NATIONAL ENERGY EFFICIENCY BEST PRACTICES STUDY

VOLUME S – CROSSCUTTING BEST PRACTICES AND PROJECT SUMMARY

Submitted to

California Best Practices Project Advisory Committee
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EXHIBITS

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1. SUMMARY OF PROGRAMS REVIEWED AND CROSSCUTTING BEST PRACTICES

1.1 INTRODUCTION

The goal of the National Best Practices Study is to develop a comprehensive and comparative understanding of energy efficiency program efforts throughout the United States. The Study seeks to broaden the skills and capabilities of energy efficiency practitioners by developing a database of energy efficiency (EE) best practices that can be used as a resource to enhance the design, implementation, and management of energy efficiency programs in California.

The term "Best Practice" refers to the business practice that, when compared to other business practices that are used to address a similar business process, produces superior results. Best practices are documented strategies and tactics employed by successful organizations and programs. Note that the focus in this Study is not on identifying best programs or best organizations but, rather, best practices that exist within and across programs.

This volume summarizes a portion of the results of the Best Practices Study that includes:

- Overview of key products, programs reviewed, and program area reports;

- Compilation of best practices common across program areas and associated rationales; and

- Summaries of the study methodology and lessons learned about the project approach.

1.2 OVERVIEW OF KEY PRODUCTS AND PROGRAMS REVIEWED

The key products of the Best Practices Study are **Program Area Reports** and **Program Profiles**, which are available on the www.eebestpractices.com website. The Study is organized around the Program Area reports. For each program area, an in-depth Program Area report presents detailed comparative analyses of benchmarked programs and identification of best practices, associated rationales, key program category-specific issues, and lessons learned. These Program Area reports are separate volumes. Each volume uses benchmarking to compare "like" programs across several program components[3]. This comparative analysis, along with results from interviews with program managers, is used to identify best practices for each specific type of program.

In addition to the Program Area reports, Program Profiles are provided for all of the programs analyzed in the project. These Program Profiles provide information about each program's basic approach to program management, implementation, marketing, and evaluation. The

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[3] Program components are program design, program management, program implementation, and program evaluation. These components are broken down further into sub-components as described in *Section 2 - Methodology*.

profile also includes a list of sources and the program contact. Program Area reports are currently available for 11 program areas. Program Profiles are currently available for 90 programs. In Exhibit S-1, we list the programs analyzed, their associated Program Area, and indicate whether a Program Area report is currently available.

Similar programs were grouped together in program categories according to several criteria. The scheme for grouping "like" programs separated residential and non-residential programs, and distinguished between incentive programs, information and training programs and new construction programs. Programs were also segregated based on targeted end-use and customer type. An "Other" group was included to capture programs that did not cleanly fall into a single sector. Currently, the only "Other" program area is for Mass Market Advertising. As shown in Exhibit S-1, each program category has an associated code and each individual program has an identification number. The Best Practices project has analyzed 90 programs and developed reports for the following 11 program areas: Residential Lighting (R1), Residential Air Conditioning (R2), Single-Family Comprehensive/Weatherization (R4), Multi-Family Comprehensive (R5), Residential Audit (R7), Residential New Construction (R8), Non-Residential Lighting (NR1), Non-Residential HVAC (NR2), Non-Residential Large Comprehensive Incentive (NR5), Non-Residential New-Construction (NR8), and Mass Market Advertising (O1). Additional program area reports are planned.

1.3 SUMMARY OF CROSSCUTTING BEST PRACTICES

As noted above, each Program Area report provides its own list of best practices developed from analysis of the programs analyzed for that program area. As one would expect, many of those best practices apply across different types of programs, while others are solely program area specific. In this crosscutting Executive Summary Volume, we present only those best practices that were found across multiple individual program areas. Program Area-specific best practices are only provided in the individual Program Area reports. In Exhibit S-2, we provide a summary listing of best practices identified in the program area reports that are applicable across multiple program categories. For example, defining key information needs for program reporting and tracking early in the program development process is an important practice, regardless of whether one is running a residential new construction program or a weatherization effort. Exhibit S-3 summarizes the rationales associated with each of the best practices.

