ES. EXECUTIVE SUMMARY FOR NON-RESIDENTIAL LIGHTING PROGRAMS (NR1)

ES.1 INTRODUCTION

This volume presents results of a comparative analysis of non-residential lighting programs included in the National Energy Efficiency Best Practices Study ("Best Practices Study"). The overall Best Practices Study objectives, scope, and methodology are briefly outlined in Appendix NR1A of this report. More details on methods and cross-program findings are provided in separate report volumes.

The Best Practices Study team ("Best Practices Team") reviewed six programs for this program area study ("NR1 Programs" and "NR1 Study," respectively) that offer turnkey installations and traditional rebate opportunities to non-residential customers. Although several of these programs offered a range of measures (e.g., refrigeration and HVAC), lighting measures (mostly T8, delamping and CFLs) account for the bulk of energy savings attributed to NR1 Programs. Therefore, these programs are referred to as lighting rather than comprehensive programs for the purposes of the NR1 Study. The NR1 Programs are listed in Exhibit NR1-E1 below and presented in the body of this report. A discussion of the program selection process is provided in Appendix NR1A.

ES.2 KEY CATEGORY THEMES

Three crosscutting issues that affect multiple program components were identified for the NR1 Programs.

A program's target market fundamentally shapes program design, incentive level and marketing approach.

Program Design. A turnkey, or direct installation, approach is often taken to penetrate the small commercial customer market, based on evidence that small customers do not have the expertise, time or available capital to make lighting upgrades. This approach is designed to provide all aspects of lighting installation for the customer and virtually eliminate the barriers of participant hassle and search costs.

Incentive Level. High incentives, often 75 percent or more of measure cost, drive the economics of investment for small, capital-constrained customers who would usually otherwise not participate in energy efficiency programs. Participation and adoption rates increase non-linearly as financial incentives increase.

Marketing Approach. Mass media does not move many small customers to participate in efficiency programs. Contractors more often drive the customer recruitment process. In prescriptive programs with moderate to low incentives, contractors typically recruit customers believed to be able and willing to co-fund project installation. In turnkey programs with high incentives, contractors are often motivated to follow program directives that emphasize census marketing of customers that are qualified for the program, typically by customer size and geography.

Contractor relationships are critical to non-residential lighting programs. In both turnkey and traditional rebate programs, contractors are usually far more involved than customers in the direct program process. Because this high level of involvement is central to the program, strong positive relationships between program staff and contractors is extremely important. Regardless of program approach, streamlining program process to make participating easy, and promoting contractor credibility are key to building and maintaining successful relationships with these trade allies.

Standardized incentives and discrete measure lists offer great potential for automated processes. Some of the NR1 Programs have pioneered innovative ways to use information technology to electronically link program administrators and the lighting contractors that implement projects at customer facilities. Internet-based project management tools offer efficiency gains as well as improved utility turn-around time and real-time tracking capability. To realize the full benefit of such tools they must be robust enough to process a high volume of projects in large programs with minimal staff resources. Limited and standardized program elements facilitate cost-effective development of efficient IT systems. Users of these workflow and project management systems considered them critical to program success.

ES.3 BEST PRACTICES SUMMARY

Best practices are identified in this study for each of the four major program components used to organize data collection and analysis. These program components are Program Design (including program theory), Program Management (including project management, reporting and tracking, and quality control and verification), Program Implementation (including participation process and marketing and outreach) and Program Evaluation. Best practices were developed by analyzing information across programs developed from detailed interviews of program managers and thorough review of all relevant secondary sources such as program filings and evaluations. Exhibit NR1-E2 presents the list of best practices developed from the analysis of R1 programs. Exhibit NR1-E3 provides the rationales associated with each best practice. The remainder of this report provides detailed analysis and discussion of program features and best practice rationales.

The scope of this study also includes a California gap analysis. A comparison of the best practices presented in this report with the practices employed in California's Statewide Express Efficiency Program is in progress and will be published when complete in a separate document.

