

Evaluation Planning Across Multiple Cycles: Delivering Value through Continuous Improvement and Innovation

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ABSTRACT

As energy efficiency portfolios have expanded over the past decade, so to have evaluation needs and activities. Evaluation planning can cover a wide range of needs, from those of a single program to those that span multiple program administrators and stakeholders, dozens of programs, and multiple years. Expanded scope, requirements, and value expectations for evaluation have dramatically increased the importance of evaluation planning as well as the challenges. This paper provides lessons learned from one of the largest and most complex evaluation planning activities in North America. The paper compares and contrasts the evaluation planning goals, strategies, tactics, and outcomes across three planning cycles. The assessment discusses how evaluation planners responded to both changing and ongoing regulatory and program administrator requirements. We compare across a set of evaluation planning cycles with different organizational structures, stakeholder interaction approaches, methods of prioritizing needs, schedules, and resource allocations. Finally, we provide lessons learned and recommendations to aid others in the evaluation community charged with developing or supporting comprehensive evaluation planning.

Introduction: Evaluation Planning at the CPUC

The California Public Utilities Commission (CPUC) has been managing evaluation of the investor-owned utility (IOU) energy efficiency portfolios since the 2006-2008 program cycle. Three CPUC-led evaluation cycles are discussed in this paper: 2006-2008, 2010-2012, and 2013-2014. The evaluation priorities for each program cycle were guided by Commission direction as well as direction from Energy Division staff and consultants. Throughout these three cycles the approaches to defining priorities and developing an evaluation plan have differed in terms of the requirements of the evaluation, the planning approach, the means for deciding on resource allocations, and the challenges unique to each period. In this paper, we break down these components across these three cycles and offer recommendations for key lessons learned in planning evaluations.

2006-2008 Evaluation Cycle

Requirements

The 2006-2008 evaluation planning cycle was guided by Commission decision D.05-04-051 (CPUC 2005). This decision set a new direction for energy efficiency evaluation measurement and verification in California by putting Energy Division in the lead role for planning and executing the evaluation. The Commission adopted a set of evaluation protocols to guide the activity. The primary intent of the Energy Division-led impact evaluations was to inform a risk-reward incentive mechanism (which could result in a payment or penalty) to the investor-owned utilities for the performance of their energy efficiency portfolios. Given this focus, the Energy Division evaluation activities were designed to obtain the best possible measure of the portfolio impacts. In addition, the accuracy and timeliness of the results was of utmost importance. The timing of the evaluation activities was also outlined in the decision, with an expectation of interim and annual performance earnings reports. The evaluation budget was set at eight percent of the program portfolio with an expectation that these funds would be

adequate to provide robust results. The impact evaluation was assigned to Energy Division, an independent division of the CPUC that was not a party to the risk-reward proceeding, since the results would be used to make a judgment on a financial earnings claim from the IOUs. The decision also authorized funding for the investor-owned utilities to conduct process evaluations and market characterization to inform program improvement.

Planning Approach

In the 2006-2008 period, much of the planning occurred in the design of the contracting strategy to complete the impact evaluations, but a centralized evaluation plan was not required from Energy Division in this cycle. Energy Division relied on senior advisors who were brought on board prior to hiring the evaluation consultants to develop the evaluation contracts and provide guidance on organizing the overall evaluation effort. These advisors assisted Energy Division in their review of the full portfolio of programs. The portfolio was then broken down by utility and general program areas into 13 groups, including residential lighting, commercial retro-commissioning, large industrial and agriculture and codes and standards, among others. The expectation was that the evaluators bidding on the projects would be able to apply similar skills and leverage their expertise across a suite of *like* programs and measures to assess the impact of the portfolio. The section below on resources describes how the budgets for each contract were established. The research contracts for 2006-2008 totaled \$76 million across the 13 groups, and commenced in the fourth quarter of 2007; roughly 20 months after the start of the program cycle.

Evaluation firms were hired to plan the evaluations for the programs included in their contract groups. The first phase of the evaluation work was to develop a more detailed evaluation plan based on guidance from Energy Division staff and the rigor levels and programs as specified in the contracts. Each firm had relative autonomy with their Energy Division project manager to define the scope and breadth of the plan. The common guidance for prioritizing and conducting the evaluations was articulated in Commission decisions and the *California Evaluation Protocols* provided a guide for planning specific evaluations and for the oversight of Energy Division management.