Exhibit S-1
List of Programs Analyzed in Best Practices Project

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
R1	**Residential Lighting**	2002 California Crosscutting Statewide Residential Lighting Program (R14)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E)	**Yes**
		2002 Efficient Products Program – Lighting Component (R13)	Efficiency Vermont (EVT)	
		2002 Massachusetts Electric – Residential Lighting Program (R11)	Massachusetts Electric	
		2002 Midwest Change a Light, Change the World Campaign (R15)	Midwest Energy Efficiency Alliance (MEEA)	
		2001 ENERGY STAR® Residential Lighting Program (R12)	Northwest Energy Efficiency Alliance (NW Alliance)	
		2000-2001 Retail Lighting Program (R16)	United Illuminating	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
R2	Residential AC	2002 Keep Cool Air Conditioner Bounty Program (R21)	New York State Energy Research and Development Authority (NYSERDA)	Yes
		2002 California Statewide Single-Family Rebate Program AC Component (R24E)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	
		2002 New Jersey Clean Energy™ Collaborative Residential AC Component (R22)	Conectiv Power Delivery (Conectiv); Jersey Central Power & Light Company (JCP&L); Public Service Electric and Gas Company (PSE&G); Rockland; and Electric Company (RECO)	
		2003 Air Conditioning Distributor Market Transformation Program (R23)	Oncor	
		2001 High Efficiency Heat Pump Incentive Program (R25)	Salt River Project (SRP)	
		2002 Residential Air Conditioning Program (R27)	Florida Power and Light (FPL)	
R3	Appliances	Energy Star Home Products (R31)	Northwest Energy Efficiency Alliance	No
		2002 California Statewide Single-Family Energy Efficiency Rebate Program (R24e)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E)	
		Residential Appliances Program (R36)	United Illuminating Company	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
R4	**Single-Family Comprehensive**	2001-2002 Central Valley Hard-to-Reach Mobile Home Energy Savings Program (R48)	American Synergy Corporation	Yes
		2002 California Statewide Single-Family Energy Efficiency Rebate Program (R24E)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E)	
		1999-2000 Residential High-Use Program (R44)	NSTAR	
		2001 EnergyWise Program (R41)	National Grid USA	
		2002 Efficiency Equipment Loan Program (R46)	Sacramento Municipal Utility District (SMUD)	
		2002 Residential Weatherization Program (R42)	Tacoma Power	
R5	**Multi-Family Comprehensive**	2002 Multi-Family Incentive Program (R59)	Austin Energy	Yes
		2002 California Statewide Multi-Family Program (R52)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	
		2003 Home Energy Savings Program - Multi-Family Component (R56)	The City of Portland/Energy Trust of Oregon, Inc. (Energy Trust)	
		2002-2003 Apartment & Condo Efficiency Services (R58)	Focus on Energy™/Wisconsin Energy Conservation Corporation (WECC)	
		2002 EnergyWise - Multi-Family Component (R51)	National Grid	
		2000 Multi-Family Conservation Program (R57)	Seattle City Light (SCL)	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
R6 & R7	Audits & Information	Energy Star Products Program (R64)	New York State Energy Research Development Association (NYSERDA)	Yes
		2002 Home Performance with ENERGY STAR Program (R71)	New York State Energy Research Development Association (NYSERDA)	
		2000 Time-of-Sale Home Inspection Program (R73)	Sponsor: Southern California Edison Implementer: GeoPraxis, Inc.	
		2002 Residential Conservation Services (RCS) Audit Program (R74)	National Grid	
		2002 E+ Energy Audit for Your Home Program (R78)	Northwestern Energy	
		2002 Residential Energy Advisory Services Program (R79)	Sacramento Municipal Utility District (SMUD)	
		2002 California Statewide Home Energy Efficiency Program (72)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
R8	**Residential New Construction**	2001-2002 Austin Green Building Program (R85)	Austin Energy	Yes
		2002 California ENERGY STAR New Homes Program (R87)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	
		2002 New Jersey ENERGY STAR Homes (R88)	Clean Energy for New Jersey	
		2002 Texas ENERGY STAR Homes Program (R82)	Oncor	
		2002 Tucson Guarantee Home Program (R86)	Tucson Electric Power	
		2001 Vermont ENERGY STAR Homes (R83)	Efficiency Vermont	
		2001-2002 Wisconsin ENERGY STAR Program (R84)	Wisconsin Energy Conservation Corporation (WECC)	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR1	**Non-Residential Lighting**	2003 Lighting Efficiency Program (NR11)	Xcel Energy	Yes
		2002-2003 Business Energy Services Team (BEST) Program (NR110)	KEMA-XENERGY	
		2002 EZ Turnkey Program (NR19)	San Diego Gas & Electric Company (SDG&E)	
		2003 Small Commercial Prescriptive Lighting Initiative (NR45)	Sacramento Municipal Utility District (SMUD)	
		2002 Small Business Energy Advantage Program (NR41)	Connecticut Light and Power (CL&P)	
		2002 California Statewide Express Efficiency Program (NR12)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR2	Non-Residential HVAC	New England Efficiency Partnership's (NEEP) Cool Choice Program (NR21)	Connecticut: Connecticut Light and Power Co., United Illuminating Massachusetts: Cape Light Compact, Massachusetts Electric Co., Nantucket Electric Co., NSTAR Electric, Unitil/Fitchburg Gas & Electric Light Co., Western Massachusetts Electric Co. New Jersey: Conectiv Power Delivery, Jersey Central Power & Light, Public Service Electric & Gas Rhode Island: Narragansett Electric Co. Vermont: Burlington Electric, Efficiency Vermont	Yes
		Avista Rooftop HVAC Maintenance Program (NR22)	Avista Utilities	
		California Express Efficiency HVAC Component (NR12)	Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison, Southern California Gas	
		Los Angeles Department of Water and Power Chiller Efficiency (NR26)	Los Angeles Department of Water and Power	
		Florida Power and Light Commercial/Industrial HVAC Program (NR28)	Florida Power and Light	
		Glendale Water and Power Check Me! (NR29)	Glendale Water and Power	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR3	Non-Residential Refrigeration, Motors, Compressed Air, Process	Premium Efficiency Motors (NR33)	NYSERDA	No
		Express Rebate Program - MotorUp Rebate Program (NR35)	The United Illuminating Company	
NR4	Non-Residential Small Comprehensive Incentive	Small Business Energy Advantage (NR41)	Northeast Utilities (Connecticut Light & Power and Western Massachusetts Energy Company)	Yes Included in NR1 report
		Small Commercial Lighting Program (NR45	Sacramento Municipal Utility District	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR5	**Non-Residential Large Comprehensive Incentive**	Non-residential Standard Performance Contract (NR54)	Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison, Southern California Gas	Yes
		Energy $mart™ C/I Performance (NR51)	New York State Energy Research Development Association (NYSERDA)	
		Energy Opportunities (NR510)	United Illuminating	
		Power Smart (NR512)	BC Hydro	
		Custom Efficiency (NR52)	Xcel Energy (Colorado)	
		Custom Services (NR55)	Northeast Utilities (CL&P)	
		Energy Initiative (NR57)	National Grid	
		Energy Shared Savings (NR58)	WP&L (Alliant) Wisconsin	
		Business Energy Services (NR513)	Efficiency Vermont	
		Commercial & Industrial Custom Retrofit (NR59)	Sacramento Municipal Utility District	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR6	**General & Other Comprehensive**	Flexible Technical Assistance (FlexTech) (NR62)	New York State Energy Research Development Association (NYSERDA)	No
		California Statewide Nonresidential Audit program (NR63)	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	
		Small Commercial and Industrial Programs (NR65)	National Grid	
		Building Operator Certification (NR68)	Northeast Energy Efficiency Partnerships, NW Alliance	
		OPUS (NR69)	Sponsor: Silicon Valley Power Implementer: Aspen Systems	
NR7	**Trade Allies**	2001-2002 NYSERDA Small Commercial Lighting Program (NR71)	Sponsor: NYSERDA Implementer: ICF Consulting	No
		2002 California Statewide Education and Training Program (NR73)	PG&E, SCE, SCG, and SDG&E	
		2000 DesignLights™ Consortium (NR75)	Northeast Energy Efficiency Partnership (NEEP)	
		2002 New York Energy $mart℠ Offices (NR77)	Sponsor: NYSERDA Implementer: PA Government Services	
		2002-2003 California Statewide Energy Design Resources (NR79)	PG&E, SCE, SCG, and SDG&E	

Program Area Code	Program Area	Program Name	Implementer/s	Program Area Report?
NR8	**New Construction Information & Incentives**	Energy Conscious Construction (NR82)	Northeast Utilities	Yes
		Energy Design Assistance (NR83)	Xcel	
		Design 2000 Plus(NR84)	National Grid	
		Savings by Design (NR85)	Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas Company	
		Construction Solutions (NR86)	Nstar	
		Commercial & Industrial New Construction Program (NR88)	Hawaiian Electric Company	
O1	**Other – Mass Market Advertising**	2003 California Statewide Flex Your Power Program (O14)	Efficiency Partnership (led by McGuire and Company in joint partnership with Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E))	Yes
		2002 NYSERDA Keep Cool Campaign (O11)	New York State Energy Research and Development Authority (NYSERDA)	
		2002-2003 Northwest Energy Efficiency Alliance BetterBricks Program Advertising Campaign (O12)	Northwest Energy Efficiency Alliance (NW Alliance)	
		2002-2003 Wisconsin Focus on Energy Umbrella Advertising Campaign (O15)	Focus on Energy™/ Wisconsin Department of Administration (DOA)	
		2003 United Illuminating Wait 'Til 8 Campaign (O16)	The United Illuminating Company (UI)	

Exhibit S-2
Summary List of Crosscutting Best Practices
(see individual Program Area Reports for additional program area-specific best practices)

Program Theory and Design
• Develop a sound program plan; if possible have a clearly articulated program theory • Link strategic approach to policy objectives and constraints • Build feedback loops into program design & logic • Do not over-promise results • Understand local market conditions • Conduct sufficient market research • Maintain program design flexibility to respond to changes in market & other factors • Put process plan (including program management) in writing • Define & locate hard-to-reach customers & target programs accordingly, as appropriate
Program Management: Project Management
• Clearly define program management responsibilities to avoid confusion as to roles and responsibilities • Use well-qualified engineering staff (for technical programs) • Delegate responsibility based on risk versus reward • Reward high performing staff and link performance evaluations to tangible measures which are known in advance and developed together jointly by the manager and employee
Program Management: Reporting and Tracking
• Define & identify key information needed to track & report early in the program development process • Clearly articulate the data requirements for measuring program success • Design program tracking system to support the requirements of evaluators as well as program staff • Use Internet to facilitate data entry & reporting; build in real time data validation systems that perform routine data quality functions • Automate, as much as is practical, routine functions (e.g., monthly program reports) • Develop electronic application processes • Develop accurate algorithms & assumptions on which to base savings estimates • Conduct regular checks of tracking reports to assess program performance • Balance the level of tracking planned against program resource availability • Document tracking system & provide manuals for all users

Exhibit S-2
Summary List of Crosscutting Best Practices (Continued)

Program Management: Quality Control and Verification

- Base quality control on program's relationship with vendors, number of vendors involved, types of measures, project volume, variability of project size
- Use measure product specification in program requirements & guidelines
- Verify accuracy of rebates, coupons, invoices to ensure the reporting system is recording actual product installations by target market
- Require pre-inspections for large or uncertain impact projects
- Conduct in-program measurement/impact evaluation for the very largest projects or those with uncertain impacts
- Assure quality of product through independent testing procedures
- Assess customer satisfaction with the product through evaluation
- Build in statistical features to the sampling protocol to allow a reduction in the number of required inspections based on observed performance & demonstrated quality of work

Program Implementation: Participation Process

- Keep participation simple
- Develop participation strategies that are multi-pronged & inclusive
- Provide quick, timely feedback to applicants
- Use incremental costs to benchmark and limit payments
- Set incentive levels to maximize net not gross program impacts
- Tie rebates for popular measure to those less likely to be considered
- Adjust incentives levels based on market demand
- Review & understand product availability before establishing product eligibility
- Make program participation part of an existing, routine transaction such as the purchase of a home or the installation of HVAC system or other linked relationship, or one-stop shopping
- Tie incentives to building performance
- Incorporate disincentives for savings inflation for performance-based options
- Use Internet/electronic means to facilitate participation. Include procedures to report installation details
- Offer a single point of contact for customers
- Avoid over committing to a project before the design parameters are known

Exhibit S-2
Summary List of Crosscutting Best Practices (Continued)

Program Implementation: Marketing and Outreach
• Use Energy Star® logo to instill consumer confidence
• Include adequate retail outreach & support to ensure product is stocked & advertised & that point-of-purchase materials are accurate & clear
• Develop & disseminate case studies to showcase program projects
• Use target marketing strategies to ensure that hard-to-reach populations are informed about available programs and options
• Provide trade allies with training & resources to enhance marketing
• Sell the customer benefits first, then energy efficiency
• Keep benefits quantifiable in economic terms; Promote life-cycle cost
• Take advantage of external factors (i.e., heat waves, etc.)