Exhibit NR1-E1
NR1 Programs: Non-residential Lighting Programs Reviewed For NR1 Study

Program Name	Implementer/s	Abbreviation for NR1 Report
2003 Lighting Efficiency Program	Xcel Energy	Xcel Lighting
2002-2003 Business Energy Services Team (BEST) Program	KEMA-XENERGY	KEMA-XENERGY BEST
2002 EZ Turnkey Program	San Diego Gas & Electric Company (SDG&E)	SDG&E EZ Turnkey
2003 Small Commercial Prescriptive Lighting Initiative	Sacramento Municipal Utility District (SMUD)	SMUD Sm Comm Prescriptive
2002 Small Business Energy Advantage Program	Connecticut Light and Power (CL&P)	CL&P SBEA
2002 California Statewide Express Efficiency Program	Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric Company (SDG&E)	CA SW Express

Exhibit NR1-E2
Summary List of Best Practices for Non-Residential Lighting Programs

Program Theory and Design
• Articulate a program theory that clearly states the target for the program, program timing and the strategic approach whether resource acquisition, market transformation or equity • Link strategic approach to policy objectives and constraints
Program Management: Project Management
• Develop and maintain strong relationships with lighting vendors/contractors • Use electronic project management tools
Program Management: Reporting and Tracking
• Collect pre-existing wattage information • Use electronic application processes • Use incentive commitment tracking • Allow program managers to generate standardized reports • Use databases that fully integrate with cross-program energy-efficiency program information systems • Use detailed process flow diagrams • Track vendor activity
Program Management: Quality Control and Verification
• Base quality control practices on a program's relationship with vendors, the number of vendors, the types of measures, the project volume, and the variability in the size of projects • Define product specifications in program requirements and guidelines • Obtain a good random sample of vendor and measure types • Always inspect the first job submitted by a new vendor • Conduct on-site post-installation inspections • Conduct an independent audit or pre-installation inspections • Govern post-inspection levels by cost-effectiveness considerations and results from an initial set of inspections early in the implementation process • For delamping projects, use light level requirements and pre- and post-light level readings to ensure quality • Implement a contractor screening/certification/training process

Exhibit NR1-E2
Summary List of Best Practices for Non-Residential Lighting Programs (Continued)

Program Implementation: Participation Process
• Use an easy, simplified process for vendors to participate • Optimize data collection requirements • Make customer eligibility easy for contractors to determine • Use electronic processing • Use high incentive levels, as appropriate, in segments and for program designs that require high penetration rates to be cost-effective or if policy goals demand high penetration levels • Reduce or eliminate incentives for measures and segments with high penetration rates not caused by program participation • Appropriately incent and bundle delamping with T12 conversion • Set base rebate levels appropriately throughout the program year instead of over-relying on short-term promotions • Offer zero-percent or low-cost financing to offset high cost of capital for small businesses
Program Implementation: Marketing and Outreach
• Leverage utility credibility to help vendors sell the program • Use door-to-door marketing by a turnkey vendor to achieve a high penetration rate, especially among small commercial customers • For prescriptive programs, combine a moderate mass marketing effort with a process of strongly motivating and leveraging contractor marketing for prescriptive programs • Leverage partnerships with cities and community-based organizations
Program Evaluation
• Perform annual evaluations for high-priority issues that are relevant and unique to each individual program year • Spot check the data entry process annually • Review inspection databases annually • Ensure that program tracking databases are correctly calculating program impacts annually • Perform detailed impact evaluations routinely, though not necessarily annually • Evaluate operating hours routinely • Collect pre-wattage information routinely • Determine measure life in estimating the lifecycle benefits of a measure routinely • Perform market assessments routinely, though not necessarily annually • Conduct process evaluations routinely • Conduct evaluations in a timely manner • Involve program staff in the evaluation process and create a culture whereby evaluation findings are valued and integrated into program management • Present actionable findings to program staff at the conclusion of study

Exhibit NR1-E3
Summary of Best Practices Rationale and CA Gap Summaries for Non-Residential Lighting Programs

