On the Threshold of Energy Efficiency in California: A Nationwide Best Practices Study of Energy Efficiency Programs

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ABSTRACT

Energy efficiency programs and those who are responsible for designing, implementing and managing these programs with Energy Efficiency Public Purpose Program (EEPPP) funds stand on the threshold of a new era. Deregulation and restructuring events in California have thrown energy efficiency into a state of disrepair since the mid-1990s. These events, coupled with the energy crisis of 2000-2001, heighten the need for developing the most effective energy efficiency (EE) programs possible. In response to this need, many solutions were proposed to enhance California's EE portfolio. One solution has been to broaden the skills and capabilities of energy efficiency practitioners by developing a database of EE best practices that can be used as a resource to enhance the design, implementation, and management of energy efficiency programs in California. In particular, program practitioners supported through EEPPP funds will be able to reference the database and apply the information towards the development of more successful energy efficiency programs. The focus of this paper is to describe the scope, process, and the intended use of this best practices research.

This study will develop an EE program decomposition model containing building blocks of programmatic components and sub-components. This study will evaluate energy efficiency programs within 22 program categories across the nation at the component and sub-component level; assess applicable best practices at each level, and deliver the analysis and data in hierarchical structure to meet the varied needs and experience of the energy efficiency community. The research will explore best practices for the residential, nonresidential, and new construction energy efficiency program sectors. To accomplish this research, the study includes process and performance benchmarking. Process benchmarking defines the best approach to use in implementing a particular energy efficiency program. Performance benchmarking measures the performance of one energy efficiency program at the component level against those of other programs. By employing these approaches together, the study provides a comprehensive means to assess the best process and performance approaches for designing and implementing energy efficiency programs.

INTRODUCTION

Recent policy decisions have sought to broaden the pool of energy efficiency talent by providing funding for third parties (non-utilities) to design, manage, and implement energy efficiency programs which are operated quasi-independently of the California Investor Owned Utilities (IOU). In the Fall of 2001, the CPUC set in motion the rules and criteria for the operation of these third party (non-utility) energy efficiency programs. Included in the CPUC motion was a provision for best practices analysis of all sectors. The CPUC stated that it "wishes to develop a comprehensive understanding of the state of energy efficiency programs design and implementation efforts (for all sectors) throughout the nation." Implicit in this statement is the desire to learn from others nationally about potentially more effective EE program components that transfer and serve energy needs in California. Also notable is the post-1996 CPUC focus towards equity distribution of PGC funded programs which has included relative newcomers to the energy efficiency implementation market – groups such as community-based organizations (CBOs) with potentially limited energy efficiency experience but deep connections within their local communities.

The remainder of this paper focuses on methodological issues related to developing the program decomposition model, selecting and screening programs, and presentation of study results. Issues related to screening programs can be found in the full version of this paper available from the authors.

Purpose of the Study

The overall goal of the Study is to develop and implement a method to identify and communicate excellent programmatic practices in order to enhance the design of energy efficiency programs in California. In particular, program implementers supported through Public Goods Charge ("PGC") funds will be encouraged to use this Study's products, along with other resources and their own knowledge and experience, to develop and refine energy efficiency programs. The study does not seek to provide a census of best practices across all types of programs. Such an approach would be neither practical nor useful given the number of programs that exist; the many differences in policies, goals, and market conditions around the country; the unique needs and market conditions in California; and the importance of encouraging innovation, which by its nature sometimes requires attempting approaches that are not yet proven.

This study is intended to be a first, not final, step in a process that would seek to identify and communicate best practices on an on-going or periodic basis. The large scope and dynamic nature of energy efficiency programs and energy markets require an on-going approach. Like any study of this type, resource and schedule constraints limit the scope of the effort. In the current study, we plan to collect data on, and benchmark, 100 programs in total across a discrete set of program types (roughly 22). Thus, readers and users of this study should recognize that the intent is not to cover all types of programs with this first effort and that the depth of coverage will vary even among the program types that are addressed. If the framework and results of the study prove useful, future phases of the work can expand the number and types of programs covered.

Significance of the Study

This study is the first step in developing a comprehensive understanding of the state of energy efficiency in the nation. While other studies have sought to identify exemplary programs, this is the first study to address program design at the program component and sub-component level. We do not envision Best Practices database as a program development "wizard" that delivers the best programs by merely clicking one's mouse. Such a tool would be simplistic and ignore the major role that experience and context play in executing best in class programs. With a regulatory focus that continues to seek new energy efficiency delivery channels, there is an increased need to more quickly deepen and broaden the EE implementation knowledge base.

