

National Best Practices Study MAESTRO Energy Efficiency Evaluation

Presentation Workshop
April 1, 2004

Presented by:
Kenneth James, Program Manager
Mike Rufo, Quantum Consulting



Project Contributors

Project Advisory Committee

Kenneth James - PG&E

Pierre Landry - SCE

Rob Rubin - SDG&E

Jay Luboff - CPUC

Eli Kollman - CPUC

Sylvia Bender - CEC

Project Team

Mike Rufo - Quantum

Derrick Rebello - Quantum

Marissa Meyers - Quantum

Jane Peters - RIA

Bruce Mast - FA

Lori Megdal - MA

Shel Feldman - SFA

Presentation Overview

- **Project Background**
- **Project Accomplishments (where are we?)**
- **Data Collection**
- **Study Approach and Methodology**
- **Overview of Study Products**
- **Preliminary Findings**
- **Next Steps**

Project Background

Objective

Broaden the skills and capabilities of energy efficiency practitioners

- **Develop a database of best practices that distills information from ~ 100 nationwide programs.**
- **Decompose program activities into 9 components that address program design, management, implementation and evaluation.**
- **Categorize programs into 17 distinct categories to compare and contrast their components and extract valuable information on best practices.**
- **Correlate component level performance with outcome metrics to identify predictors of program success.**

Project Background

- **This is the first study to address program design at the program component and subcomponent level.**
- **We will attempt to uncover relationships between performance at the subcomponent level and overall outcome of the program.**
- **This study is only the first stage in the ultimate development of a searchable database of energy efficiency best practices:**
 - **Assist future program designers in quickly accessing information on proven best practices for different program types**
 - **Provide summary qualitative data across programs on elements such as: budget allocations, incentive levels, participation rates, etc.**

Literature Review

- **Trying to identify exemplary practices in energy efficiency is not uncommon:**
 - ACEEE's America's Best profiles leading energy efficiency programs;
 - Energy Trust of Oregon recently commissioned a best practices study.
- **A cursory literature review reveals:**
 - Energy efficiency programs are usually compared across groups of like programs;
 - Analysis is usually purely qualitative, focusing on lessons learned or on identifying specific best practices.
- **Quantitative attempts at finding predictors of program success have only had mixed results:**
 - 1992 LBNL study did not find any definitive correlation between program components and program success.

BP Project Accomplishments to Date

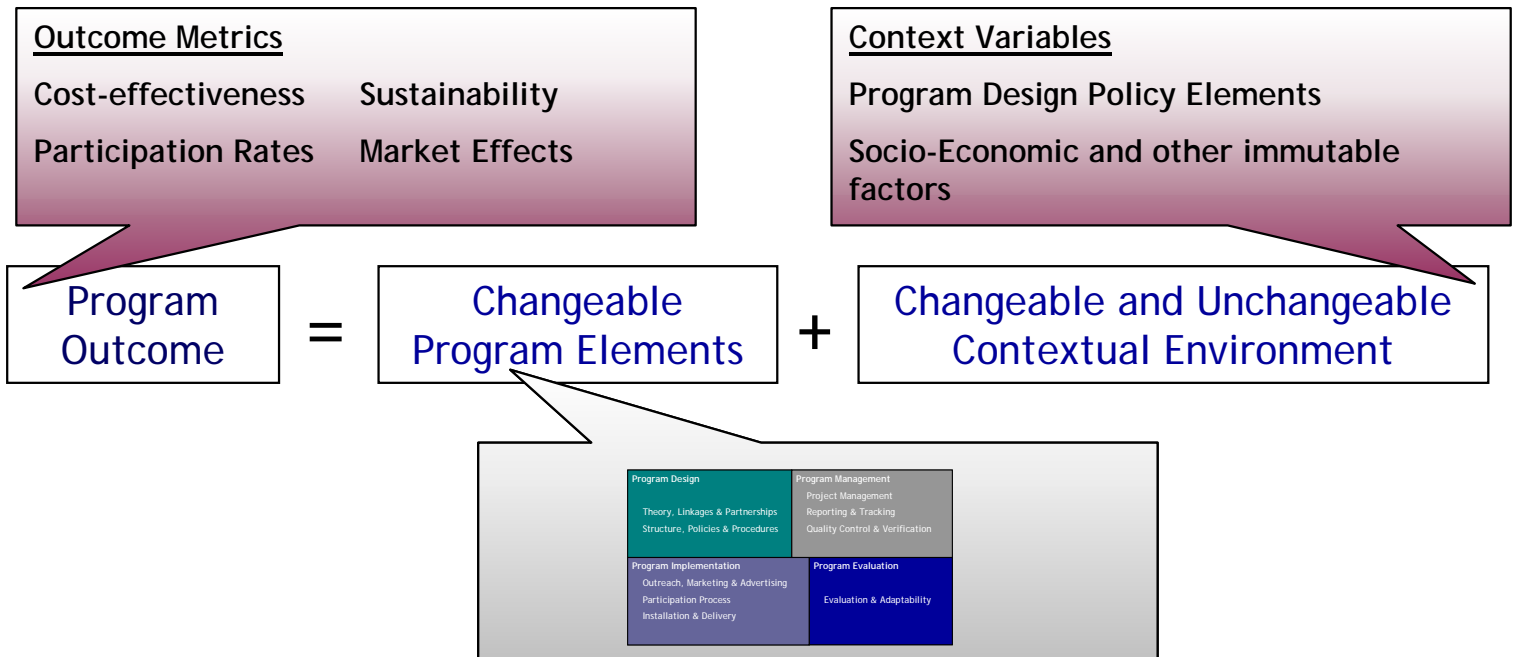
- **Data Collection**
 - ✓ Organization recruitment (i.e., NYSERDA, NGRID, NEEA, etc.)
 - ✓ Completed in-depth interviews for 84 programs
 - ✓ Compiled secondary information
- **Analysis**
 - ✓ Developed analysis template
 - ✓ Quantitative analysis ongoing
 - ✓ Qualitative analysis ongoing
 - WIP Chapters for Res Lighting, Nonres Lighting, Res New Construction, Nonres Comprehensive
- **Reporting**
 - ✓ Developed reporting format
 - ✓ Developed summary profile report for programs
 - ✓ Profiled 70 energy efficiency programs