Best Practice	Rationale
Program Theory and Design	
Articulate a program theory that clearly states the target for the program, program timing and the strategic approach whether resource acquisition, market transformation or equity	Even a relatively simple statement of program logic can reveal gaps in program focus or effort and assure that everyone involved knows what the program seeks to accomplish and why.
Link strategic approach and target to policy objectives and constraints	Program strategic approach and target should be linked to policy objectives and constraints to help ensure the strategic and tactical approaches will lead to the desired results. For example, a direct installation program may be desirable when the primary goal is to maximize penetration in a hard-to-reach segment under a Total Resource Cost test. By contrast, a prescriptive rebate approach with lower incentive levels is often superior at maximizing savings per program dollar (as viewed by the Utility/Program Administrator Cost Test) in segments where sufficient market demand exists. The pivot point between these two approaches may be swayed by several factors, including, market saturation, program costs, participation rates, and levels of free-ridership.
Program Management: Project Management	
Develop and maintain strong relationships with lighting vendors	Vendors are the critical program delivery mechanism for non-residential lighting programs. Strong vendor relationships are especially critical for traditional rebate programs that do not directly subcontract with vendors but do rely on them to market the program.
Use electronic project management tools	Electronic management tools can improve turn-around time and reduce administrative cost. Electronic submission processes are especially useful for high-volume programs.
Program Management: Reporting and Tracking	
Collect pre-existing wattage information	This has proven key to accurate savings and program impact estimates. It may be easier to collect this information through an existing audit process or electronic submission. However, if the incremental effort involved in collecting pre-existing information is too great, considerable value can be obtained by collecting this information on a random sample. This could be done either through the program or through a real-time independent evaluation.

Best Practice	Rationale
Use electronic application processes	Electronic application processes can accelerate program turn-around and reduce administrative costs.
Use incentive commitment tracking	This is useful for programs that enable customers to reserve funds, especially for larger customers or customized measures with longer project cycles. Reservations guarantee funds to customers and help the program administrator anticipate expenditures. Incentive commitment tracking can be part of project status reporting.
Allow program managers to generate standardized reports	Program staff is not forced to rely on programmers, database specialists or IT staff to extract information.
Use databases that fully integrate with cross-program energy-efficiency program information systems	Integration facilitates management review.
Use detailed process flow diagrams	Process flow diagrams help facilitate data entry for high-volume programs.
Track vendor activity	Market activity highlights active vendors and high-volume measures.
Program Management: Quality Control and Verification	
Base quality control practices on a program's relationship with vendors, the number of vendors, the types of measures, the project volume, and the variability in the size of projects	A prescriptive rebate program with no control over vendors may need to require more quality control-oriented inspection. A turnkey program that trains a small pool of vendors and uses a pre-screened list of products may require less *ex-post* product quality review.
Define product specifications in program requirements and guidelines	Product specifications help to ensure installation of high-quality products and enhance participant satisfaction.

Best Practice	Rationale
Obtain a good random sample of vendor and measure types	A stratified random sample ensures that different job types, measure and vendors are inspected.
Always inspect the first job submitted by a new vendor	Inspecting jobs by new vendors helps to ensure they are installing products appropriately and makes clear that quality control is taken seriously.
Conduct on-site post-installation inspections	On-site inspections discourage vendors from failing to fully and properly install all rebated measures (e.g., dropping CFL shipments.) Random inspections of 10 to 20 percent of projects are usually adequate for lower incentive prescriptive programs. The fraction of on-site inspections should be higher for direct installation programs and may need to be increased for any program as conditions warrant.
Conduct an independent audit or pre-installation inspections	An independent audit or pre-inspections by the program administrator ensures a comprehensive, accurate assessment of needed measures, and reduce any tendency of contractors to promote products of most benefit or familiarity to them. However, for mass market prescriptive programs, this may be cost-effective for only a random sample of projects.
Govern post-inspection levels by cost-effectiveness considerations and results from an initial set of inspections early in the implementation process	It may not be cost-effective to perform 100% post-inspections in a high-volume program or a program with small impacts per site. A good rule of thumb is 10-20% for a high-volume program or low impact per site program and 100% for very large projects and problem vendors.
For delamping projects, use light level requirements and pre- and post-light level readings to ensure quality	Delamping can provide significant and highly cost-effective savings but is only appropriate if required light levels are maintained. Light level requirements help ensure customer satisfaction and retention of savings.
Implement a contractor screening/training/certification process	Screening encourages the participation of responsible contractors and helps ensure high-quality installations.
Program Implementation: Participation Process	
Use an easy, simplified process for vendors to participate	Vendors are the most important actor in the prospecting and delivery mechanism, so success depends on a process that facilitates participation and keeps contractor costs modest.
Optimize data collection requirements	Contractors will not participate aggressively if they incur significant costs in application development. Paperwork should be easy for contractors and customers.