The evaluation plans for each of the contract groups reflected varying methods to measure savings and many evaluations covered similar technologies or the same customers participating in different programs. While the innovation and expertise of individual firms was important, the need for consistent, adequate coverage of the portfolio savings, and concerns about duplication, led to the creation of another layer of evaluation planning being infused into the process mid-stream. Coordination across contract groups also allowed Energy Division to leverage expertise and use peer review across teams to improve work products. Net-to-gross methodologies, for example, were described in detail in the California Evaluation Framework and Protocols, but having a group of experts review and consider proposed net-to-gross methods helped to ensure the final results were consistent across the contract groups and reflected Commission policy and direction. Likewise, an “Engineering Working Group” met on a regular basis to develop standard measurement and verification (M&V) strategies, formats, and guidelines; and to coordinate sample and field contacts to avoid duplicate site visits. This group was also instrumental in reconciling measure to program results by developing a standardized, centralized data set of utility claims and successfully mapping the evaluation results to assess the portfolio performance at the end of the program cycle.

Resource Allocation

The impact evaluation was the responsibility of Energy Division, which had sole responsibility for allocating resources to meet the Commission objectives and had a singular mission of quantifying the savings. The investor-owned utilities were responsible for process evaluations and market characterization studies as needed to improve their programs. In the 2006-2008 period, there was no expectation of direct coordination for defining resource allocation nor was coordination of the

evaluation activities required in Commission decisions. Energy Division and the investor-owned utilities operated separately in allocating their respective evaluation resources prescribed in the Commission decision, which was not the case in future cycles.

Energy Division's distribution of its resources by contract group was based on the relative size of the programs within the contract group (budget and savings) as well as the expected cost of the evaluation activities. The budget allocations for each contract group took into account the number of programs, the size of the portfolio and the type of field evaluation and analysis needed to assess the impacts at the prescribed rigor levels. Energy Division specified which programs would use protocol-guided direct impact evaluation and which would use a verification-only approach, including expected budgets to meet the rigor levels, in the request for proposal and the contract. The contracted amounts were essentially maintained for the duration of the evaluation cycle, and for the most part expenditures were for the full budget. Some adjustments to budgets were made when Energy Division shifted resources to ensure measures with the greatest impacts in the portfolio were receiving full coverage. Otherwise, budget constraints had to be met within the existing contract tasks and priorities, but funds were not exchanged across the evaluation contracts.

Lessons Learned

The 2006-2008 evaluation planning and execution presented a series of important lessons that have informed the subsequent set of evaluations led by Energy Division. The evaluation planning and execution was driven by a single policy objective: quantify the impacts of the portfolios with accuracy and speed to inform an incentive payment or penalty. While the focus left little ambiguity about the end objective, the methods and process to reach that objective had to evolve through the planning and execution of the evaluation.

The original plan of organizing evaluation contracts around groups of programs and managing a multitude of relatively autonomous contractors was effective in leveraging expertise of the individual firms that were hired, and gave Energy Division staff clear and distinct responsibility for the evaluations under their purview. The one-to-one relationship between the contractor and the Energy Division staff person may have also afforded efficiencies in communicating and working through the day-to-day issues of managing the evaluation. However, this approach also led to challenges in summarizing the full impact of the portfolio in the required reporting specifications and ensuring that the measures with the largest portions of the portfolio savings had sufficient coverage, not just the programs. This posed coordination challenges in the execution of the portfolio evaluations, as there was a need to identify which measures were being evaluated across the evaluation portfolio. Mid-course adjustments to sample plans and activities were disruptive to the flow of the work in some cases and would have ideally been worked out in advance. In the end, the necessary linkages were made and the final products were able to tell the full story of impacts from the portfolio, program, and measure level, but it required flexibility on the part of contractors and staff.

Without a centralized evaluation plan and more defined Energy Division and evaluation contractor administrative structure, it was difficult to anticipate coordination needs across the multiple contracts. In future cycles, Energy Division developed an administrative structure as well as a centralized evaluation plan to guide execution and identify cross-cutting roles and needs. The roles and costs associated with the net to gross and engineering working groups' activities were prescribed in the roles and responsibilities of the contractors and the Energy Division staff. As a result of having these defined at the beginning of the evaluation process, all parties could better manage expectations and needs and Energy Division could more efficiently execute on its mandate.