Program Evaluation
• Engage the implementation team in the evaluation process
• Present actionable findings to program staff both in real time and at the end of study
• Conduct detailed ex post, impact evaluations routinely, though not necessarily annually
• Include periodic estimation or free-ridership and spillover
• Use regular process evaluation activities to provide timely and fresh data
• Periodically review & update market level information about construction practices, EE market share, and measure adoption
• Perform market assessments for those programs that have an MT component
• Support program review & assessment at the most comprehensive level possible

Exhibit S-3
Summary of Rationales for Crosscutting Best Practices

Best Practice	Rationale
Program Theory and Design	
Develop a sound program plan; if possible have a clearly articulated program theory	Having a stated program theory can facilitate adaptive management by providing a basis for assessing progress and identifying when tactics need to be revised or adjusted in response to market changes.
Link strategic approach to policy objectives and constraints	Articulating a program theory and structuring program tactics to be in line with it enables the program administrator to think through the likely outputs and outcomes of the program tactics, potentially improving the likelihood that the strategic approach will lead to the anticipated results. Prioritizing objectives and taking stock of resource constraints helps clarify choices among policy and design choices.
Build feedback loops into program design & logic	Feedback loops assure that program participants continue to provide and receive input throughout program implementation. The effectiveness of such feedback depends on establishing leading indicators of program performance and being sufficiently flexible to respond to feedback.
Do not over-promise results	Program credibility as an objective, trustworthy, and knowledgeable information source is crucial. Optimistic promises may attract more interest early on but they set the stage for disappointment later. Be prepared to justify all claimed program benefits with objective, empirical information.
Understand local market conditions	Much of a program's success depends on understanding the market within which the program works. This permits the program to have effective relationships with relevant market actors and to recognize which lessons from other areas transfer to the local market and which ones do not.
Conduct sufficient market research	Objective baseline market research bolsters design credibility with diverse stakeholders. Successful programs develop long term relationships with market players and align the interests of those players with their own goals.

Best Practice	Rationale
Maintain program design flexibility to respond to changes in market & other factors	Programs must be able to respond to changing market conditions and address unforeseen challenges throughout program implementation
Put a process plan (including program management) in writing	A written plan is more likely to be a well thought-out plan and is easier to disseminate to the various affected stakeholders. This forces planners to more thoroughly think through implementation strategies and provides a mechanism for review by stakeholders. Thorough program implementation plans or policies and procedures manuals facilitate fair and consistent implementation and aid in design of management processes.
Define & locate hard-to-reach customers & target programs accordingly, as appropriate	Hard-to-reach populations might include those outside of urban/suburban areas, those whose primary language is something other than English, and those with moderate incomes. Where appropriate given the policy environment, efforts to include these groups assure that efficiency funds are spent in an equitable manner.
Program Management: Project Management	
Clearly define program management responsibilities to avoid confusion as to roles and responsibilities	Programs with multiple entities involved, such as technical support contractors, must ensure that lines of responsibility and communication protocols are clear. Whatever the mix of responsibilities, the process should appear integrated and seamless.
Use well-qualified engineering staff (for technical programs)	Whether the program relies on in-house staff or contractors to provide design assistance and technical support, make sure service providers are experienced, knowledgeable, and have the engineering expertise needed to assess project validity, estimate or measure savings, and assure proper implementation.
Delegate responsibility based on risk versus reward	Delegation should be based on balance of risk and rewards associated with the individual projects or administrative function (i.e., low-risk tasks to more junior or less technical employees, high-risk tasks and decisions to senior staff and upper management). Risks and rewards are often tied to the size of a project, the type of project, and the level of uncertainty associated with project savings.
Reward high performing staff and link performance to evaluations	Link staff performance evaluations to tangible measures, which are known upfront and developed together. Staff will perform better when they clearly understand what is expected of them and they agree that the expectations are reasonable.

Best Practice	Rationale
Program Management: Reporting and Tracking	
Define & identify key information needed to track & report early in the program development process	Clearly articulate the data requirements needed to measure success. Early on, Identify all the stakeholders and their information needs and design accordingly, in time to develop useful reporting and tracing systems in a cost-effective manner.
Clearly articulate the data requirements for measuring program success	Describing what "success" looks like is one of the first steps in deciding what to track. Indicators of success include assumptions of energy savings, participant data and any program-specific data. Clearly articulated data collection requirements enhance the prospects that those requirements will be met.
Design program tracking system to support the requirements of evaluators as well as program staff	This ensures that the kinds of information sought by each group can be readily obtained from the program database.
Use Internet to facilitate data entry & reporting; build in real time data validation systems that perform routine data quality functions	Enhance the quality and cost-effectiveness of information management; help minimize duplicative data entry and storage by automating many routine quality-control steps.
Automate, as much as is practical, routine functions (e.g., monthly program reports)	Automating routine tasks (i.e., standardized reports, automated notification procedures) build in quality control checks and allow staff time for more strategically important tasks. Programs should utilize regular check-in and progress milestones to ensure that project status is known on a timely basis.
Develop electronic application processes	Electronic application processes can accelerate program turnaround and reduce administrative cost.
Develop accurate algorithms & assumptions on which to base savings estimates	Reviewing and revising the algorithms and assumptions as market conditions change is important to assure the program is actually achieving its goals. This helps set reasonable expectations and avoids the temptation to oversell program benefits.
Conduct regular checks of tracking reports to assess program performance	Monitoring the program and making adjustments as needed is very important. A tracking system tool should also incorporate variance-reporting features.

Best Practice	Rationale
Balance the level of tracking planned against program resource availability	There is a legitimate tradeoff between the level of detail tracked, the extent of data entry burden, and the amount of time available from staff who are otherwise busy conducting program activities. A comprehensive tracking system that staff does not have adequate time to support is of little value.
Document tracking system & provide manuals for all users	Good documentation will help mitigate problems stemming from staff turn-over, especially when the system must serve a variety of users with varying computer skill levels. Documentation should Include database structure, data field definitions and screening criteria, and data entry and analysis procedures.
Program Management: Quality Control and Verification	
Base quality control on program's relationship with vendors, number of vendors involved, types of measures, project volume, variability of project size	Standard measures installed by known vendors are likely to need less rigorous quality control and verification than higher risk measures (e.g., those with potential impacts on indoor air quality, or those that represent more cutting edge technology, like EMS systems). Programs with no control over trade allies may need to require more quality control-oriented inspection, whereas programs that use a small pool of approved, trained allies using pre-screened lists of products may require less extensive oversight.
Use measure product specification in program requirements and guidelines	Product specifications help to ensure installation of high-quality products. Also, contractors should explain all product warranties to their customers, and be prepared to respond to incidents of product failure. Requiring contractors to repair and/or replace products that fail before warranty expiration will help assure that contractors use high quality products and stand by the performance of the products they install.
Verify accuracy of rebates, coupons, invoices to ensure the reporting system is recording actual product installations by target market	It is critical to ensure that quality products are in the market and that the payments to subcontractors and customers are for qualified and legitimate purchases of products. Additional activities can also be conducted as part of evaluation efforts to provide further verification.
Require pre-inspections for large or uncertain impact projects	Savings cannot be reliably estimated for some types of projects on purely an ex post basis. Pre-inspections are an important part of developing defensible savings for projects such as complex compressed air and industrial process retrofits.