Data Collection Issues

- **Low completion rates in some categories due to significant drop-outs (16)**
- **Mixed quality of data for some programs: weak qualitative depth and quantitative data**
- **Some selected progs didn't pan out**
- **Time constraints within data collection period**
- **Gap in data: primary and secondary sources**

What Makes a Program?

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



Approach: Program Components

Program Design

Theory, Linkages & Partnerships
Structure, Policies & Procedures

Program Management

Project Management
Reporting & Tracking
Quality Control & Verification

Program Implementation

Outreach, Marketing & Advertising
Participation Process
Installation & Delivery

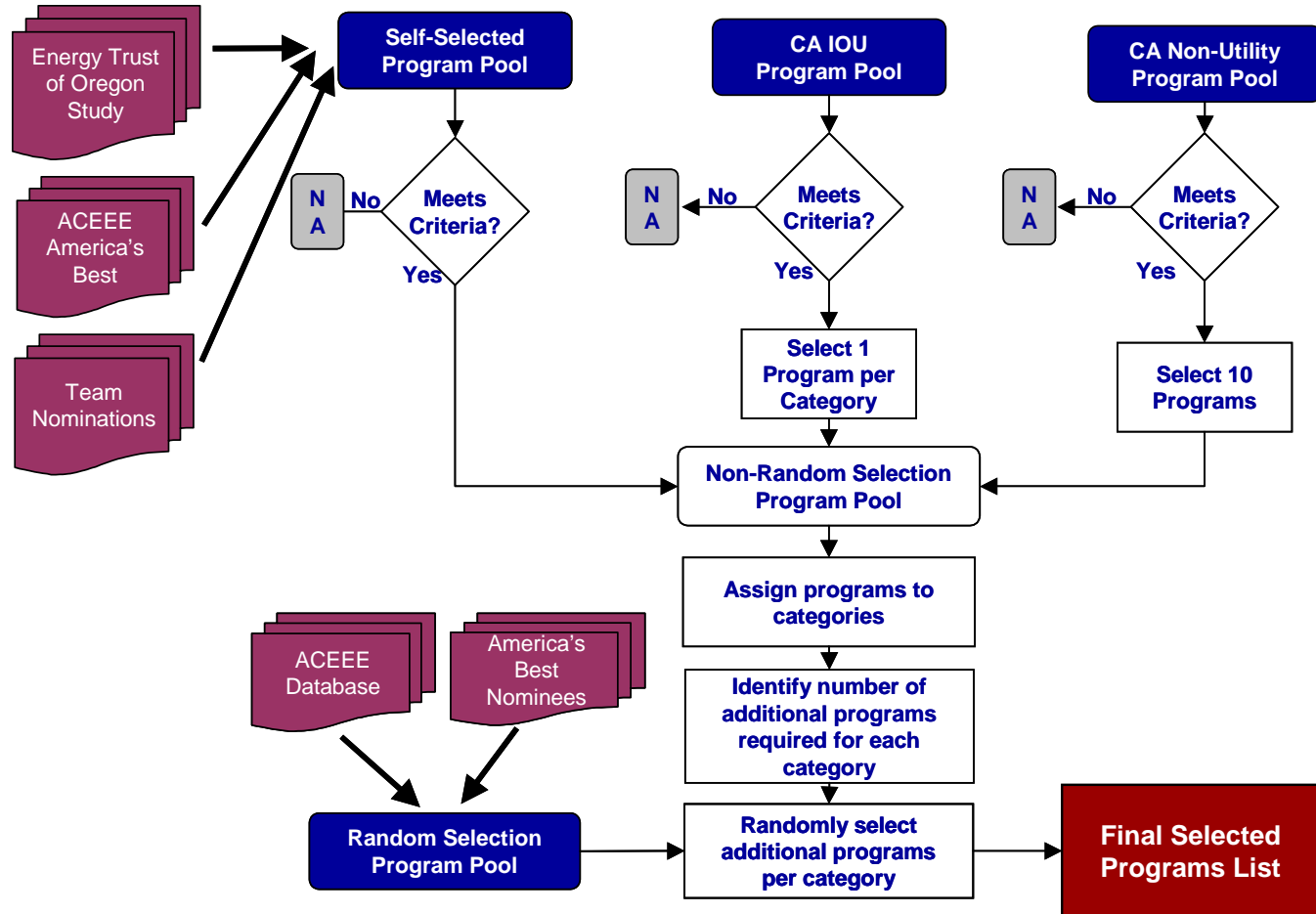
Program Evaluation

Evaluation & Adaptability

Program Screening

- **We started with a non-exhaustive list of over 500 energy efficiency programs**
- **Sought 5-7 programs for each of 17 categories**
- **We then grouped programs into two categories, secondary/team-nominated programs vs. random programs**
 - **Random programs selected from population database to fill out categories with too few programs**
- **We selected one California IOU program for each category, and choose several additional non-utility California programs**
- **Screening Criteria:**
 - **Complete Programmatic Cycle**
 - **Sufficient Documentation, Preferable Including Evaluation**

Program Selection Process



Study Products: Outline for Overall Report

- **Volume 1: Executive Summary and Reporting Overview**
- **Volume 2: Summary of Program Characteristics and Outcomes**
- **Volume 3-N: Program Category-Specific Results**
- **Volume X: Summary Profiles**
- **Volume Y: Methodology**
- **Volume Z: Database Documentation**
- **Appendices**

Study Products: Program Summary Profile

- **Contents of Summary Profiles**
 - **Program Synopsis**
 - **Program Focus**
 - **Program Context**
 - **Program Components**
 - **Quantitative Data**
 - **List of Key Sources**
 - **Contact Information**

Study Products: Benchmarking

Outline of Program Category-Specific Analysis

- **Summary of Findings**
- **Introduction**
- **Overview of Programs**
- **Context**
- **Comparison of Program Features**
 - **Program Theory and Design**
 - **Program Management**
 - **Participation process**
 - **Marketing & Outreach**
 - **Program Evaluation**

Study Products: Benchmarking (continued)

- **Comparison of Outcomes**
 - Participation Levels and Savings
 - Benefit-Cost data
 - Market Effects
- **Conclusions and Recommendations**
 - Key Category Issues
 - Best Practices by Component
 - Lessons Learned
 - *CA Gap/Comparison Summary*
- **Sources**
- **Appendices**

Example: Nonresidential Lighting – Data & Workflow Management

- **Six Programs**
 - **Xcel Energy C&I and Small Business Lighting 2002**
 - **XENERGY BEST 2002-2003**
 - **SDG&E EZ Turnkey 2002**
 - **SMUD Prescriptive Lighting 2003**
 - **Connecticut Light & Power Small Business Energy Advantage 2002**
 - **California IOU statewide Express Efficiency 2002**
- **Key Findings from Project Management**