Review of Literature

Over the last decade a number of attempts have been made to develop best practices, including Eto et al 1995, IRT Environment 1996, Mowris et al, 1998, and Peters, et al, 2002. These studies are distributed across two primary continua; quantitative and qualitative, and broad and in-depth. Studies such as Eto, et al 1995 were focused on quantifying program performance using a statistical approach to relate program costs and benefits. IRT Environment 1996 took in-depth qualitative approach to best practices, providing arguably the most detailed program information to date, though there was no clear attempt to rigorously compare programs. Peters, et al, 2002 provided a qualitative assessment of best practices relying primarily on secondary sources and a team of evaluation experts.

This research seeks to blend the work of Peters et all 2002 and IRT Environment 1996 with that of Eto et al, providing a detailed program component descriptions with a structured and defensible methodology to evaluate program components and sub-components.

Research Methodology

A simplified overview of the study process is shown in Figure 1. As shown in Figure 1, key aspects of the study include a user needs assessment, secondary research, development of the benchmarking methods, identification and selection of programs to benchmark, development of the program database, data collection and program benchmarking, analysis, and preparation of the study's best practices report and final database. In addition outcome metrics will be tracked in addition to components and sub-components.

The outcome of a program – as measured by outcome metrics such as $ per kWh saved, market penetration or sustainability – can be thought to be a function of (a) changeable program elements, (b) changeable portfolio-level design and programmatic policy decisions, and (c) unchangeable social, economic, demographic, climate, and other factors. All of these factors can influence the ultimate success of an energy efficiency program. Some program elements (such as marketing, tracking or customer service) are directly controllable at the program level and can be modified to affect the success of the program. Other elements (such as the program policy objectives and whether the program has a single- or multi-year funding commitment) may not be changeable at the program level but may be changeable at a policy level. Other elements are not changeable and cannot be affected by program managers, implementers, or policy-makers (such as the physical climate or density of the customer base).

Our approach focuses on analyzing programs primarily from the perspective of their changeable program operations. Our decomposition model, described below, primarily targets these changeable elements. The other, less mutable elements are considered qualitatively as part of the context in which the programs operate. Context variables will be tracked and used to inform individual and cross-program analyses. Outcome metrics, which are imperfect, proxy indicators off a program's overall success, also must be considered in light of both the changeable program elements and the context in which programs are run.

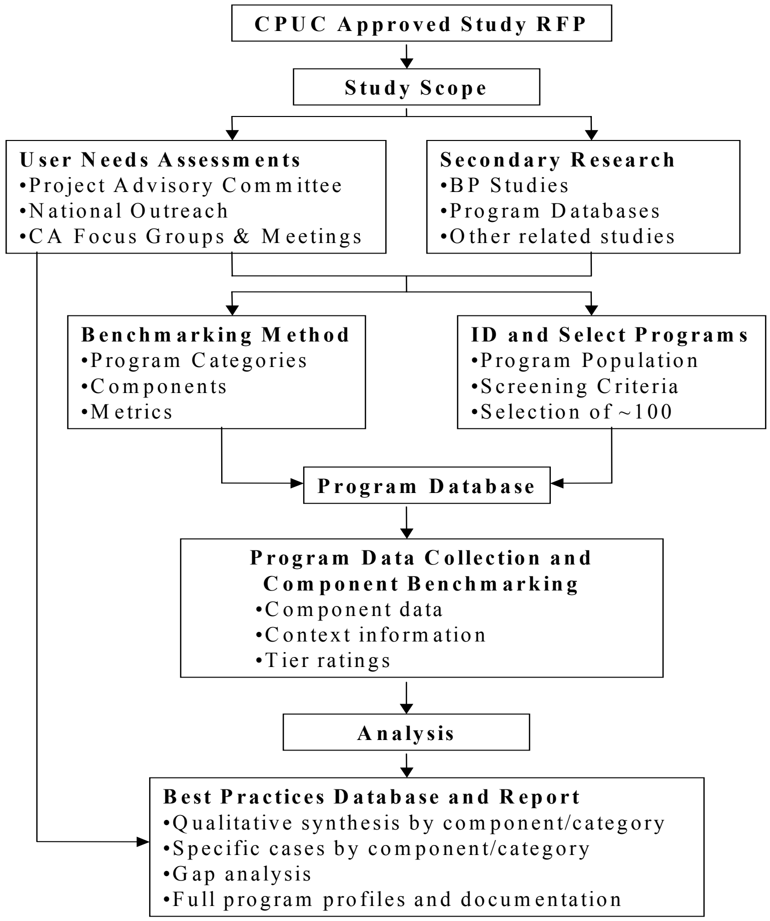

Figure 1. Overview of Study

Research Framework

As defined above, program decomposition refers to the process of disaggregating programs into underlying subparts to allow for analysis of specific program features of importance to users of the study. Two levels of decomposition are planned – a primary decomposition into *components* and a secondary decomposition into *sub-components*. Our approach utilizes systematic decomposition to define and analyze components and sub-components for each program. We plan to decompose programs into four components: program design, program management, program implementation, and evaluation. Each of these is further decomposed into sub-components (as discussed in the following sub-sections).