Best Practice	Rationale
Conduct in-program measurement/impact evaluation for the very largest projects or those with uncertain impacts	Measurement for the largest projects is usually cost justified given these projects' contribution to overall savings and the size of the associated incentive checks. Pre-measurement should be utilized for large, complex measures that cannot otherwise be reliably quantified with only ex post data.
Assure quality of product through independent testing procedures	An independent review of products, such as PEARL's review of ENERGY STAR products, helps ensure the reliability of products and their compliance with energy-efficient specifications.
Assess customer satisfaction with the product through evaluation	Customer satisfaction surveys can identify unanticipated problems or benefits related to a particular product and are important to timely correction of problems.
Build in statistical features to the sampling protocol to allow a reduction in the number of required inspections based on observed performance & demonstrated quality of work.	Target inspections where needed by fitting the rigor of verification and inspection to match the type of project. A random sample in which different job types, measures, and trade allies are inspected is more cost-effective than requiring a census, while still providing high levels of reliability and a check on gaming.
Program Implementation: Participation Process	
Keep participation simple	Simplicity is important no matter whether the target is retailers, manufacturers or consumers. Using an easy, simplified process decreases the likelihood that program prospects—both customers and vendors—choose not to participate because of apparent complexity. Administrators should examine application procedures, reporting, invoicing, inspections and payment procedures to streamline processes. This must be balanced, of course, against the need for appropriate quality control, verification, and evaluation.
Develop participation strategies that are multi-pronged & inclusive	Multi-pronged strategies are more likely to allow many market actors to participate in a variety of ways. The exact mix of activities will vary depending on the unique circumstances of an individual program's environment.
Provide quick, timely feedback to applicants	Participants' satisfaction with the program is often driven by fast turnaround and good service.

Best Practice	Rationale
Use incremental costs to benchmark and limit payments	Limiting payments so that they do not exceed a pre-determined portion of average or customer-specific incremental cost estimates is critical to avoiding grossly overpaying for savings.
Set incentive levels to maximize net not gross program impacts	Program resources should be focused on achieving high net effects. Where market penetration is high and self-sustaining, standards should be considered to capture the remaining resource potential while program dollars are shifted to new measures with lower levels of market penetration.
Tie rebates for popular measure to those less likely to be considered	Leverage interest on a particular measure by rebating that measure only if all other cost-effective measures have been considered and used.
Adjust incentives levels based on market demand	When program funds are severely over or under subscribed, adjusting incentive levels may be necessary. However, incentive levels should not be based strictly on market demand and should not be altered in patterns that appear random to market participants.
Review & understand product availability before establishing product eligibility	Constant review ensures that program standards move the market forward without creating demand that significantly exceeds supply (which could result in consumer backlash).
Make program participation part of an existing, routine transaction such as the purchase of a home or the installation of HVAC system or other linked relationship, or one-stop shopping	Making participation part of an existing transaction, or creating one-stop shopping for an energy efficiency measure, helps build energy efficiency into the market.
Tie incentives to performance	Performance-based incentives offer project design flexibility, and should be used in conjunction with prescriptive incentives.
Incorporate disincentives for savings inflation for performance-based options	All incentive structures should be critically reviewed to minimize gaming opportunities. Performance-based structures are particularly vulnerable due to the variety and complexity of input assumptions required to determine expected performance.
Use Internet/electronic means to facilitate participation. Include procedures to report installation details	Using the Internet (i.e., electronic application processing, installation reports) can improve program responsiveness and reduce administration cost.

Best Practice	Rationale
Offer a single point of contact for customers	Projects, particularly those involving complex system upgrades or long timelines, are more effectively managed through a consistent single point of contact.
Avoid over committing to a project before the design parameters are known	A solid understanding of project design parameters facilitates targeted deployment of program resources and minimization of free ridership
Program Implementation: Marketing and Outreach	
Use Energy Star logo to instill consumer confidence.	Retail outreach and support can play an important role for measures that are typically installed by customers such as lighting and appliances. The national ENERGY STAR efforts provide a common brand for both customers and trade allies to associate with high-value energy savings.
When partnering with retailers, include adequate retail outreach and support to ensure product is stocked & advertised & that point-of-purchase materials are accurate & clear	Retailers are key to long-term viability of consumer program implementation. Outreach to retailers helps maintain relationships, keeps program staff apprised of what is happening in the market, and ensures that the marketing messages are clear.
Develop and disseminate case studies to showcase program projects	Case studies help to facilitate the diffusion of new ideas and practices to customers, especially large customers and trade allies, that are risk averse with respect to new technologies and practices, yet concerned about staying competitive and keeping up with industry trends.
Use target marketing strategies to ensure that hard-to-reach populations are informed about available programs and options	By definition HTR customers respond disproportionately to program offerings. Increasing participation requires targeting of messages and often use of alternative information delivery channels such as community-based organizations.
Provide trade allies with training & resources to enhance marketing	In many markets, consumers rely on trade allies as their chief source of information about products, and trade allies can be an effective sales force for the program. To keep private sector marketing efforts effectives, it is important to provide outreach and offer training on both on-going program details and periodic program updates. Leverage trade ally opportunities, trade association trainings, annual meetings, etc.
Sell the customer benefits first, then energy efficiency	Economic benefits tend to be more persuasive than energy efficiency messages, which rarely resonate with the customer. To close the deal, the program representative must understand the customer's needs and barriers and be able to articulate the benefits of program participation in language the customer understands and finds compelling.

Best Practice	Rationale
Keep benefits quantifiable in economic terms, Promote life-cycle cost	Quantify health and productivity benefits as much as possible. Project proponents often lack key information regarding the life-cycle cost implications of their design alternatives. Clear presentation of this information can be persuasive.
Take advantage of external factors (i.e., heat waves, etc.)	Utilities report an upswing in interest following heat waves or energy shortages. Marketing efforts should be tied to such events where possible (and consistent with the program's ability to respond to the demand).
Program Evaluation	
Engage the implementation team in the evaluation process	Involving program staff encourages their buy-in, encourages them to express research issues and express their perspective on program activities. Creating a climate within which evaluation findings are used to improve program delivery and provide important information to staff maximizes the value of the evaluation investment.
Present actionable findings to program staff both in real time and at the end of study	Timely evaluations give real-time feedback to program staff and contribute to program planning. Key findings from evaluations should be well-distilled and disseminated (i.e., via workshops, good executive summaries, two-page briefs). Presentations bring implementers into the feedback loop and encourage them to act on study recommendations.
Conduct detailed ex post, impact evaluations routinely, though not necessarily annually	Impact evaluations may not need to be annual. However, scheduling them at least every two to three years will ensure that changes in program savings are sufficiently tracked to identify changes in program success. Impact evaluations should occur when some change is suspected in these metrics due to different behavior, changing target market, or an external event (e.g., energy crisis).
Include periodic estimation or free-ridership and spillover	Although measuring free-ridership and spillover can be challenging, it yields valuable insight into program cost-effectiveness and the role of the program in the market. Many jurisdictions do not attempt to measure these parameters. Despite the challenges, ceasing measurement may be the wrong approach because free-ridership and spillover measurement often provide the most actionable and practically useful information in an evaluation. It is important, however, for parties to agree upfront on how results will be used, particularly with respect to any performance rewards or penalties for program administrators.

Best Practice	Rationale
Use regular process evaluation activities to provide timely and fresh data	Plan for short time lags between participation and customer interviews to minimize revisionist histories and memory loss. Do not rely solely on impact evaluations to provide recommendations for program improvements several years after the fact.
Periodically review and update market level information about construction practices, energy-efficiency market share and measure adoption	Program design must reflect current market conditions, and studies that obtain an accurate picture of market conditions are important. For example, a program operating in a large, highly fragmented market may require a full-scale study to obtain an accurate picture of market conditions; whereas a program in a small or highly concentrated market may be able to compile a reasonable picture of market conditions through its routine interactions with key market players. In addition, market intelligence inform designers that program resources should not be expended to promote technologies and practices that are already widely adopted or standard industry practices.
Perform market assessments for those programs that have a MT component	Market assessments should occur when the market or program design change significantly. By using established indicators to verify the extent of market transformation, program effectiveness can be measured.
Support program review & assessment at the most comprehensive level possible	Gain the most detailed understanding of program cause and effect that available resources and reporting requirements will support. Process evaluations are important for newer programs and programs in transition. To the extent possible, market transformation programs should measure market effects. Likewise, resource acquisition programs should look beyond simple participant/non-participant comparisons. More comprehensive results will better permit program managers to gauge program performance over time. Program process issues, market changes and estimation and verification of program impacts are key activities to consider in designing an evaluation.