Overview of Nonresidential Lighting Programs

	Xcel Energy		Xenergy	SDG&E	SMUD	CL&P	CA Express
	C&I	Small Business					
Cost							
Average retail price of electricity	\$0.05	\$0.05	\$0.16	\$0.16	\$0.10	\$0.08	\$0.16
Program budget	\$2,433,114	\$902,885	\$941,000	\$1,317,000	\$2,729,000	\$4,570,000	\$21,656,000
\$/kW	\$382	\$482	\$1,683	\$2,311	\$696	\$1,280	\$504
Participation							
Customer Size	all	<500kW	<100kW	<20kW	<150 kW	<100 KW	<500 kW
Eligible Measures	Lighting	Lighting	Lighting HVAC Custom Gas	Lighting	Lighting	Lighting refrigeration HVAC	All
Number of Jobs	364	707	179	687 audits 643 jobs	1478	605	4000
Energy Savings Accomplishments							
MWh achieved (net)	29,852	8,676	2,704	3,121	19,865	16,167	244,346
kW achieved	6,363	1,874	559	570	3,920	3,570	43,000

Best Practices - Nonresidential Lighting Project Management

- **Innovative electronic pathways for managing projects:**
 - Upload/download of worksheets submitted electronically by contractors
 - CL&P, SMUD
 - Contractors access Internet-based database software
 - SDG&E EZ Turnkey, Xenergy BEST
- **Advantages**
 - Quicker turnaround
 - Shift data entry to contractors
 - Automates project processing
 - well-suited for prescriptive incentives
 - Real-time project tracking by program staff and contractors

Example: Residential Lighting – Participation Process

- **Contractors Six Programs**
 - California Statewide Res. Lighting 2002
 - Efficiency Vermont Efficient Products 2002
 - Massachusetts Electric Res. Lighting 2002
 - MEEA Midwest Change a Light Fall 2002
 - NW Energy Efficiency Alliance Res. Lighting 2001
 - United Illuminating Retail Lighting 2000-2001
- **Key Findings from Participation Process**

Overview of Res Lighting Programs

	California	Vermont	Mass Electric	MEEA	NW Alliance	United Illuminating
Program Budget	\$9.4 mill	\$1.6 million	\$3.3 million	\$630,000	\$2.6 million	\$1.5 million
Incentives Paid	\$7.3 million	\$655,147	\$2.2 million	\$309.00	\$0	\$635,405/yr
Eligible Households	9.1 million	286,000	1.1 million	NA	4.2 million	276,539
MWh Achieved	162,888 NET	11,039	18,036 net	10,198	271,560	7,808
Unique Participants	Na	21,784	71,193	23,272	NA	13,327

Key Findings - Residential Lighting Participation Process

- **Many tactics used to obtain participation:**
 - **Leverage the ENERGY STAR label**
 - **Use regional or statewide coordination for market level activities**
 - **Retailer outreach/support**
 - **Instant rebate**
 - **Coupon redemption**
 - **Manufacturer buy-downs**
 - **Utility marketing**

Res Lighting - Participation Tactics

TACTIC	California	Vermont	Mass. Electric	MEEA	NWEEA	United Illuminating
Instant rebate		↙	↙	↙	(through utilities)	↙
Mail Order Catalog		↙	↙			↙
Special Events		↙			↙	
Cooperative Marketing		↙ (limited)		↙	↙	
Regional Coordination	↙	↙	↙	↙	↙	↙
Retailer Support	(limited)	↙	↙	↙	↙	↙
Manuf. Buy down	↙		↙ (pilot)			

Residential Lighting – Lessons Learned in Participation

Participation Tactic	Lessons Learned
Retailer Agreements	Make them short & clear, not more than 1 page. Assure logo will be used correctly.
Retailer Outreach/Support	It takes time to develop contacts and relationships. Can be expensive but is critical to assure consistent use of POP materials.
Coupon Redemption	Barcodes simplify redemption. As CLF price point drops, coupon fulfillment costs can become costly. Avoid a give away.
Retailer Reimbursement	Regulatory due diligence requirements can put undo burden on retailers. Establish a quick turn around time.
Marketing	Avoid over marketing when supply is limited. Leverage marketing dollars to hold costs down.
Invitation to Participate	Can reduce risk & admin of coupon. Engages manufacturers. May require regulators accept level of uncertainty.
Upstream Buy-down	Due diligence can be difficult to meet & tend to drive program design. Can reduce price point. A high leverage strategy for limited resources.