Decomposition into components and sub-components will serve several purposes. First, the goal of the project is to identify best practices within specific program elements such as marketing, tracking systems, participation processes, etc., that are likely to have transferable value to others. Second, the components and sub-components provide the ability to refine programs or construct new hybrid programs that combine best practices from different program elements. The decomposition provides a uniform approach to compare programs and is well suited to developing new or refining existing programs. These programmatic building blocks will also permit cross comparison of program components from multiple sectors, which will help inform best practices.

Program Component – Program Design. Program design subcomponents are focused on laying a solid foundation for a successful program. Good program design begins with good program theory and a complete understanding of the marketplace. Baselines are also important when evaluating success, while contingency planning can stop projects from stalling indefinitely. The program design category is decomposed according to the elements described below.

- **Program Design: Theory, Linkages & Partnerships.** Successful program design starts with a good program theory. We will look for evidence of a well-thought out and documented program theory that includes buy-in from planners, implementers and other key players. Program theory should address potential barriers to adoption and methods to overcome those barriers. A program's theory and design should also leverage appropriate linkages & partnerships in multiple areas, and should incorporates these linkages and partnerships at the design stage.

- **Program Design: Structure, Policies and Procedures.** Good program structure, policies and procedures begin with a well thought-out "process plan" that describes both the program structure and the associated policies and procedures. We will look for process plans that clearly illustrate step-by-step participation processes.

Program Component – Program Management. We decompose program management into the following subcomponents related to project management, reporting and tracking, and quality control and verification.

- **Program Management: Project Management.** We assume that basic management skills are already in place and will not include those in our evaluation. However, we will look for evidence of a clear and reasonable organization plan, with clearly defined responsibilities.
- **Program Management: Reporting & Tracking.** Best practices in this arena entail the cost-effective tracking of useful and appropriate metrics that can efficiently be translated into reporting information. The tracked variables should generate useful information at appropriate intervals, and this information should be used to maintain program effectiveness.
- **Program Management: Quality Control & Verification.** Successful programs should have a verification process in place that is part of both the implementation and evaluation phases. The precision level of the verification should be balanced against cost to ensure overall cost-effectiveness. Verification should be accompanied by a comprehensive quality control process that addresses both the quality of the implementation process, as well as that of equipment or measures installed as part of the program.

Program Component – Program Implementation

Implementation can be broken into a number of subcomponents; our decomposition consists of outreach/marketing/advertising, the participation process and customer service, and installation & delivery mechanisms.

- **Program Implementation: Outreach, Marketing & Advertising.** In evaluating outreach, marketing and advertising efforts, we will seek measures of marketing effectiveness such a total marketing costs and marketing costs per participant made aware of the program. Good outreach, marketing and advertising efforts should result in relatively high program awareness, knowledge, and participation levels. We will look for evidence of innovative or successful marketing and outreach mechanisms, and assess the appropriateness of the marketing strategies for the program objectives and targeted populations.

- **Program Implementation: Participation Process.** The participation process is a critically important element of a program's ultimate success. Standard measures of customer satisfaction provide one indication of a program's effectives at enrolling and processing customers. Good programs should measure satisfaction with multiple aspects of the participation process, and should collect sufficient information at every stage to support evaluation, tracking and reporting needs. Programs should also check for and limit to the extent possible the administrative burden they place on customers (some burdens may be necessary to fulfill good practice requirements for other sub-components such as quality control and verification). We will look for evidence of successful mechanisms to streamline the customer participation process, and check to see whether the program results in many callbacks, reinstalls, and quality control problems.

- **Program Implementation: Installation & Delivery.** We will review delivery and/or installation objectives and assess how well those have been met. Successful programs should demonstrate evidence of installation and delivery follow-though on marketing and outreach efforts. We will assess how installation and delivery problems have been addressed, and evaluate how well a program works with subcontractors, partners and recruitment resources to ensure a smooth delivery process. The effectiveness of any incentives in inducing measure installations will also be assessed here.