2. SUMMARY OF PROJECT METHODOLOGY

2.1   PROJECT OBJECTIVE AND OVERVIEW

The overall goal of the Best Practices project is to develop and implement a method to identify and communicate excellent programmatic practices nationwide in order to enhance the design of energy efficiency programs in California. In particular, program implementers supported through public goods 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. This section presents a brief summary of the project's methodology. **A full description of the methodology for this project is provided in a separate report volume**.

This study is intended as a first-order effort to identify successful program approaches through systematic cross-program data collection and comparative analyses. The study does not expect to produce 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. If the framework and results of the study prove useful, future phases of the work can expand the number and types of programs covered.

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 are tracked. An overview of the studies key activities is shown in Exhibit S-4.

As shown in Exhibit S-5, the outcome of a program – as measured by $ 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).
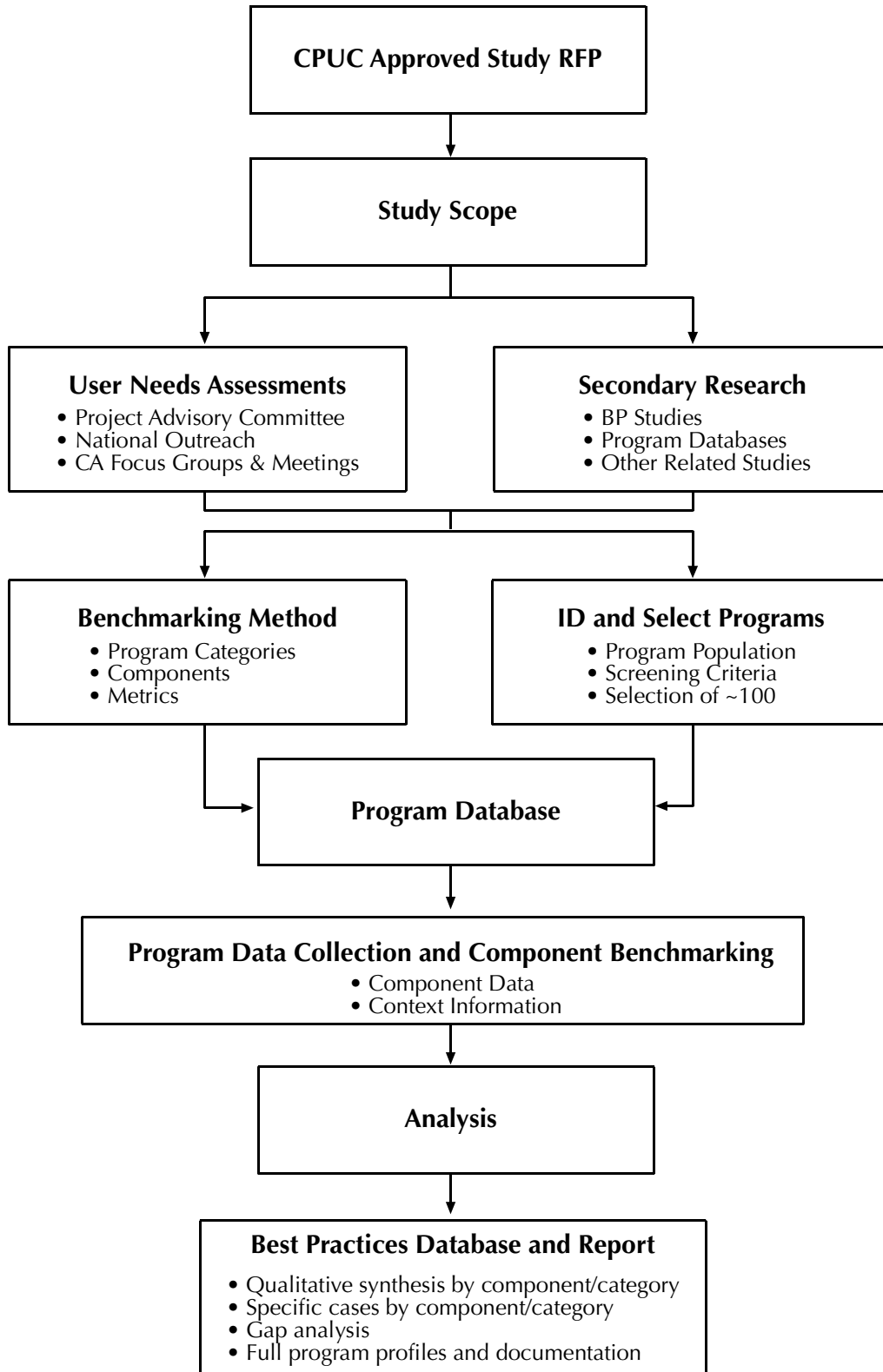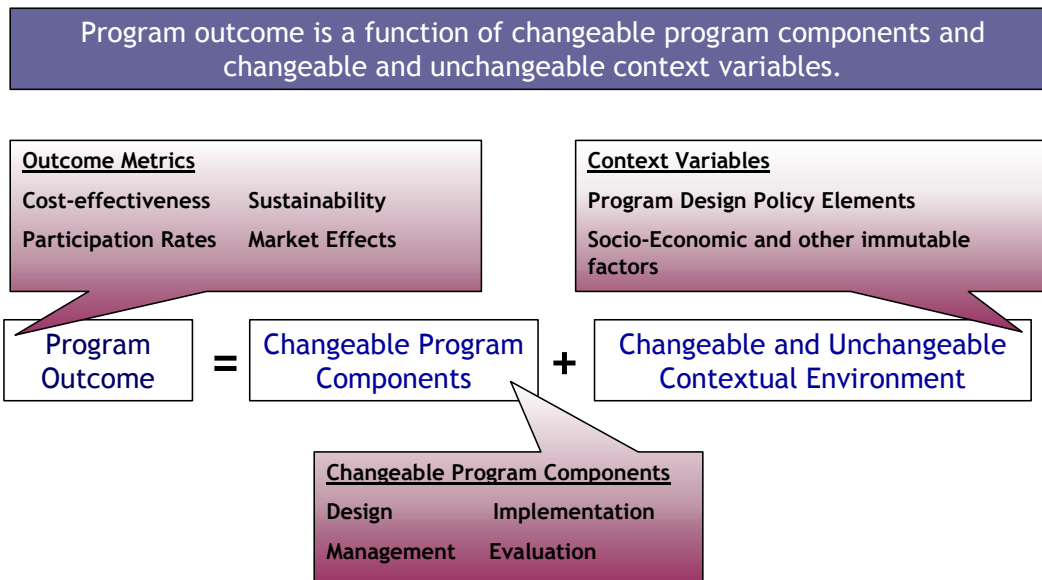
Exhibit S-4
Overview of the Study

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  │ User Needs Assessments   │      │    Secondary Research     │
  │ • Project Advisory       │      │ • BP Studies              │
  │   Committee              │      │ • Program Databases       │
  │ • National Outreach      │      │ • Other Related Studies   │
  │ • CA Focus Groups &      │      │                           │
  │   Meetings               │      │                           │
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  │  Benchmarking Method     │      │  ID and Select Programs   │
  │ • Program Categories     │      │ • Program Population       │
  │ • Components             │      │ • Screening Criteria       │
  │ • Metrics                │      │ • Selection of ~100        │
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  │   Program Data Collection and Component Benchmarking       │
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  │                   • Context Information                     │
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  │         Best Practices Database and Report                 │
  │ • Qualitative synthesis by component/category              │
  │ • Specific cases by component/category                     │
  │ • Gap analysis                                             │
  │ • Full program profiles and documentation                 │
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Exhibit S-5
Relationship Among Program Outcomes, Components, and Context

> Program outcome is a function of changeable program components and changeable and unchangeable context variables.