Best Practices in Residential Lighting Participation Process

- **Successful participation strategies target multiple actors**
 - Multiple market venues and actors involved requires multiple tactics to fully reach market
 - Allow a variety of market actors to participate
 - Retailers, manufacturers, end users
 - Encourage the market to respond in a variety of ways across the end user and supply chain
- **Tactical mix depends on program theory/logic and program environment**
 - Because each tactic tends to have strengths and weaknesses, when a clear theory/logic is in place the choice of appropriate tactics are fairly obvious
- **Simplicity is always important**

Next Steps

- Finalize chapters in progress
 - Residential Lighting
 - Residential New Construction
 - Nonres Comprehensive
 - Nonres Lighting
- Begin and complete additional program category chapters (e.g. Res and Nonres Info)
- Finish all Summary Profiles/Participant Review
- Finish collecting quantitative data and begin comparisons across program categories
- 2003 study will address third-party programs and develop alpha/beta version of website
- 2004-5 study will launch website, evaluation user interface, and document

2002 NRNC Market Characterization and Program Activity Tracking Study

Summary of Final Report

Prepared by:

Corina Jump, Quantum Consulting

Cathy Chappell, Doug Mahone, HMG



Evaluation Objectives

Summarize NRNC Market Characteristics

- Construction value and volume
- Types of buildings
- Design team characteristics

Summarize Savings By Design (SBD) Program Activity and Estimate Penetration in the NRNC Market

- Project information: number, type and size of projects
- Measure information: type of measures and impacts
- Program penetration into the NRNC market

NRNC Market Characterization

- Market Characterization is Based on Two Data Sources:
 - F.W. Dodge Reports (number, size and value of projects that break ground in a given time period)
 - Construction Industry Research Board (CIRB) Reports (value of permits filed within a given time period)
- Data Analysis:
 - New Construction/Additions analyzed separately from Alterations (Remodel/Renovations)
 - Construction value and volume
 - Types of buildings
 - Design team characteristics (ten most active players in the market, by number of projects and by project cost)

NRNC Market Summary for 2002

Project Type	Quarter	Value (\$ billions)	Area (millions of sqft)	Number of Projects
New and additions	Q1, 2002	2.741	35.61	1,273
	Q2, 2002	3.164	34.01	1,020
	Q3, 2002	3.562	41.45	1,267
	Q4, 2002	3.423	32.55	1,066
	Subtotal	12.890	143.62	4,626
Alterations	Q1, 2002	0.827	-	1,174
	Q2, 2002	0.856	-	1,200
	Q3, 2002	0.876	-	1,175
	Q4, 2002	0.672	-	794
	Subtotal	3.230	-	4,343
Total		16.121	-	8,969