In the 2006-2008 period, Energy Division and its consultants did execute on the mandate to inform the incentive mechanism. In its first time through, Energy Division and its consultants delivered an interim (CPUC 2009) report and final (CPUC 2010a) report in time and with sufficient rigor to significantly influence the 2006-2008 Risk Reward Incentive Mechanism decisions. Detailed utility

tracking data and contract-specific evaluation results were integrated through the Energy Division's overarching evaluation, vetted publicly, processed for cost effectiveness, and was reported and directly comparable to IOU claims at the measure level. The evaluation activities covered over 80 percent of the claimed electric savings.¹ Though a significant challenge, it represented a first in California's history and included scenario analyses for policy consideration. This data set continues to be a resource for long-term procurement planning, and the reports from that period continue to be a foundation for considerations of future program performance. The Commission ultimately decided not to base the incentive payments to the utilities on the evaluation-based results based on a justification that the utilities could have done little to affect the outcomes of key evaluation parameters, and hence should be rewarded based on expected savings not evaluated performance.

Another lesson learned from the 2006-2008 period was that the Commission desired a more collaborative approach to evaluation, and a desire for a broader evaluation agenda from Energy Division. The debates that ensued around the findings of the evaluation activities were perceived by policy makers to be an unnecessary level of discord over what seemed to be technical issues. While many involved in the process believe the discord was inevitable given the structure of the risk-reward mechanism, constraints of the associated regulatory schedule, technical nuances of evaluation, and inherent levels of uncertainty in estimating net and gross efficiency impacts, and had warned against it. Subsequently, the Commission directed Energy Division to work collaboratively with the IOUs and other stakeholders to develop evaluation plans and vet results, while it also re-opened the risk-reward proceeding to determine whether to continue or modify the 2006-2008 approach. Navigating a collaborative strategy and planning around a broader evaluation agenda became a focus of the next two evaluation cycles.

2010-2012 Evaluation Cycle

Requirements

The evaluation plan for the 2010-2012 energy efficiency programs expanded on the Energy Division and IOU's previous evaluation work in terms of the breadth of objectives and scope. The plan was designed to address five core evaluation functions set forth in the CPUC's 2010-2012 EM&V planning decision (CPUC 2010b): 1) Savings Measurement and Verification; 2) Program Evaluation; 3) Market Assessment; 4) Policy and Planning Support; and 5) Financial and Management Audit.

This broadening of the scope of the evaluation effort was intended to support the strategic nature of the 2010-2012 portfolio of programs, as guided by the *California Energy Efficiency Strategic Plan* and its emphasis on market transformation and comprehensive approaches to energy savings. It was also in reaction to the limited scope of evaluation activity in the 2006-2008 period. Meeting these broader objectives was intended to help the CPUC build a body of research and knowledge to support future program innovations and the work of other state agencies, including the California Energy Commission (CEC) and California Air Resources Board (CARB). In lay terms, the Commission was interested in expanding the scope of Energy Division evaluation from just answering "what" was achieved to answering "why" certain strategies were or were not successful to inform a broader range of policy decisions.

In developing the 2010-2012 Evaluation, Measurement & Verification Plan, the EM&V planning team sought to create a plan with the following characteristics: a) focus on a set of high-level, strategic objectives; b) flexibility to anticipate and adjust to changing needs; c) balance between qualitative and quantitative elements; d) balance between proven and newer, innovative study types; and e) a process that was collaborative and transparent.

¹ CPUC 2010a. See Main Report at page 79; *Figure 31. Outcomes of Unit Energy Savings Updates by Utility and Energy Type*

To address the EM&V requirements and needs comprehensively, the evaluation plan took a strategic perspective that tried to go beyond typical energy efficiency EM&V activities. Areas of focus in the 2010-2012 plan that were less common in previous evaluation portfolios included detailed tracking and analysis of program and portfolio spending and resource deployment; analyses of the effectiveness of marketing and other non-incentive activities; estimation and measurement of incremental measure costs; comparative assessment of relative effectiveness across programs, measures or other activities; financial audits of spending; and integrative portfolio management assessment.

Planning Approach

In the 2010-2012 period, Energy Division hired two prime contractors to plan the evaluation portfolio. A skeleton of the evaluation plan had been developed and adopted in D.10-04-029, but was further refined when two prime contractors were brought on board. The intent of concentrating the evaluation contracting to two core firms was to streamline administrative processes and improve coordination across evaluation activities which were identified as challenges in the execution of the 2006-2008 evaluations. There was also an expectation that the prime firms would subcontract much of the work to ensure that enough resources would be available to get the work done and leverage expertise from the industry.