Program Component – Evaluation and Adaptability. In addition to the design, management and implementation components, we believe that programs should also be screened for the effort that has been put into evaluating their effectiveness, and for their effectiveness at adapting to evaluation findings and changing market conditions. Good programs should obtain feedback from both participants and non-participants and measure program accomplishments and progress relative to a program theory. This would usually be accomplished through a thorough program evaluation; however, some programs may achieve the equivalent result through activities that are built into the implementation process and carried out by the program manager. We will assess how programs use evaluation results or other feedback mechanisms to improve over time. We will look for flexibility and adaptability in the program design and implementation that facilitates rapid readjustments.

Cross-Cutting Outcome Metrics

These indicators are very attractive as overall quantitative measures of a program's effectiveness because total program impacts can often be compared with total dollars spent. In practice, extreme care and caution must be applied to collecting and assessing this indicator. A key limitation on the usefulness of these indicators is the extent to which all costs and impacts are properly and consistently accounted for across programs.

The program components and subcomponents provide the breakdown of the various aspects of the program that program implementers can modify and improve to create better programs. The overall outcome of a program, however, is often measured through high-level metrics such as $/kWh saved. We will collect, track, and analyze crosscutting outcome metrics to help determine the impact of different subcomponents on the overall impact of a program. We note, however, that these outcome measures, by themselves, are often poor proxies for programmatic best practices because of the many confounding contextual and other variables that underlie them as well as the significant differences in budget and program impact tracking and measurement around the country. We will attempt to collect data on the following outcome metrics: cost effectiveness (e.g., $/kWh saved, TRC, etc.); *net* market penetration rates, participant adoption rates, and measure saturation levels; and sustainability/market effects. Cross-cutting outcome metrics will include cost effectiveness indicators, net penetration rates and sustainability/market effects.

Cost Effectiveness Indicators ($/kWh or $/kW Saved, Benefit-Cost Ratios.) These indicators are very attractive as overall quantitative measures of a program's effectiveness because total program impacts can often be compared with total dollars spent. In practice, extreme care and caution must be applied to collecting and assessing this indicator. A key limitation on the usefulness of these indicators is the extent to which all costs and impacts are properly and consistently accounted for across programs. While cost effectiveness is usually a discrete, quantitative number, it needs to be analyzed within the context of a program's environment and goals. Sole consideration of cost-effectiveness would imply targeting the largest commercial customers, while equity would imply targeting smaller hard-to-reach customers. Correlating program outcomes to help determine best practice components would depend of the contextual definition of what is "best".

Net Penetration Rates, Participant Adoption Rates, and Measure Saturation Levels. These can be some of the most important indicators of the effectiveness of resource acquisition programs; unfortunately, they are also some of the least well tracked and, surprisingly, often poorly understood. Ideally, one wants to be able to examine the rate and level of efficiency adoptions as well. Key challenges with these indicators are defining and collecting data on the denominator needed for their calculation (e.g., what is the appropriate population or subpopulation that should be used to divide the efficiency actions). Few programs track all of the in-program and out-of-program data needed to measure these indicators.

Sustainability/Market Effects. Sustainability is an important crosscutting indicator of program effectiveness. Programs that create lasting market effects are more beneficial than those that do not, *all else being equal*. Persistence of savings can also be an element of sustainability. The proportion of evaluation effort placed on examining market change sustainability versus persistence of savings may depend upon the desire for resource acquisition versus market transformation at any point in time in a jurisdiction. More importantly for this project, obtaining hard, empirical evidence of sustainability and market effects can be difficult in practice.

Program Context Characteristics

In addition to the changeable program elements outlined above, the outcome of a program also depends on the context in which it operates. Understanding that context will be critical to our analysis process: wherever possible, we will track and analyze the changeable decomposed program elements in light of a program's less mutable context. To facilitate this process, we identified several contextual elements to track for our analysis. These elements can be organized into two broad categories: program design policy elements, and socio-economic and other immutable factors.