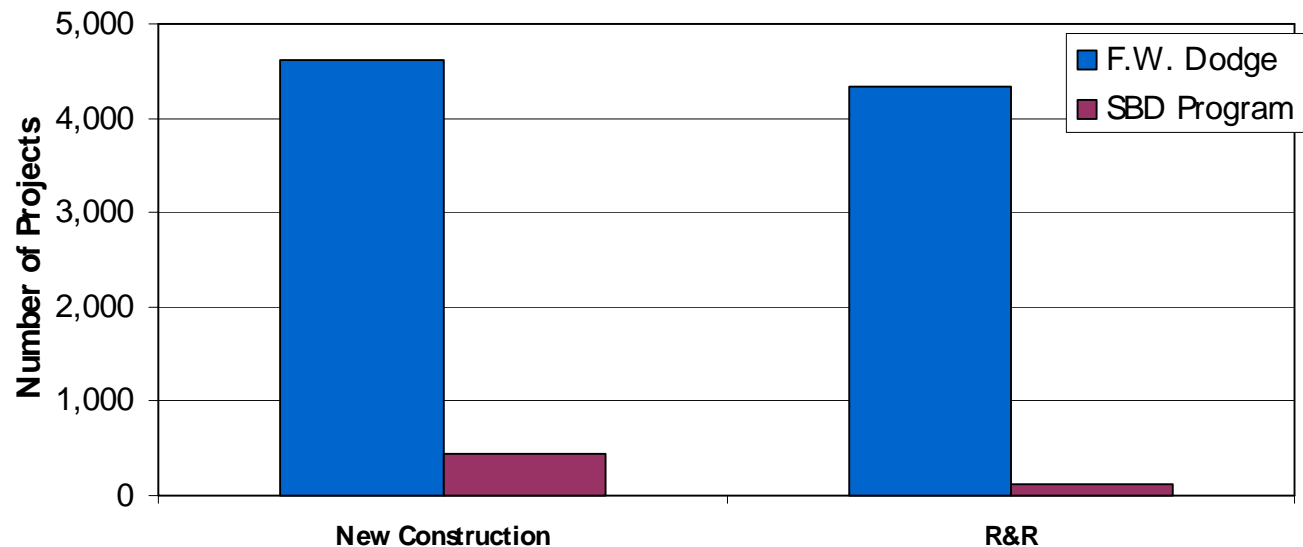
SBD Program Tracking and Penetration

- SBD Program Tracking is based on data from the individual utility tracking databases. SoCalGas tracking data were added to SCE, PG&E and SDG&E data in 2002.
 - Number of Program Participants
 - Type and Size of Projects
 - Type of Measures Installed
 - Estimated annual MWh impacts
 - Estimated kW and therm impacts also reported in 2002
- Program Penetration into the market is estimated based on number of projects and size (sqft) of projects

SBD Program Tracking Summary for 2002

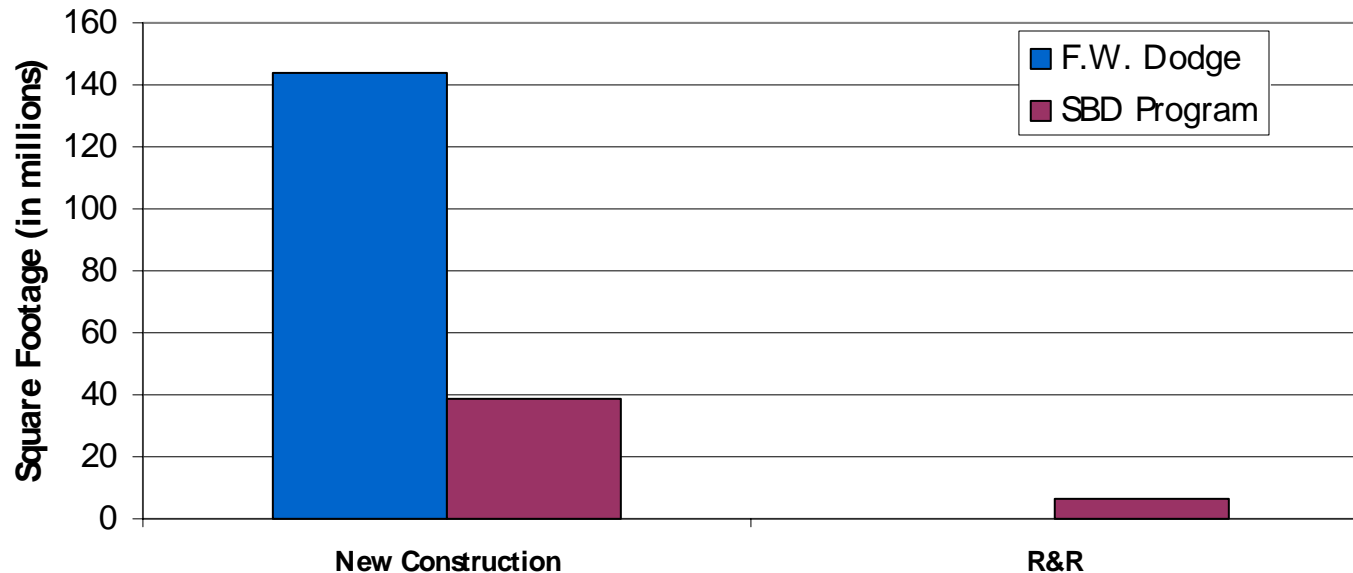
Project Type	Quarter	Area (millions of sqft)	Number of Participants
New and additions	Q1, 2002	4.08	36
	Q2, 2002	7.39	61
	Q3, 2002	7.83	92
	Q4, 2002	19.33	246
	Subtotal	38.63	435
Alterations (R&R)	Q1, 2002	0.89	13
	Q2, 2002	0.90	18
	Q3, 2002	1.95	43
	Q4, 2002	2.91	53
	Subtotal	6.65	127
Total		45.28	562

SBD Program Penetration Summary for 2002



- 9.4% of new construction/alteration projects
- 2.9% of remodel/renovation projects

SBD Program Penetration Summary for 2002



- 26.9% of new construction square footage
- F.W. Dodge does not track square footage for remodel/renovation projects

Historic Trends

- Based on market and program activity from July 1999 through December 2002.