The two prime contractors and Energy Division staff developed the 2010-2012 plan through a comprehensive, collaborative, and iterative research planning process. The following steps formed the basis of the planning process:

1. Review high-level EM&V goals based on prior decisions and Commission directives
2. Define major EM&V activity categories
3. Prioritize and allocate the available EM&V budget across major activity categories (e.g., “top down” budgeting)
4. Conduct a comprehensive inventory of EM&V information needs and combine and prioritize the needs into EM&V studies and study areas, and estimate “bottom up” EM&V study budgets
5. Iterate and reconcile top down and bottom up evaluation budgets
6. Develop work authorizations and research plans for Energy Division approved projects

To prepare the 2010-2012 EM&V plan, the EM&V planning team developed a system to organize the various types of EM&V activities. The team used a variety of sources as input in considering different organizational approaches, in particular, the organizational elements of the CPUC’s 2010-2012 EM&V decision. The goal in developing these EM&V activity categories was to provide a planning framework that was useful both for allocating EM&V funding at a high-level, and for organizing EM&V activities in a logical, hierarchal schema to which projects could be assigned, and activities mapped, with respect to the study objectives and information needs addressed.

The specific EM&V projects were assigned a primary activity home in this system and many projects addressed multiple EM&V activity areas. Activities were divided into two broad categories in the 2010-2012 EM&V organizational framework: ***Program, Portfolio, and Market Analysis*** and ***Management, Policy, and Planning***. This approach kept most of the primary data collection and analysis activities in the same branch, with day-to-day implementation and management led primarily by the evaluation contractors. The remaining activities were led by Energy Division and focused on overall EM&V management and policy-driven research and analysis activities that would draw on data collected and developed in the program, portfolio, and market analysis projects. The intent was also to enable development of project synergies that cut across measures, programs, and markets. The Program, Portfolio, and Market Analysis area was then organized into program/measure analysis, portfolio analysis, and market analysis. In addition to the traditional EM&V studies that address impact and process evaluation at the measure, program, and market segment levels, a few of the unique elements in the plan included a large measure cost study, a portfolio management assessment and financial audit,

and several comprehensive baseline saturation studies. Finally, in addition to the direct evaluation and market studies, a strong effort was made under the Management, Policy, and Planning area to organize and adequately fund the Energy Division's applied use of the EM&V results and data to meet a wide variety of regulatory and planning requirements. These activities included Energy Division's estimates of total savings, savings as compared to goals, tracking and reporting utility-reported savings, ex ante review and impact estimation, potential and goals studies, strategic planning support, and overall EM&V management.

The high level plan was completed in January 2011 (CPUC 2010c), five months after the prime contractors were brought on board. At that point, the detailed work order and project-specific research planning commenced and continued through summer 2011. New plans are developed on an ongoing basis, as needed, to address gaps and new needs or regulatory requirements.

Resource Allocation

The evaluation plan allocated \$93 million in project funds (net of Energy Division and IOU EM&V management costs) to some 80 studies.² The plan often sought to address multiple needs in the same study. Information needs were developed by the IOUs and Energy Division contractors and then aggregated into studies that cut across programs and sectors in order to maximize resources for evaluations that involved the same programs or participants. This was necessary due to the very large number of programs administered by the IOUs (roughly 200, including local government and third-party implemented programs). Core IOU programs represented a small number of the total number of programs but a large percentage of the total portfolio impacts. The 2010-2012 evaluation plan sought to minimize duplication, overlap, and unnecessary disruption of participants across these 200 programs.

Some elements of the planning and budgeting process lent themselves to more quantitative approaches while others were inherently qualitative. Qualitative input was deemed more appropriate for allocating EM&V funds at a high level across major categories of EM&V activities in order to align funding with the CPUC's EM&V goals and directives. Quantitative data was used to help allocate EM&V resources within particular activity areas such as impact and process evaluation.