Best Practice	Rationale
Make customer eligibility easy for contractors to determine	Determining customer eligibility is important to a streamlined process and quick turn-around.
Use electronic processing	Electronic application processing improves the program implementer's responsiveness and reduces administration cost.
Use high incentive levels, as appropriate, in segments and for program designs that require high penetration rates to be cost-effective or if policy goals demand high penetration levels	High market barriers among small customers and high fixed marketing costs typically require a high penetration rate to achieve desired cost-effectiveness.
Reduce or eliminate incentives for measures and segments with high penetration rates not caused by program participation	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.
Appropriately incent and bundle delamping with T12 conversion	This combination measure delivers very cost-effective savings but must be implemented conservatively.
Set base rebate levels appropriately throughout the program year instead of over-relying on short-term promotions	Sale periods create processing bottlenecks and slower turn-around. Occasional sales help promote a specific technology or target a specific segment, but should be used sparingly.
Offer zero-percent or low-cost financing to offset high capital for small business	Zero-percent financing, with convenient terms and short repayment periods, can improve customer acceptance rates by overcoming the high cost of capital for small businesses.
Program Implementation: Marketing and Outreach	
Leverage utility credibility to help vendors sell the program	Customers consider utilities as more credible than contractors in some markets. In these cases, leveraging utility credibility is usually effective.
Use door-to-door marketing by a turnkey vendor to achieve a high penetration rate, especially among small commercial customers	Face-to-face marketing and turnkey services reduce the hassle and information search costs for small businesses that might otherwise not participate.

Best Practice	Rationale
For prescriptive programs, combine a moderate mass marketing effort with a process of strongly motivating and leveraging contractor marketing for prescriptive programs	This combination works to create program awareness and close sales.
Leverage partnerships with cities and community-based organizations	Partnerships offer marketing leverage for a program administrator and credibility and economies of scale for contractors by brining vendors, utility representatives and customers together to provide education, demonstrate products, and sign the customer up for rebated measures.
Program Evaluation	
Perform annual evaluations for high-priority issues that are relevant and unique to each individual program year	Due to the volume of contractors and measures typically involved in non-residential lighting programs each year, accurate routine verification and tracking of related data is a high-priority element to ensuring customer satisfaction and useful program assessment.
Spot check the data entry process annually	
Review inspection databases annually	
Ensure that program tracking databases are correctly calculating program impacts annually	
Perform detailed impact evaluations routinely though not necessarily annually	Impact evaluations (e.g. which involves inputs to total resource cost, such as energy savings, free-ridership, measure life and cost) should occur when some change is suspected in these metrics due to different behavior, changing target market, or an external event like an energy crisis. In order to effectively evaluate impacts, accurate operating hour, pre-wattage and measure life information is critical.
Evaluate operating hours routinely	For non-residential lighting programs, operating hours are one of the key parameters that drive energy savings, and should be evaluated routinely using lighting logger or other end use monitoring techniques.
Collect pre-wattage information routinely	Pre-wattage information is also a key parameter to collect as part of the program tracking process. If impacts are not calculated based on customer specific pre-wattage information, pre-wattage assumptions should be revised on a routine basis.
Determine measure life in estimating the lifecycle benefits of a measure routinely	Measure life studies are most accurate when based on empirical data collected over many years (as many as 10 years for some measures).

Best Practice	Rationale
Perform market assessments routinely, though not necessarily annually	Market assessments should occur when the market or program design change significantly or when longitudinal indicators are being tracked to assess longer term market effects.
Conduct process evaluations routinely	Because vendors are key to program success, vendor input on processes and vendor satisfaction should be obtained for process evaluations. Because non-residential lighting programs have relatively high volume, the application, incentive payment and inspection processes should be thoroughly review every few years.
Conduct evaluations in a timely manner	Timely evaluations give real-time feedback to program staff and contribute to program planning. In some instances these evaluation can be conducted concurrent with the program.
Involve program staff in the evaluation process and create a culture whereby evaluation findings are valued and integrated into program management	Involving program staff encourages their buy-in, encourages them to express research issues and express their perspective on program activities.
Present actionable findings to program managers at the conclusion of study	Presentations bring implementers into the feedback loop and encourage them to act on study recommendations. Key findings from evaluations should be well distilled and disseminated (i.e., workshops, good executive summaries, summary briefs) so appropriate actions may be taken to improve future programs.