations of financing programs in any state will be most valuable when they clearly identify choices of scope, perspective, rationales and policy goals behind them.

The California Legislature directed CAEATFA to develop proposed criteria for a comparative assessment given the state's multiple financing programs for energy efficiency. As financing programs continue their expansion, more states may be in position to undertake such an evaluation. The criteria and discussion in the final CAEATFA report are particularly relevant to these states as they grapple with understanding the impacts of multiple programs. Nonetheless, most of this information also is useful for states evaluating individual programs. Over time, well-executed evaluations will enrich our understanding of how to best design, position and coordinate financing programs.

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<sup>1</sup> Chuck Goldman, Berkeley Lab, contributed to the process that informed the criteria development. Chris Kramer, Energy Futures Group, worked closely with Berkeley Lab staff and CAEATFA to develop the criteria. The author thanks the U.S. Department of Energy for supporting this work and the following individuals for reviewing a draft of this brief: Eleni Pelican (DOE), Lisa Schwartz (Berkeley Lab), Chris Kramer (Energy Futures Group), and Bettina Redway, Deana Carrillo and Ashley Bonnett (CAEATFA).

<sup>2</sup> Kramer et al. (2015).

<sup>3</sup> Deason et al. (2016).

<sup>4</sup> <https://emp.lbl.gov/projects/financing-energy>.

<sup>5</sup> CAEATFA, housed in the State Treasurer's Office, was established to advance the state's goals of reducing greenhouse gas emissions, increasing the deployment of sustainable and renewable energy sources, implementing measures that increase the efficiency of the use of energy, creating high quality employment opportunities, and lessening the state's dependence on fossil fuels.

<sup>6</sup> See <http://www.lao.ca.gov/reports/2015/supplemental/2015-16-supplemental-report.pdf>, p. 8.

<sup>7</sup> See <http://www.treasurer.ca.gov/CAEATFA/cheef/index.asp>.

<sup>8</sup> See, for example, the California HERO program at <https://www.heroprogram.com>; the California Statewide Communities Development Authority's Open PACE program at <http://cscda.org/Open-PACE>; the Ygrene Works program at <https://ygreneworks.com/>; Sonoma County's Energy Independence Program at <http://sonomacountyenergy.org/>; and the mPOWER program at <http://www.mpoweradvantage.net/>.

<sup>9</sup> See Pacific Gas & Electric's web site at <http://www.pge.com/eef>, Southern California Edison's web site at <http://www.sce.com/onbill>, and San Diego Gas & Electric's web site at <http://www.sdge.com/business/bill-financing>.

<sup>10</sup> <http://www.treasurer.ca.gov/caeatfa/workinggroup/report.pdf>.

<sup>11</sup> Workshops were held February 10, 2016; March 22, 2016; March 29, 2016; and April 22, 2016.

<sup>12</sup> Kramer et al. (2015).

<sup>13</sup> Written commenters included representatives of the California Association of Realtors, the California Bankers Association, the California Credit Union League, the California Housing Partnership Corporation, Renovate America, The Cadmus Group, the California PUC, Joule Assets, The PFM Group, Pacific Gas & Electric Company, Renew Financial, Ygrene Energy Fund, and one individual.

<sup>14</sup> See the attribution discussion in Chapter 5, Kramer et al. (2015). In program evaluation terminology, savings attributable to financing is more akin to net savings than to gross savings, accounting for the fact that some participants in programs might proceed with energy improvements even absent the programs. Such participants are commonly referred to as free riders, and the savings from such participants would not represent net savings. However, approaches to evaluating savings attributable to financing may not account for spillover, or savings the program induces in non-program households, while net savings would include spillover. For example, a household sees a neighboring household install a program-financed improvement and is motivated to install one, but doesn't make use of the program.

<sup>15</sup> See comments of James Dodenhoff in Appendix B of the CAEATFA report.

<sup>16</sup> See comments of Renovate America in Appendix B of the CAEATFA report.

<sup>17</sup> See Chapter 4 in Kramer et al. (2015) for an in-depth discussion of this issue. Also note that Connecticut Green Bank recently added net benefits to its evaluation plan, which already considered benefit/cost ratios. See Connecticut Green Bank (2016).

<sup>18</sup> <http://www.treasurer.ca.gov/caeatfa/workinggroup/criteria.pdf>.

<sup>19</sup> See Mills and Rosenfeld (1994).

<sup>20</sup> See comments of the California Housing Partnership Coalition in Appendix B of the CAEATFA report.

<sup>21</sup> See The Cadmus Group (2016).

<sup>22</sup> See comments from the CPUC's Special Advisor for Energy Efficiency in Appendix B of the CAEATFA report.

<sup>23</sup> See, for example, comments from the California Bankers Association in Appendix B of the CAEATFA report.

<sup>24</sup> See [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201520160AB2693](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2693).

<sup>25</sup> See <http://www.sandiegouniontribune.com/news/watchdog/sd-me-renovate-america-20161117-story.html>, <http://www.northbaybusinessjournal.com/industrynews/6792293-181/ygrene-energy-fund-pace-finance-lawsuit>, and <http://www.sun-sentinel.com/business/fl-bz-pace-prepayment-penalty-suit-20170411-story.html>.

<sup>26</sup> Northwest Energy Efficiency Alliance, [http://neea.org/docs/default-source/marketingtoolkits/neea\\_definition\\_of\\_markettransformation.pdf?sfvrsn=2](http://neea.org/docs/default-source/marketingtoolkits/neea_definition_of_markettransformation.pdf?sfvrsn=2).

<sup>27</sup> Chapter 5 of Kramer et al. (2015) discusses this issue in considerable depth.

<sup>28</sup> <http://www.treasurer.ca.gov/caeatfa/workinggroup/criteria.pdf>.

<sup>29</sup> Some local governments provide direct financings from their local treasury or other funds.

<sup>30</sup> See <https://www4.eere.energy.gov/seeaction/publication/understanding-cost-effectiveness-energy-efficiency-programs> for discussion of standard utility cost-effectiveness tests. The National Standard Practice Manual, a comprehensive framework for cost-effectiveness assessment of energy resources with a focus on energy efficiency, addresses additional criteria that jurisdictions may wish to consider: <https://nationalefficiencyscreening.org/national-standard-practice-manual/>.

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