EM&V budgets were developed through two processes: 1) a high-level, top-down process which was conducted at the EM&V activity area level; and 2) a bottom-up, study-level budgeting process. Because of the size and complexity of the EM&V portfolio and the wide variety of EM&V goals and objectives, the top-down and bottom-up budgeting processes were implemented sequentially, beginning with the high-level budget allocation process. The high-level budgeting process focused on engaging senior EM&V and management staff early in the process so that they could provide input and guidance on resource allocation priorities across major activity areas such as impact evaluation, process evaluation, market studies, and regulatory reporting and oversight studies and activities. This high-level budget input was then used to help guide the more complex and detailed bottom-up, study-level budgeting process. The planning teams for the bottom up part of the effort were organized by sector or program area. There were 14 sector/program areas based on the structure of the IOU compliance filings. The bottom up EM&V information needs were analyzed and organized into a prioritized list of EM&V studies and study areas. A total of 82 studies or study areas resulted from the bottom up planning effort. Energy Division and IOU EM&V staff met several times to collaborate, coordinate, and reconcile the bottom up and top down EM&V cost estimates into a final set of 2010-2012 EM&V budgets.

² A total of \$125 million was allocated for evaluation activities in the CPUC's 2010-2012 energy efficiency portfolio decision; this amount includes Energy Division and IOU management and related Energy Division regulatory activities and represents four percent of the program portfolio budget.

Lessons Learned

Areas of success. Although some of the 2010-2012 evaluation activities are still in progress, there are a number of activities that have been completed, as well as several important lessons learned. On the plus side, the 2010-2012 plan accomplished much of what it intended. A significant effort was undertaken to organize the evaluation portfolio into a logical and comprehensive set of activities that, collectively, would meet most of the key evaluation needs and regulatory objectives for the program cycle, supported by budgets developed through both top down and bottom up processes to balance and prioritize across the range of activities. For the most part, the organizational and budgeting activities were successful in that funding allocations proved to be reasonably well matched to objectives and needs and none of the major activity areas ran significantly short on funds.

Another important objective of the 2010-2012 EM&V effort was to balance between current cycle evaluation efforts and large-scale baseline research activities that would support planning and evaluation of future cycles. Major projects were successfully launched in both areas and are moving toward completion.

It was also important to provide some evaluation findings during the program cycle rather than only after the cycle was completed. Progress was made in this area as well with a number of projects reporting interim or complete findings during the program cycle, and planning around a pre-defined reporting strategy. The 2010-2012 EM&V objectives also called for transparency and collaboration. To this end, quarterly public meetings have been held throughout the EM&V cycle to provide stakeholders and parties with up-to-date information on evaluation research plans, interim results, and final results for selected projects. In addition, each project provides major deliverables to a publicly accessible website.

The use of only two prime contractors for such a large portfolio of work had some successful outcomes and presented challenges. As compared to 2006-2008, it significantly increased the ease with which the CPUC Energy Division managers could communicate direction, requirements, and requests to the evaluation teams. It also supported more consistent reporting and organization of evaluation activities and deliverables as they occurred, and facilitated Energy Division's internal roll up of results. In addition, it provided Energy Division with significant flexibility with respect to which resources to contract with when, as Energy Division was able to request that the prime contractors bring in subcontractors for new or niche assignments as needed throughout the cycle. Another goal achieved via the 2010-2012 prime contracting approach was increased consistency in methods and data collection so that results could be compared more easily across program administrators and program areas. The tradeoffs were that getting the field work launched suffered partially due to backlog of existing staff at the two prime firms, internal collaboration expectations, and the sheer size of the activity. Many subcontractors (actual and potential) felt the dual prime arrangement limited opportunities to perform work despite the fact that the prime contracts were competitively bid, an open RFQ for subcontractors was put in place quickly and continued throughout the contract period, and roughly 30 percent of the work has been performed by 39 subcontractors to date.

Areas for further improvement. In addition to the successes associated with the 2010-2012 EM&V plan and implementation, there were a number of aspects of the process that could have gone better and can be improved upon in the next cycle.

With respect to the timing of the EM&V planning and implementation, although progress was made in terms of providing some results during the program implementation period, these results were not as extensive as they might have been and relatively late in the cycle. This limited their use somewhat with respect to influencing the next cycle's (2013-2014) program plans, due to the fact that these program plans had to be formulated almost a year prior to 2013. There were multiple factors that contributed to this. First, despite best efforts, the CPUC's RFP for 2010-2012 EM&V was not released until late spring 2010 with contracting commencing at the end of summer/early fall 2010. Development of the full 2010-2012 EM&V Plan was subsequently completed relatively quickly in December 2010. The next step in the process – development of detailed research plans for each project – took

considerably longer for some of the larger, most important projects. In some cases these research plans were not finalized until late summer 2011. Delays in completing research plans resulted from a combination of challenges, including: getting timely agreement among CPUC PMs, CPUC advisors, and CPUC prime contractors; delays obtaining data from the IOUs on project installations; adapting one of the major research plans mid-stream in response to a major regulatory update; changes in key personnel; and trying to ensure cross-project coordination and consistency; among other factors as described below.