Program Type	Year, Quarter	F.W.Dodge Area (millions of sqft)	SBD Area (millions of sqft)	F.W.Dodge Projects	SBD Participants
New Construction	1999, Q3-4	88.38	15.37	2,511	128
	2000, Q1-4	180.15	22.92	4,674	316
	2001, Q1-4	178.49	60.53	4,805	576
	2002, Q1-4	143.62	38.63	4,626	435
Alterations (R&R)	1999, Q3-4	-	3.29	2,400	52
	2000, Q1-4	-	13.27	4,654	182
	2001, Q1-4	-	12.60	4,791	222
	2002, Q1-4	-	6.65	4,343	127

Recommendations

- Continue reporting on market and program tracking activities
- Produce a “trends report” using 4 years of data (from mid-1999 through mid-2003)
 - Building type construction and program participation by year
 - Measures installed by year

Energy Design Resources Evaluation

MAESTRO Workshop

April 1, 2004

Cathy Chappell

Heschong Mahone Group, Inc.



Energy Design Resources Tools

- www.energydesignresources.com
- 6 Publications,
- 4 Software Tools, and
- Training Opportunities

EDR Publications

- eNews
- Design Briefs
- Skylighting Guidelines
- Commissioning Handbook
- Case Studies
- The Newsletter