Program Design Policy Elements. Energy efficiency programs and portfolios are often designed with specific policy objectives in mind, and those objectives can often impact the outcome of a program. For example, programs that target hard-to-reach areas may not exhibit the same rates of participation as those that do not. A correct analysis should take that design policy element into account. Below is a list of the types of design policy elements we will attempt to track and consider:

- Energy efficiency policy objectives
- Market barriers addressed
- Measure mix
- Demand/energy
- Multi-year policy objectives,
- Multi-year funding levels
- Program/Market Lifecycle

Socio-Economic And Other Immutable Factors. Beyond program design policy elements, there are many broader socio-economic factors and other immutable factors that can affect the outcome of the program. The team has identified the following, though this list is not meant to be comprehensive:

- Climate
- Customer/target market actor mix
- Customer density
- Customer Energy Rates
- Economic Conditions
- Customer Values

Program Benchmarking

Our proposed program decomposition addresses the RFP's goal of conducting both *process benchmarking* and *performance benchmarking*. *Process benchmarking* will be accomplished by synthesizing best practice characteristics across programs that have the highest ordinal rankings within their program group. *Performance benchmarking* will be accomplished be comparing programs sub-component by sub-component.

Process Benchmarking. Although both process and performance benchmarking are important, we believe that the nature of energy efficiency programs and associated data limitations makes *process* benchmarking the most valuable product of the project. Process benchmarking is different from performance benchmarking in that the latter does not address why differences exist or affect change. Process benchmarking looks at the processes in detail and addresses why there are differences so that best (and less desirable) practices can be identified and improvements effected. Under our approach, we will analyze each of the program components and sub-components to identify the set of common or unique best practice characteristics that differentiates the more successful programs. Almost as importantly, in our judgment, we will also ascertain which features are generally unsuccessful or less productive to reduce repetition of ineffective program elements. The energy efficiency industry has over 20 years of lessons learned; unfortunately, many of the lessons regarding implementation ineffectiveness have not been documented. As a result, approaches that have been proven to be ineffective in the past are seen repeated unnecessarily.

Performance Benchmarking. As defined at the outset of this section, benchmark metrics are the basis for differentiating overall program performance, as well as performance at the component or sub-component level. Some crosscutting metrics, such as $ per kWh saved, are directly quantitative. Other crosscutting metrics, such as sustainability, will require a judgmental scoring based on the information available to the study team. As proposed and currently envisioned, each sub-component for each in-scope program will ultimately receive a ranking of first, second, or third tier. These metrics will form the basis for the *performance* benchmarking part of the study. Scores will not be published with program names.

Using the initial components and subcomponents described above, we provide an example decomposition and component comparison in Figure 2 for the *performance* benchmarking portion of the analysis. This **illustrative** example presents programs within the residential non-information class. (Note that the ratings are strictly random for this fictitious example.) For each area, a number of programs will be selected and then rated ordinally on each component for which reliable information is available. (In a potential future phase of this project, the detailed information on the underlying practices could be easily linked to the matrix, making the transition to a searchable database relatively straightforward.)

Ratings will be based upon quantitative data when available and qualitative information in other cases. Note that in some cases we will not adequate data, such cases will be noted as NA (not available). The ordinal rankings will be useful for comparing similar programs and identifying top tier practices. We also will explore relationships between outcome metrics and component ratings. Although we do not expect the data to support useful quantitative analyses (e.g., regression), analyzing correlations between outcome metrics and the sub-component scores should be informative and, at a minimum, will be used to help maintain internal quality control.

Program Class		Program*	Program Design		Program Management			Program Implementation			Eva-luation
			Theory, Linkages & Partnerships	Structure, Policies & Procedures	Project Management	Reporting & Tracking	Quality Control & Verification	Outreach, Mktg & Advertising	Participation Process	Installation & Delivery	Evaluation & Adaptability
Residential Non-Information	Lighting	Calif. Lighting Program	4	4	NA	4	2	4	4	2	4
		Lighting Program A	4	2	NA	4	NA	4	2	4	2
		Lighting Program B	NA	NA	NA	2	4	2	2	4	4
		Lighting Program C	1	NA	NA	1	2	1	4	2	4
	HVAC	Calif. HVAC Program	4	4	NA	2	NA	4	2	2	4
		HVAC Program A	NA	2	NA	2	4	1	4	4	2
		HVAC Program B	NA	2	NA	NA	4	1	2	2	2
		HVAC Program C	NA	NA	NA	4	2	2	2	4	4
		HVAC Program D	4	1	NA	2	2	2	2	4	1
		HVAC Program E	2	1	NA	2	1	4	4	4	1

KEY

4	1st Tier Component within Program Class
2	2nd Tier Component within Program Class
1	3rd Tier Component within Program Class
NA	Not Available

Note: Rankings are ordinal and tier distinction is based upon metrics and judgment of team members

* Note that Program names are from actual programs, however the program sub-components are illustrative and for effect.