Another aspect of the 2010-2012 EM&V Plan that proved very challenging was managing the breadth of activities. Planning and executing a comprehensive evaluation portfolio with a relatively small number of program managers in the two prime firms and Energy Division staff proved challenging. In particular, maintaining adequate availability of staff with the requisite expertise to focus on, guide, and navigate newer areas of research, some of which were expected to be somewhat risky and political. There were a few areas of the plan that purposefully sought to carry out research in new areas that were felt to be of high importance but also high difficulty. These included research in portfolio management, financial auditing/assessment, measure costs, goal setting, macro consumption modeling, and HVAC and lighting laboratory testing, to name a few. Several of these new study areas progressed successfully to completion; however, one of the major new focus areas, portfolio management, was divested from due to significant challenges. The volume and breadth of EM&V activities made it difficult to focus management resources on overcoming the challenges in the portfolio management study and contributed to delays in the more “standard” evaluation activities getting off the ground in the first cooling season of the program cycle.

With respect to the policy context, the 2010-2012 evaluation planning activities did not have pressure from a looming financial incentive decision. Discussions and debates of the incentive structure were taken away from evaluation, which gave Energy Division space to design a research portfolio able to inform a wide range of critical decisions, instead of informing a single policy directive. Energy Division was able to consider what would likely be best practices and stable, longer term evaluation activities that can be called on in any given policy discussion. As noted, progress still needs to be made in the timeliness of results to close the feedback loops for informing savings estimates, potential analysis, and program design. However, the 2010-2012 evaluation period set Energy Division on a strong path for managing a portfolio of research that has the potential to answer a wide variety of policy questions and serve the role of objective resource for information about what is working and what is not; but is not mired in a single policy directive. Many of these concepts were continued into the 2013-2014 evaluation planning activities.

2013-2014 Evaluation Cycle

Requirements

The evaluation objectives for the 2013-2014 evaluation activities were a continuation of the 2010-2012 cycle. Specifically Energy Division was again to develop a broad research agenda, with an unspecified incentive mechanism, and continue collaboration efforts with evaluation joint planning with the IOUs. The Commission also set an expectation (in D.10-10-033) that the evaluation plans should be developed concurrent with the program applications. The intent was for program implementers and the program administrators to have insight into how they would be evaluated by seeing the evaluation plans, and it would allow evaluation results to be available in a more timely fashion. Energy Division and the IOUs delivered a joint evaluation plan one month after the applications were approved, but they consequently had to rely exclusively on proposed programs (not yet approved by the Commission) which had significant holes in the implementation plans at the time of review, but in large part were continuation of existing programs. The budgets for evaluation were set at four percent of the program

portfolio, as had been the case in 2010-2012; with roughly 75 percent administered by Energy Division and 25 percent administered by the IOUs (CPUC, 2013).

Planning Approach

Energy Division wanted to build on the concepts of the 2010-2012 plan to create a comprehensive, prioritized research portfolio but also wanted to save time in the evaluation planning phase, enable quicker turnaround on results, and bring the planning and execution closer to staff most likely to use the results. Starting with a fairly robust evaluation plan from the 2010-2012 program cycle and continuing with the same set of five evaluation objectives, Energy Division considered these aspects of ownership, longevity, coordination, and alignment with other Energy Division objectives to make improvements in the 2013-2014 evaluation planning process. Energy Division developed a new tool called the “Long Term Research Roadmaps” for the 2013-2014 evaluation plan as a strategy to address these issues. The roadmaps provide an inventory of what has recently been studied (or is underway) identifies changes in programs or sector interventions that may need new research, and proposes studies or key research questions to meet the evaluation objectives and fill the identified gaps in knowledge.