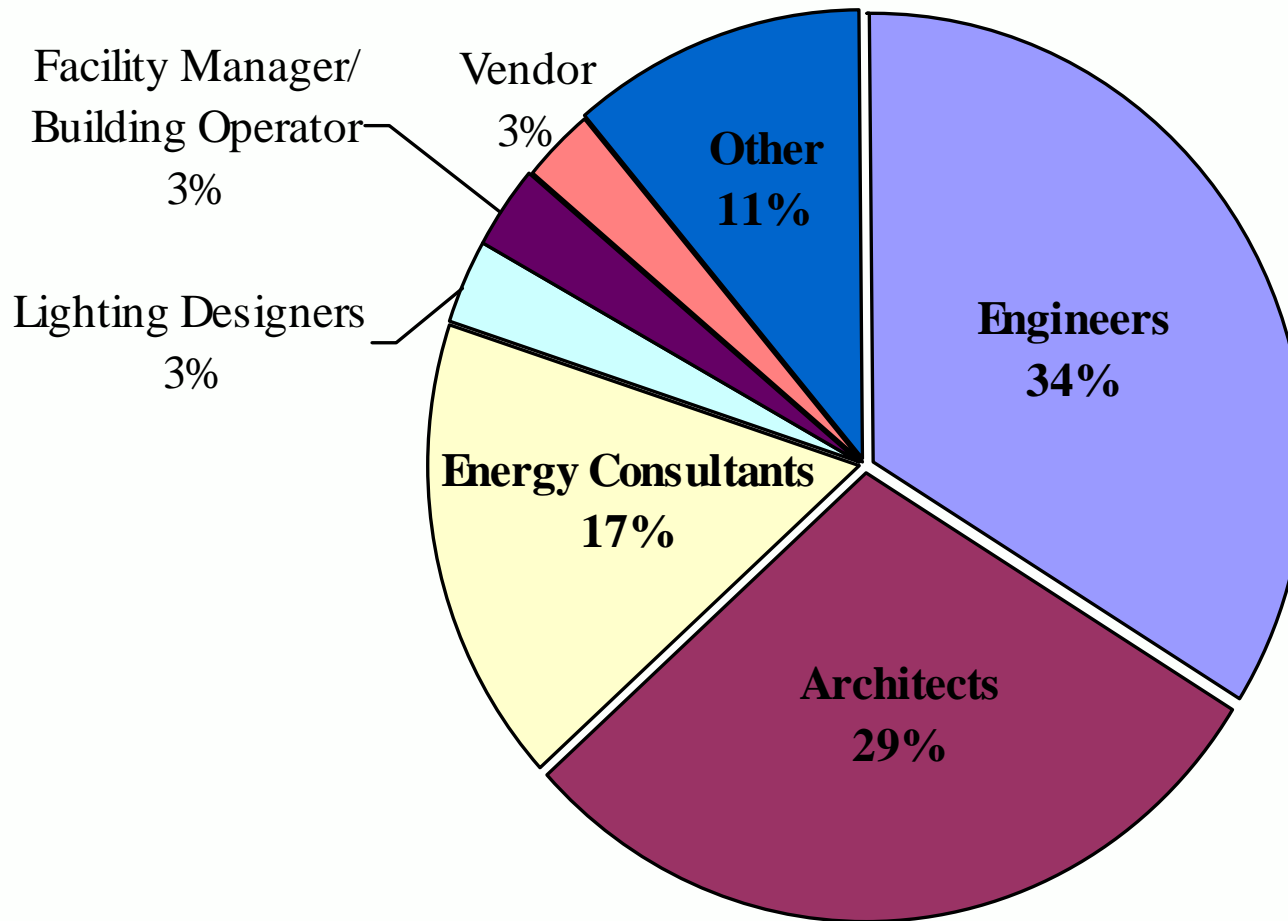
EDR Software Tools

- eQUEST®
- eVALUator
- SkyCalc™
- EDR Charette