Outcome Metrics

Cost-effectiveness   Sustainability

Participation Rates   Market Effects

Context Variables

Program Design Policy Elements

Socio-Economic and other immutable factors

$$\text{Program Outcome} = \text{Changeable Program Components} + \text{Changeable and Unchangeable Contextual Environment}$$

Changeable Program Components

Design   Implementation

Management   Evaluation

2.2   DEFINITION OF TERMS

The list below provides definitions of terms used extensively to describe the Study methodology.

Benchmarking - refers to a structured process of comparing and analyzing business practices. A variety of definitions have been put forward by different benchmarking organizations, for example:

- "Benchmarking is the process of identifying, sharing, and using best practices to improve business processes." Source: American Productivity and Quality Center

- "Benchmarking is simply about making comparisons with other organizations and then learning the lessons that those comparisons reveal". Source: The European Benchmarking Code of Conduct

As practiced, Benchmarking almost always occurs as a collaborative process in which members of the same industry, or participants from different industries, share information. Typically the shared information is about business processes with the intention of identifying excellence and developing an understanding of how excellence is achieved.

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*.

Program Component – refers to the first level of the program decomposition, which is further disaggregated into sub-components. The Study decomposes programs into four primary components: program design, program management, program implementation, and evaluation.

Program Sub-component – is a further disaggregation of a program component. The program decomposition model consists of the following sub-components:

- Program Theory and Design: No sub-components

- Program Management: Project Management, Reporting & Tracking, and Quality Control & Verification

- Program Implementation: Outreach/Marketing/Advertising, Participation Process, and Installation & Delivery

These sub-components are further defined in the Methodology report.

Crosscutting Outcome Metrics – are the basis for differentiating program performance at the overall program level. Crosscutting metrics include:

- $ Per kWh and kW saved; Market Penetration, Adoption, and Saturation Rates; and Sustainability/Market Effects

Some crosscutting metrics, such as $ per kWh saved, are directly quantitative. Other crosscutting metrics, such as sustainability and some market effects, can be more difficult to assess.

Best Practice – The term "Best Practice" refers to the business practice that, when compared to other business practices that are used to address a similar business process, produces superior results. Best practices are documented strategies and tactics employed by successful organizations and programs. Note, however, that rarely is an organization or program "best-in-class" in every area. Our focus is not on identifying best programs or best organizations but, rather, best practices that exist within and across programs.

As developed in this Study, Best Practices are identified from in-depth interviews with program managers, thorough review of program documents, analysis of secondary sources, and comparison of program features and outcomes. Programs are compared and best practices developed by program type and program component. The focus of this Study is on best practices that can be generalized and have a high likelihood of transferability to other programs within or across program categories.

Program Context Characteristics - the outcome of a program also depends on the context in which it operates. Understanding that context is critical to the analysis process: wherever possible, the Study team analyzed the changeable decomposed program elements in light of a program's less mutable context. To facilitate this process, several contextual elements were identified to include in the data collection process and consider during the analysis. As described later in this section, we divide these characteristics into two categories: program design policy elements, and socio-economic and other immutable factors.

Program Categories – are the basis for grouping "like" programs to compare across components and sub-components. Program categories were used in the process of selecting which programs to benchmark and to organize the reports and analyses. 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. The program categories developed and used for this study are presented in Section 2.4.

2.3   BENCHMARKING PROGRAM COMPONENTS

The Best Practices Study approach focuses on analyzing programs primarily from the perspective of their changeable program characteristics. The Best Practices Team developed a method for breaking programs down into components and sub-components in order to systematically identify and compare specific program features of importance to overall program success. The four primary program components are program design, program management, program implementation, and program evaluation. These components and their associated sub-components are briefly summarized below.

- **Program Design** provides the initial foundation for a successful program. The program design category has two sub-components: **program theory** and **program structure** (which includes policies and procedures). Good program design begins with good program theory and a complete understanding of the marketplace. Good program structure, policies and procedures are necessary to translate program design theories and goals into practical and effective management and implementation actions.

- **Program Management** is the command and control center that drives the implementation process, and may be broken down into the sub-components of **project management**, **reporting and tracking**, and **quality control and verification**. Project management includes the structure and relationship among responsible parties. Reporting and tracking focuses on approaches to identifying and tracking useful and appropriate metrics that can be translated efficiently into reporting effective information. Quality control and verification includes accountability and improvement processes that are typically carried out through implementation and evaluation activities.

- **Program Implementation** is defined by the actual activities carried out in the marketplace to increase adoption of energy efficiency products and practices. Its sub-components include **outreach, marketing, and advertising**, the **participation process**, and **installation and incentive** mechanisms. Good outreach, marketing and advertising efforts should result in relatively high program awareness, knowledge of program specifics, and participation levels. The participation process is a critically important element of a program's ultimate success. Standard measures of market penetration and customer satisfaction provide one indication of a program's effectiveness at enrolling customers and processing their applications. Installation and incentives should

demonstrate evidence of installation and delivery follow-through on marketing and outreach efforts.

- **Evaluation and Adaptability** of programs should also be analyzed. The Best Practices Study assesses the adequacy of evaluation efforts and how programs use evaluation results or other feedback mechanisms to improve over time.

2.4   PROGRAM CATEGORIES

A program category is defined for the Best Practices Study as the basis for grouping "like" programs to compare across components and sub-components. A number of criteria a good program categorization strategy should address were identified and include user accessibility, benchmarking compatibility, potential, compatibility with policy guidelines, and compatibility with scope directives. The number of program categories was limited to approximately 17 to conform to resource constraints. These are shown in Exhibit S-6 below. The final scheme 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. A Crosscutting section is included to address programs, such as mass market advertising, that do not cleanly fall within the other 16 categories.

Exhibit S-6
Program Categories & Related Codes

PROGRAM CATEGORY			CODE
RESIDENTIAL	Incentives	Lighting	R1
		Air Conditioning	R2
		Appliance and Plug Load	R3
		Single-Family Comprehensive	R4
		Multi-Family Comprehensive	R5
	Information & Training		R6
		Audits and Information	R7
	New Construction Information & Incentives		R8
NON-RESIDENTIAL	Incentives	Lighting	NR1
		HVAC	NR2
		Refrigeration, Motors, Compressed Air, Process	NR3
		Small Comprehensive	NR4
		Large Comprehensive	NR5
	Information & Training	End-Users	NR6
		Trade Allies	NR7
	New Construction Information & Incentives		NR8
Other	Crosscutting		O1

2.5   PROGRAM SELECTION SUMMARY

The program screening and selection process utilized a combination of team-nomination, canvassing, secondary sources, and random stratified selection. Using a stage and gate approach, the team narrowed a large set of programs (approximately 400) down to roughly 100 selected programs, so as to have roughly 5 programs for each of the 17 original program categories. The team identified initial candidate programs through primary research, a review of existing secondary sources, and expert nominations.

Programs included in the study met a set of screening criteria that included (a) completing at least one "programmatic cycle" (to weed out new programs less than one year old) and (b) sufficient documentation (preferably including *ex post* evaluation).   Excluded from consideration were (a) national blanket programs (i.e., Energy Star, Compressed Air Challenge, etc.), international programs, programs focused on codes and standards, agricultural, low-income, and R&D programs.