Ownership and Alignment. After the experience of the 2010-2012 evaluation planning process, which was heavily guided by the evaluation consultants and emphasized top down management needs, Energy Division wanted to refine the planning process to squarely put responsibility of defining the research agenda in the hands of evaluation staff. This change was intended to ensure that the research questions were more tightly linked to the policy needs and the knowledge gaps in their specific sector areas. Energy Division was organized around sector level oversight of the utility portfolios with an evaluation and program staff person assigned to each sector or programmatic area. Around this same time, the evaluation team had just completed a re-designed annual report that was also organized around these same sectors and was summarizing results and recommendations from evaluation research in those sectors. This organizing principle was embedded in the planning to close the feedback loop between evaluation planning, reporting results, and providing direction to future portfolios. The research plan and the report chapters are now a core work product for Energy Division evaluation staff and provide a systematic way for them to identify needs with stakeholders and consultants, track and implement evaluation research, and communicate results in a public forum. Top down and cross cutting elements of the research portfolio were developed at the same time as the sector level research roadmaps; but they were somewhat more limited in scope and size, largely because they were covered already in the 2010-2012 plan. Centralized strategies for identifying uncertainties for prioritizing impact evaluation and assessing market study needs were approached from the top down and cross cutting angles to properly support these critical portfolio level evaluation needs.

Longevity. The long-term research roadmaps were designed to document the programs and activities in the sector and take inventory of current research and new program developments as a means to identify new research needs. Much like an academic paper would start with the literature review and build on existing research, documenting current research enables planning that builds on past knowledge, and cuts planning time. The long-term research roadmap is a living document maintained by the Energy Division lead and the Project Coordination Group (PCG) responsible for this sector/topic area. Updates to this document will be made on a semi-annual basis as the PCG continues to monitor the research gaps and coordinates with other sector/topic area PCGs. The roadmap is intended to support ongoing planning and coordination for the research as well as guide future program/policy design, implementation, and evaluation throughout this cycle and for future program cycles.

Collaboration. As the 2013-2014 planning cycle commenced, Energy Division and the IOUs already had established working groups called Project Coordination Groups. The intent of these groups is to provide a forum for sharing evaluation plans to avoid duplication, discussing evaluation methods, and sharing results. These groups consisted of evaluation staff from both the IOUs and Energy Division and development of research roadmaps was their responsibility as a joint work product. Having a work

product for the project coordination groups in many cases helped to gel the group and orient their ongoing oversight of the evaluation work around a longer term plan and maintain accountability for overseeing the work and for ensuring the results are considered and acted upon.

In the course of developing the roadmaps Energy Division led not only the collaborative process with the IOUs but also engaged other stakeholders in the sector level working groups to share their respective evaluation needs and solicit comments on the evaluation plans. The working groups are primarily an Energy Division IOU forum for collaboration, but during the roadmap development process, a wide swath of stakeholders were invited to weigh in on evaluation plans and proposed research questions. Evaluation contractors were limited to commenting on the past research to protect from conflicts of interest in proposing specific research they may bid on in the future. The public process served as a wide ranging needs assessment, and the work product (the roadmap) serves as a valuable communication tool for explaining what evaluation is doing and relevance to specific sector interventions. It also keeps evaluation planning at the level of staff and implementers who will be best able to use the results to improve programs and sector level interventions. The roadmaps are inclusive of Energy Division and IOU led studies and, where reasonable, should cite other research that is going on in the industry that may affect the need for any proposed analysis.

Resource Allocation

In the 2013-2014 program cycle, an overall four percent budget authorization was given to fund evaluation measurement and verification activities. To initiate discussions for the research roadmaps, the sector level coordination groups were asked to consider research that could be funded within the same cap, i.e., four percent of the program budgets for their sectors. Overarching costs for centralized research needs including strategic planning, ex-ante review, goals and potential, data and reporting, and administrative costs were taken “off the top.” The remaining budgets were made available to the sector level coordination groups. This approach did not take careful consideration of the variable cost of certain evaluation activities over another, but in some cases, it did make funds available to areas of the program portfolio that had not had much evaluation attention in the past. Several iterations of cuts were necessary to build a contingency fund to protect against some of these uncertainties. Each sector has had to, and will continue to have to, make concessions or tradeoffs as they face resource constraints and need to prioritize activities within their research plans defined in the roadmaps.

Execution of the 2013-2014 evaluation plan was developed around the research roadmaps and the budgets proposed in the first version. Energy Division will need to develop more detailed plans and additional tradeoffs in resources may be necessary based on the methods that are ultimately proposed and adopted, their timing, and any necessary re-assessment of priorities as the programs are rolled out. Changes to the resource allocations will be transparently communicated to the public via updates to the research roadmaps every six months by Energy Division staff to ensure that the research objectives are met.