Figure 2. Hypothetical Sub-component Comparison – Illustrative

Selection of Program Categories

A program category is defined in this study as the basis for grouping "like" programs to compare across components and sub-components. Program categories may be defined in any number of ways, for example, as a function of target market (e.g., sector, vintage, segment, end use, value chain, urban/rural); approach (e.g., information-focused, incentive-focused [prescriptive; custom/performance based], etc.); objective (e.g., resource acquisition, market transformation, equity, etc.), and geographic scope (e.g., local, utility service territory, state, region, nation); among other possible dimensions. To keep the project scope within our resource constraints number of program categories will be approximately 20.

Our program categorization scheme, shown in Figure 3, separates residential from non-residential programs, and distinguishes between incentive programs, information and training programs and new construction programs. Programs are also segregated based on targeted end-use and customer type. We include a Crosscutting section to address comprehensive programs that do not cleanly fall within our other 21 categories.

<table>
<tr><td rowspan="10">Residential</td><td rowspan="5">Incentives</td><td>Appliance and Plug Load</td></tr>
<tr><td>Heating & Cooling</td></tr>
<tr><td>Lighting</td></tr>
<tr><td>Single-Family Comprehensive</td></tr>
<tr><td>Multi-Family Comprehensive</td></tr>
<tr><td rowspan="4">Information & Training</td><td>Appliance and Plug Load</td></tr>
<tr><td>Heating & Cooling</td></tr>
<tr><td>Lighting</td></tr>
<tr><td>Comprehensive</td></tr>
<tr><td colspan="2">New Construction Information & Incentives</td></tr>
<tr><td rowspan="11">Non-Residential</td><td rowspan="5">Incentives</td><td>Lighting</td></tr>
<tr><td>HVAC</td></tr>
<tr><td>Refrigeration, Motors, Compressed Air, Process</td></tr>
<tr><td>Small Comprehensive</td></tr>
<tr><td>Large Comprehensive</td></tr>
<tr><td rowspan="5">Information & Training</td><td>Lighting</td></tr>
<tr><td>HVAC</td></tr>
<tr><td>Refrigeration, Motors, Compressed Air, Process</td></tr>
<tr><td>Small Comprehensive</td></tr>
<tr><td>Large Comprehensive</td></tr>
<tr><td colspan="2">New Construction Information & Incentives</td></tr>
<tr><td>Other</td><td colspan="2">Cross Cutting</td></tr>
</table>

Figure 3. Program Categorization Scheme

PROGRAM SCREENING AND SELECTION

This study does not seek to provide a census of best practices across all types of programs. Such an approach would be neither practical nor useful given the number of programs that exist; the many differences in policies, goals, and market conditions around the country; the unique needs and market conditions in California; and the importance of encouraging innovation, which by its nature sometimes requires attempting approaches that are not yet proven.

The program screening and selection process, highlighted in Figure 4, utilizes a combination of team-nomination, canvassing, secondary sources, and random stratified selection. Using a stage and gate approach, we will narrow a large set of programs (over 300) down to 100 selected programs, so as to have roughly 5 programs for each of the program categories. We have identified initial candidate programs through primary research, a review of existing secondary sources, and expert nominations. The selection process detailed here is designed to ensure sufficient representation of programs that are already perceived as "good", while allowing for a random selection of other programs against which to benchmark. The process also allows for the inclusion of some non-utility California energy efficiency programs as well.

Program Screening Criteria

In order to be considered for inclusion, all programs must meet a clear set of screening criteria, as described below. The screening criteria are as follows:

- Complete Programmatic Cycle
- Sufficient Documentation, Preferable Including Ex-Post Evaluation
- National "Blanket" Programs
- International Programs
- Budget Size
- Codes and Standards
- Agricultural Programs
- Low-Income Programs
- R&D Programs

Program Selection

The complete program screening and selection process will take place in four discrete steps using a combination of secondary sources, random selection, and expert judgment.

Team-Selected Programs. There is already considerable knowledge and expertise within the industry on what constitutes best practices and programs in energy efficiency. We have reviewed numerous secondary sources and are gathering input from national experts to develop a preliminary list of programs that have already been identified as exemplary.

Programs from these and other sources (including national expert nominations) will be combined into a group of team-selected programs. We will apply our screening criteria, and after removing duplicate or redundant programs, we expect to be left with approximately 30 to 50 programs from this part of the selection process.

We will assign each of these programs to one of the 22 program categories. If more than three programs fall into one specific category, we will limit our analysis to the three programs that present the best fit for that category.

California IOU Programs. For the purposes of our gap analysis, as required by the RFP, we will need at least one California IOU program in each program category. We will review the CPUC list of 2002 IOU energy efficiency programs, and after applying the screening criteria, we will select one California IOU program for each of our 22 categories. Because of limitations in scope for this first phase of the study, we will not be able to include all IOU programs in each program category. More IOU programs could be included in future phases of this study.