Programs reviewed for each of the program categories in the Best Practices Study were selected through a three step process. Exhibit S-7 illustrates the complete screening and selection process.
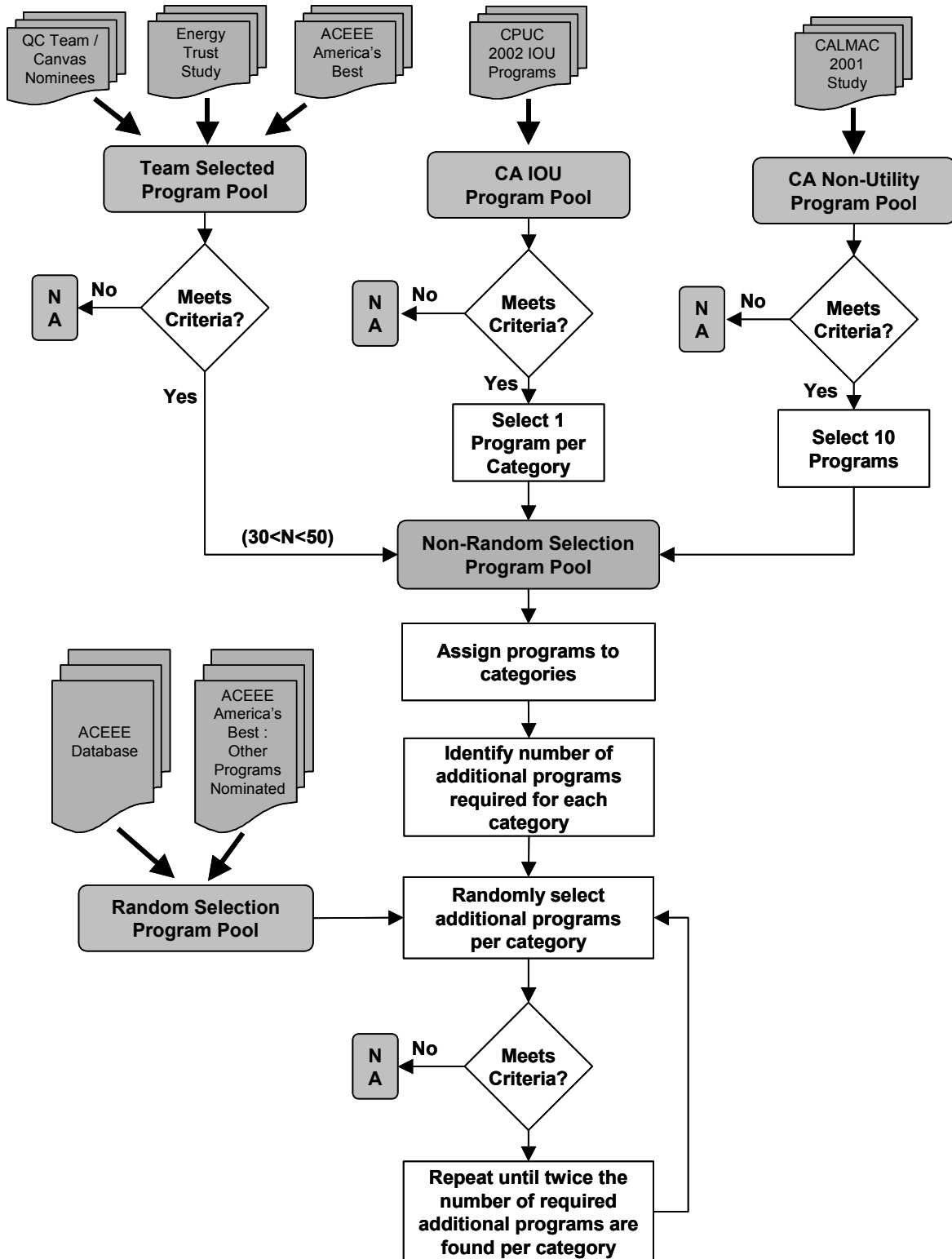
First, programs were nominated using recent best practice studies, team member recommendations. Next programs were randomly selected from published data on energy programs to complete the roster. The third step involved conducting outreach interviews with the staff of nominated programs to determine if sufficient information was available to conduct the research. With the final set of programs determined, in-depth interviews were conducted.

This selection process was designed to ensure sufficient representation of programs that were already perceived as "good", while allowing for a random selection of other programs against which to benchmark. The process also allowed for the inclusion of some non-utility California energy efficiency programs as well.

The research team employed a purposefully academic method of program selection 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 program screening and selection process utilized a combination of team-nomination, canvassing, secondary sources, and random stratified selection. This method worked well in selecting about half the programs for inclusion in the study, the final program count is currently short of the initial target of 100 programs for several reasons.

- First, the random selection method yielded many "soft" programs unsuitable for study (i.e., programs that did not track participation or budgets, did not have measurable impacts, or did not really represent meaningful, discrete programmatic efforts).

- Second, it became clear that the diminishing returns of scouring niches for little-known programs did not justify the cost of additional time and effort.

Exhibit S-7
Program Screening and Selection Process

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  │ QC Team /│    │ Energy   │    │ ACEEE    │        │ CPUC     │                    │ CALMAC   │
  │ Canvas   │    │ Trust    │    │ America's│        │ 2002 IOU │                    │ 2001     │
  │ Nominees │    │ Study    │    │ Best     │        │ Programs │                    │ Study    │
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| Team Selected Program Pool | CA IOU Program Pool | CA Non-Utility Program Pool |

```
        Meets                    Meets                       Meets
NA ←No─ Criteria?        NA ←No─ Criteria?           NA ←No─ Criteria?

        Yes                      Yes                         Yes

                            Select 1                     Select 10
                            Program per                  Programs
                            Category
```

(30<N<50) ───────────→ **Non-Random Selection Program Pool** ←───────────

Assign programs to categories

```
  ┌──────────┐    ┌──────────┐
  │ ACEEE    │    │ ACEEE    │
  │ Database │    │ America's│            **Identify number of**
  │          │    │ Best :   │            **additional programs**
  │          │    │ Other    │            **required for each**
  │          │    │ Programs │            **category**
  │          │    │ Nominated│
  └──────────┘    └──────────┘
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Random Selection Program Pool ──────→ **Randomly select additional programs per category** ←──────