Lessons Learned

The early development of the 2013-2014 evaluation plan demonstrates the need for flexibility in the planning process. The Commission requirement to have the evaluation plan in place concurrent with the portfolio applications created a rush for planning with uncertain information about actual program implementation. However, the framework for the research roadmap evaluation planning process - with built in review, updates, and a coordination infrastructure - should allow for adaptation.

The 2013-2014 evaluation plan balances the implementation approaches from the 2006-2008 and 2010-2012 periods. Much of the work will focus on sectors and application of similar methods, as in the 2006-2008 period. However, cross coordination and ease of administrative structure are also achieved (as in 2010-2012) by having a master plan and a well-integrated management structure. Three

crosscutting evaluation roadmaps are also provided to maintain coordination across the multiple research projects and to ensure clear expectations from the beginning.

Conclusions and Recommendations

Over the course of three program evaluation cycles, Energy Division has continued to evolve its approaches to planning evaluation and adapted them to changing policy needs. From this body of increasing experience, a number of lessons learned have emerged with respect to core principles and best practices in large scale evaluation planning.

- ***Develop a comprehensive master plan that recognizes the wide variety of evaluation and research needs and an administrative structure to get the work done.***

The evaluation plans in each of these three cycles went from a singular focus, to a broad based research agenda. In the past two cycles the master plan has been a critical tool for the identification of the cross cutting needs, opportunities to coordinate, and clarifying roles and responsibilities. It is also an important joint work product in which to work out overarching priorities and communicate progress on the execution of the plan to the public.

- ***Commit to a systematic process for prioritizing the research.***

In all three of these planning cycles, a process was adopted for prioritizing the research and assigning budget allocations, and each of them succeeded in their own way. Each was able to meet the requirements and policy objectives that were set out for Energy Division by deliberating on the varied needs and resources that were available, and there is no magic algorithm. One of the key differences across the program cycles was who was most engaged in the prioritization. The current process of attempting to leverage a broader group of stakeholder input may make the results more meaningful and relevant in the long run for program improvements.

- ***Plan with the end in mind by focusing evaluation planning on the program or portfolio core objectives and design a comprehensive system to bring results together.***

The research plans in each of these cycles represented a diverse set of activities and efforts that all needed to converge to answer the key questions of “What did we get?” and “Was it cost effective?” The answer to those questions alone are necessary but not sufficient and hence the driving factors behind those results need to be able to be extracted and analyzed and supplemented with other information from other evaluation activities including process and market analysis. Since Energy Division has taken on the evaluation work, the integration of detailed tracking-level and evaluation data and resulting overarching summary report have been the defining features of this endeavor. They present the greatest element of “value-add” to the policy discussions about the resource energy efficiency provides to long-term planning as well as what “works” in energy efficiency as it is coupled with other important research covered in the evaluation plans.

- ***Develop a long-term vision (and associated documentation) of evaluation needs to simplify planning and strategically target evaluation over time to adapt to program and policy needs and still focus on the greatest uncertainties.***

Use evaluation to build on existing knowledge, not re-study the same things. Energy efficiency evaluation has been active in California for over 30 years and yet evaluation planning seems to frequently start from a blank page, or institutional knowledge held by consultants or evaluation project managers. The long-term research roadmaps are an important tool to a) facilitate transparency in the planning process including cooperation and input on evaluation planning, b) maintain accountability in executing evaluation plans, and c.) ensure that evaluation activities are building on existing knowledge and targeted at filling knowledge gaps.

- ***Provide appropriate levels of access and transparency to the planning, execution and results of publicly funded evaluation to strengthen the work overall.***
In each phase of the planning, execution, and reporting of the evaluation results, Energy Division has created opportunities to get feedback from IOUs, stakeholders and the public. While the approaches and requirements to do so have varied from one cycle to the next, for the CPUC, as a public institution overseeing this research, it has always been an important consideration in each phase of the evaluation activity. However, the collaboration that was mandated after the 2006-2008 program cycle has been valuable to the evaluation planning process and will be critical for maintaining the research road maps.
- ***Balance immediate evaluation requirements against baseline and market analysis needs.***
In some jurisdictions baseline research may be separately funded and managed, while in others these activities are part of overall evaluation funding. Measuring and tracking baseline and other indicators of current and emerging efficiency-related adoption levels and practices is critical to the development of new programs, assessing long-term market changes, informing demand forecasts, and providing additional information and insights for estimating net program impacts. In addition, funding should be allocated to periodically update a variety of key parameters for assessing cost effectiveness and future potential beyond energy impacts, such as measure costs and measure life, among others.

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