California Non-Utility Programs. We will include in our analysis a review of California non-utility programs. Programs that only exist in the current 2002/2003 local programs will be screened out form this phase of the study based on the criteria that they have not completed a programmatic cycle. These 10 programs will each be assigned to their respective program category.

Random Program Selection. After completing steps 1 through 3, we will expect to have anywhere from 2 to 4 programs in each program category. We will select the remaining 1 to 3 programs using a stratified random selection approach.

We are in the process of compiling a list of many of the energy efficiency programs in the United States. This list is not meant to be a complete census of all energy efficiency programs in the United States. Rather, it is designed to be representative and will include most major programs.

To this list, we will add approximately 50 programs nominated through two rounds of nominations for ACEEE's Profiles of Leading Energy Efficiency Programs but which did not make it into the list of 57 exemplary programs included in Step 1 above.

We will stratify the completed list of programs by program category, and then randomly draw from each category. Each drawn program will be screened to ensure it meets our standard criteria. We will repeat the drawing until we have twice as many eligible programs as are needed to complete each program category (we want 5 programs per category). The over-sampled programs will be used as backup in case candidate programs are found to be unfit at a later stage in the analysis.

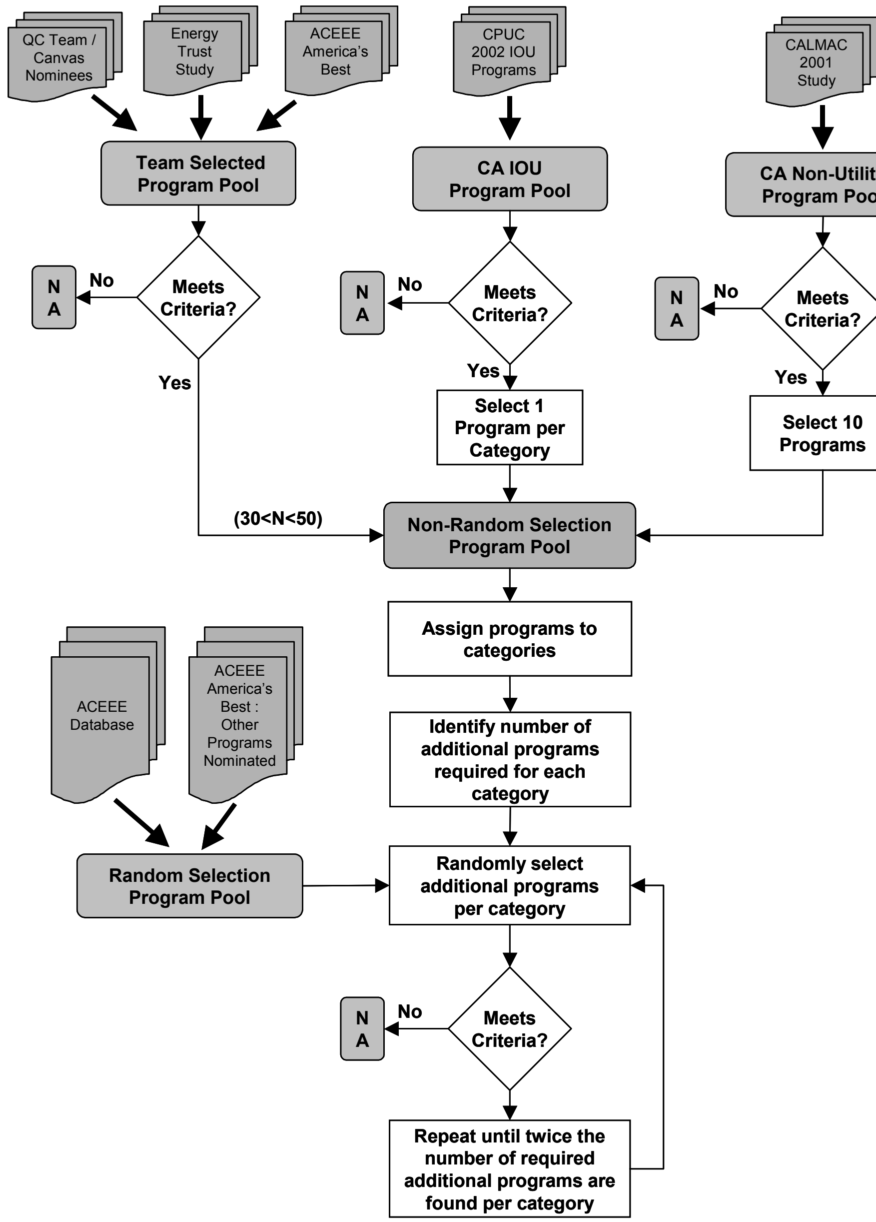

Figure 4. Program Screening & Selection Process

DATA PRESENTATION

Effective communication of the best practices results and supporting program/sub-component profiles is probably the most important aspect of this project. No matter how successful the benchmarking process may be from a technical point of view, to succeed, the project must effectively convey these results to the broad audience of energy efficiency stakeholders in California. Further, stakeholders must actively utilize the project report and follow-on database/website on an ongoing basis. To achieve this success, we propose a set of project results that are layered in a pyramid structure. To organize stakeholders' use of the BPD, we would lead with brief concise findings and descriptions followed by links to increasingly more detailed information. Specifically, the pyramid of best practice knowledge would be constructed as shown in Figure 5: Layer 1 – would contain the most critical key findings and best practices presented in an extremely concise format (for example, cut sheets of best practice bullets organized by sector and program component), it would also contain top-line summaries of performance benchmarking results including program/subcomponent benchmarks; this information will consist of the most highly synthesized process and