```
        Meets
NA ←No─ Criteria?
```

Repeat until twice the number of required additional programs are found per category

- Third, the study sought to compare and contrast unique programs. The database listed fewer unique programs than expected, as several programs that appeared to be unique initially proved to be virtually identical to other programs already in the study.

- Finally, it remains difficult to estimate how many good, unique programs exist in the universe of energy efficiency programs. The initial 100 programs targeted may be closer to the actual population than anticipated, resulting in a sample that pushes the bounds of the population.

2.6   DATA COLLECTION SUMMARY

Program information was gathered using primary and secondary sources. Primary data collection occurred primarily through surveys of program managers[4] and review of regulatory filings, annual reports, and program evaluations. A detailed survey instrument guided interviews with program staff. The team conducted interviews with program managers that often lasted over two hours, indicating both the comprehensiveness of the instrument and the willingness of program managers to discuss their programs.

The survey instrument collected information on three main areas: policy context and environment, outcome metrics, and information about program components. The first set of questions elicited responses on how the program might have been affected by the broader context in which it operates. Next, respondents provided information on outcome metrics, such as program impacts and costs. The remainder of the instrument was devoted to collecting detailed program information for each program component. For each component, respondents were asked to provide factual information (i.e., how the program addressed each issue) and qualitative judgments about what practices they felt contributed to the success of this program and what practices should have been avoided or could be improved.

The sequence of data collection steps conducted is summarized below.

Step 1: Contact Program Representatives

This initial contact explained to program representatives the purpose of the Study, and asked for the representative's participation, or for a go-ahead to contact members of their organization. Any readily available information such as regulatory filings, procedures manuals, marketing materials, evaluations, etc. were requested and a time and date for an in-depth interview was scheduled.

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[4] Some interviews were also conducted with evaluators and program directors.

Step 2: Identify and Review Existing Information

For programs scheduled for an interview the team reviewed and completed the existing data in the Screening Database and gathered any additional required information through research.

Step 3: Integrate Existing Documentation

Prior to an interview, all existing information sources were integrated into the Best Practices Database (the database that contains all programs to be benchmarked) and into the data collection instrument. Any data inconsistencies were resolved or flagged.

Step 4: Conduct Interviews

During the in-depth interviews with program representatives, the team focused on collecting information not found during the initial research. The team also attempted to resolve any data inconsistencies. In addition to collecting information germane to the program, program representatives were interviewed regarding their general knowledge of program development and tools that they have found useful when conceiving and constructing their own programs. Additionally program mangers were queried about some of the best and worst practices they have seen in the industry, in their opinion, in their program area.

Step 5: Update Best Practices Database

Once the interview was completed, the Best Practices Database was updated and checked to see that the minimum amount of data necessary to keep the program in the Study was obtained. Any missing data or inconsistencies were flagged.

Step 6: Submit Summary Profile to Program Representatives for Review

The Study team circled back one last time with the program representatives to discuss the final data that was input to the Best Practices Database. A Summary Profile of each program was developed from interview and secondary data sources that focused primarily on the descriptive and factual characterizations of the program components. That Summary Profile (in electronic PDF format) was submitted to program representatives for their review. This review process helped resolve any data discrepancies with the program manager.

Once all interviews were completed, all data in the Best Practices Database was finalized to prepare for the analysis phase of the Study.

3. SUMMARY OF PROJECT CHALLENGES

In general, willingness to participate in the project and interviews was excellent. Most organizations and program managers were very interested in the project and believed there was value to them and their organization in participating. Outright refusals to participate were extremely rare. However, our comprehensive approach to data collection proved an arduous and ambitious task. The quality of the data collected from participating organizations was mixed. For some programs, the team obtained excellent qualitative findings and quantitative data on program costs and benefits. In other cases, qualitative depth and quantitative data was weak. Although data collection progress was quite good, there were several challenges. Note, however, that the type and extent of challenges encountered are generally within the range of what were expected going into the data collection phase of the Study. Specifically, the key challenges were as follows:

- Selected programs included on the original target list did not pan out.

- Programs or organizations that agreed to participate but were unable or unwilling to make time for the interviews within our data collection period.

- Gaps in the information collected despite lengthy interviews and mining of all available secondary sources.

- Reliance on qualitative judgments.

Each of these issues is addressed below.

Selected Programs Included on Our Original Target List that did not Pan Out

Despite our extensive efforts to pre-screen programs for inclusion in the project, the team had to drop a number of programs that made it onto the list of targeted programs. As expected, this problem was more extensive for those programs that were randomly selected than for those that were identified by the Team and related secondary sources as high-priority targets. Key reasons for program dropouts include:

- *The program no longer exists.* This was not a fatal barrier if reliable ex post cost and savings data were available for a recent program year and the associated program manager could be identified and interviewed. However, in most cases, dead programs lacked available data and program managers to interview.

- *The program was not really a program* from the Study perspective but was rather a program element. The most common example of this were cases where an activity was identified as a program but that activity was not tracked separately from the larger actual program within which it occurred. For example, secondary sources indicated that an organization had a "Compressed Air" program but in actuality it was just a target

area of a custom incentive or information program. In a few cases the savings associated with the element was tracked, but not the costs. For resource programs, the Study kept the detailed data collection focused on programs with costs and savings data.

- *The program overlaps too much with other programs on the Study list*. This was a particular problem in the Northeast where there is extensive convergence in program approaches. Some of this convergence is regulatory driven (e.g., requirements for statewide program consistency in places like Massachusetts), some associated with holding companies (e.g., Northeast Utilities desiring consistency across its Connecticut and Massachusetts distribution companies), some associated with regional initiatives (e.g., implementation of Cool Choice across many utilities in the Northeast), and some simply normal diffusion (e.g., program designers simply sharing design concepts and converging through peer-to-peer communication).

The upshot for the project was that there is less uniqueness in programmatic approaches than were anticipated going into the data collection phase. In general, if it appeared to the team that a program on the list was virtually identical to one for which data had already been collected, the inclination was to drop the program. The team tried to be flexible on this as there may be value in including some programs that appeared very similar but had different levels, performance, or lessons learned.

Programs or Organizations that Agreed to Participate But Were Unable or Unwilling to Make Time for the Interviews Within Our Data Collection Period

A few programs and organizations expressed interest in the project and willingness to participate but under challenging terms, generally with respect to schedule. There were a few programs and organizations for which time was at a very high premium. In these cases, program managers appeared to be stretched to the limit on their core job duties and could not free up time.

Gaps in the Information Collected Despite Lengthy Interviews (Average Two Hours) and Mining of All Available Secondary Sources

Another challenge that was faced throughout the data collection process was that it was difficult in practice to obtain information on all of the areas covered in the data collection forms for each and every program. This was due to a variety of constraints, particularly the following:

- *Information simply not available*. In some cases, the information sought was neither available from secondary sources nor from the individual(s) interviewed. This pertained to both factual and judgmental information. Reasons for these gaps included program managers not having been the original designers of the programs they were running and interviewees not having thought about their programs at the level of decomposition in the Study forms. Other reasons included lack of formal program evaluations and ex post summary of program accomplishments (e.g., costs and impacts).

- *Shortage of quantitative data.* Considerable effort was required to obtain outcome metrics, where available. The amount of quantitative data collected by the research team varied widely by program. Many programs do not track basic performance indicators that have consistent meaning across markets, such as cost per kWh saved and

market penetration, due to the difficulty of collecting this information. Furthermore, the usefulness of cost-effectiveness indicators was limited by differences in how costs and impacts are accounted for across programs. This dearth of comparable quantitative data, while not unexpected, points to an issue that demands attention from the industry. A number of program administrators appear to be under-evaluating their programs. The lack of regular, consistent evaluations compromised the availability of quantitative data and challenged the team's ability to compare empirical, ex post data across programs.

- *Not enough time to obtain all desired information during interview.* Despite conducting what were, on average, two hour or longer interviews it was still not possible to ask every question on the data collection form because the expected amount of information was simply overwhelming. This problem was anticipated from the outset of the Study and was a focus of the pre-testing process. The survey instrument was reduced substantially as a result of three-plus hour pretest interviews. Although the forms that resulted from the pre-test were more manageable than the longer initial forms, the amount of information still exceeded what most interviewees could provide in two hours which was typically the limit of their willingness to participate (though a number of interviewees have spent up to three or four hours on the phone with the team). This problem was addressed in two ways. First, interviewers used secondary sources wherever possible to complete the descriptive parts of the forms. Combining the secondary sources with the interviews allowed the team to focus the interviews on gaps in the secondary sources and those parts of the form that could only be addressed through the direct experience of the interviewee. The telephone interviews prioritized obtaining information that was unpublished, i.e., leveraging the interviewee's personal knowledge and experience. Second, interviewers were forced to use a triage process to obtain the most important lessons learned from the interviewee. While valuable program insights were gathered in the interviews, team members often asked only the most essential questions.

- *Multi-program scopes for single interviews.* This is a related problem to the time constraint issues discussed in the previous bullet. In a few cases the interviewer was directed to a single person in an organization for multiple programs in the organizations that were selected for inclusion in the Study. This occurred (1) because a single manager was actually running multiple programs, (2) because a sector-level manager was the "brains" behind several programs and believed the actual program managers would not be able to provide the lessons learned the Study sought, or (3) because the interviewee was covering for other program managers who may have left the organization recently or were otherwise unavailable for the interview. Multi-program interviews had some advantage in that they allowed a strategic, multi-program manager to discuss their overarching program design philosophies and how their individual programs were designed to work together. However, the down side was that it was generally impossible to collect all of the component-specific lessons learned for each program that was selected for inclusion in this project in these types of interviews.

- *Parts of form are not relevant to some programs.* As was known throughout the design of the data collection process, the complete range of information targeted in the forms would not be relevant to every program. The forms were designed to capture relevant characteristics and findings for programs across a wide range of strategic and tactical

objectives. Thus, parts of the form designed to capture information on one type of program were not relevant to other types (e.g., the portions of the form with detailed information on a direct installation program was different from the detailed portions for a mass market advertising program). This is, of course, a key reason why the method and forms utilized a decomposition approach – to ensure flexibility and relevance across diverse program types. Gaps associated with strategy and tactical differences were not considered to be a problem, but were identified simply to provide a reminder on this.

- ***Program managers sometimes lack strategic perspective.*** The survey instrument solicited both factual information and strategic judgments from program staff and the team learned that a tradeoff existed between gathering factual information and strategic judgment. Program managers, on the front lines of program administration, are well-versed in the workings of the program but often lack a broader strategic perspective that lies with strategic sector or portfolio management. Many day-to-day program managers offered only limited lessons learned and best practices. However, the primary program manager was an appropriate choice for the initial and single point of contact, given resource constraints and the need to collect detailed comparative information.

Reliance on Qualitative Judgments

The lack of reliable empirical data compelled the team to adopt a more qualitative, judgment-based approach to identifying best practices, with attendant problems in justifying qualitative assessments. A scoring approach was envisioned for differentiating program performance that would rely on quantitative crosscutting metrics, but this approach had to be set-aside in the absence of sufficient quantitative information. Furthermore, such an approach is not feasible when the number of independent variables is greater than the number of observations, as is the case with energy efficiency programs.