performance benchmarking results. Layer 2 – would be an expanded version of Layer 1, providing an expanded discussion of best practices, justification for best practice findings, general methodology and sampling documentation, and links to Layer 3 (profiles) and Layer 4 (methods and data collection documentation). Layer 3 – would contain complete sets of program/subcomponent profiles. Layer 4 – would provide complete documentation of project methods and data collection processes and results.

The final structuring of reported results and supporting documentation will facilitate incorporation of this project's deliverables into a future phase database and website. Anticipating and designing the organizational structure of the future phase products will be critically important to project success, as restructuring results and documentation in the future phase would be expensive and could lead to documentation errors.

In the final website version of the BPD (which is also outside the scope of the current study), users could access information at varying levels of depth through a variety of paths. For example, a user might click on a cell that represents Tier 1 practices for a particular program type and subcomponent (e.g., marketing/outreach for residential audits) and find both a list of cross-program best practices as well as further links to the specific practices and associated success indicators of individual Tier 1 programs.

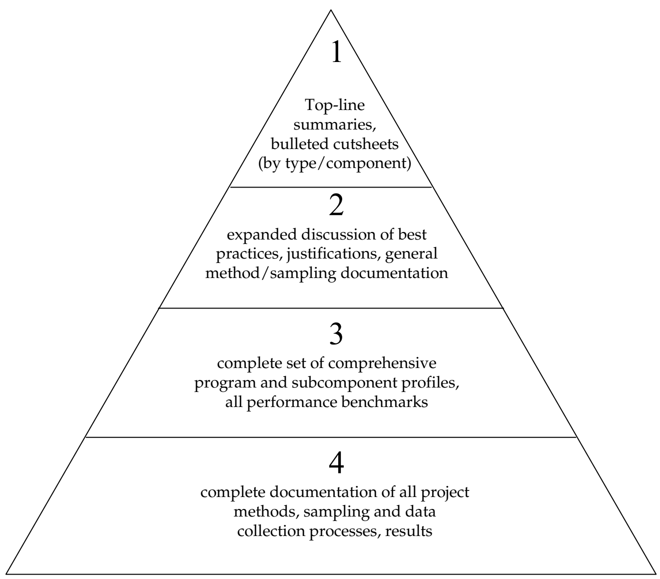

Figure 5. Layered Communication of Project Results

Study Transferability

Recent research raises the issue of program transferability by stating, "energy-efficiency programs are highly contextual and cannot easily be transferred among countries and/or sectors."[1] As part of our data collection process, Team members will include questions to address the transferability issue. For example:

1 Nadel, S., T. Kubo, and H. Geller. ( ). State Scorecard on Utility Energy Efficiency Program Trends. ACEEE. Washington D.C.

- Does the program target a specific sector, demographic group, or industry, which would make it difficult to transfer?
- How do energy costs, environmental costs, and utility revenue requirements affect a program?
- What is the role of weather and regional building practices in defining a program?
- To what extent do fuel type constraints limit transferability of a program's success?
- What is the role of regional culture on transferability of behavior and information messaging?
- What is the context under which a program's successful practices influenced by management, the type of implementer, and other organizational and motivational factors available to program designers?

These and other related issues will be addressed in the data collection phase to provide a better understanding of to which programs or best practice subcomponents are more likely to be transferable from their regions and segments of origin.

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