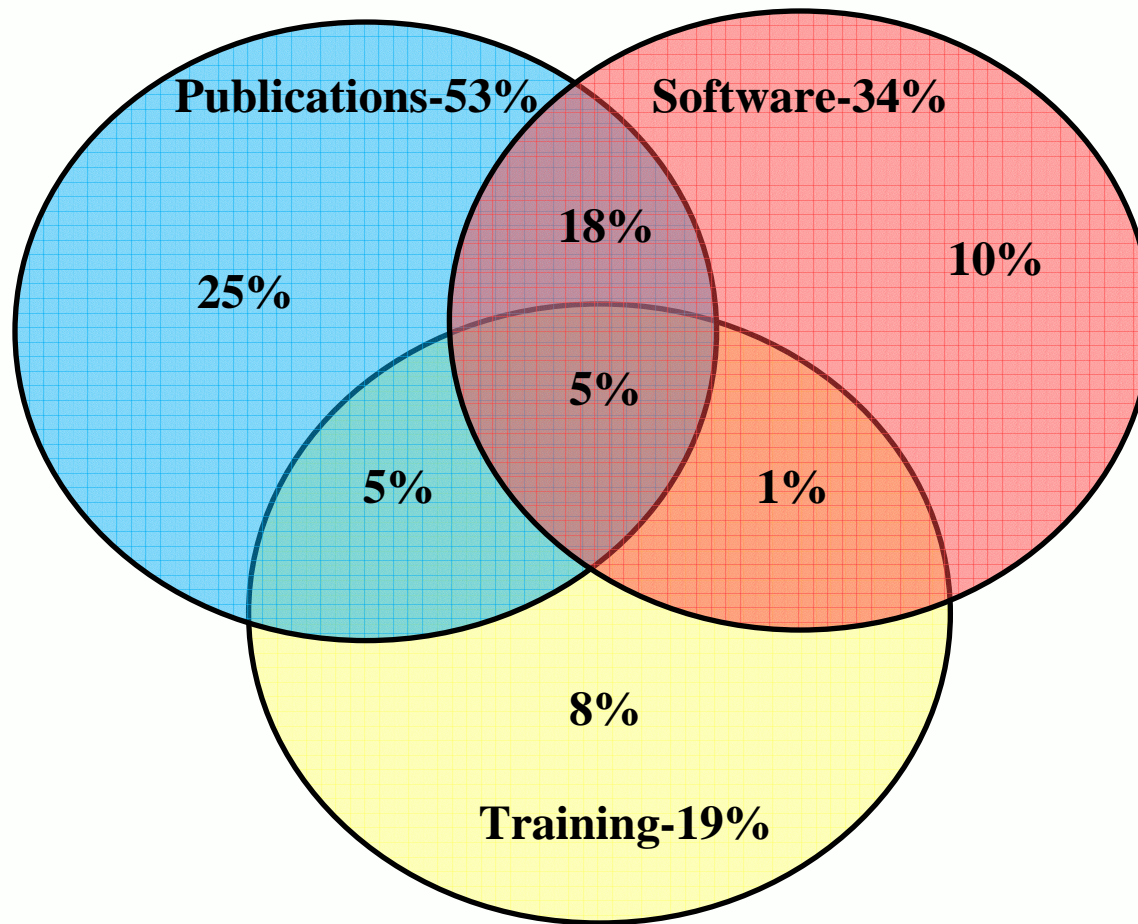
EDR Trainings

- On-Site Presentations
- Virtual Workshops
- EDR Lights
- Energy Center Trainings

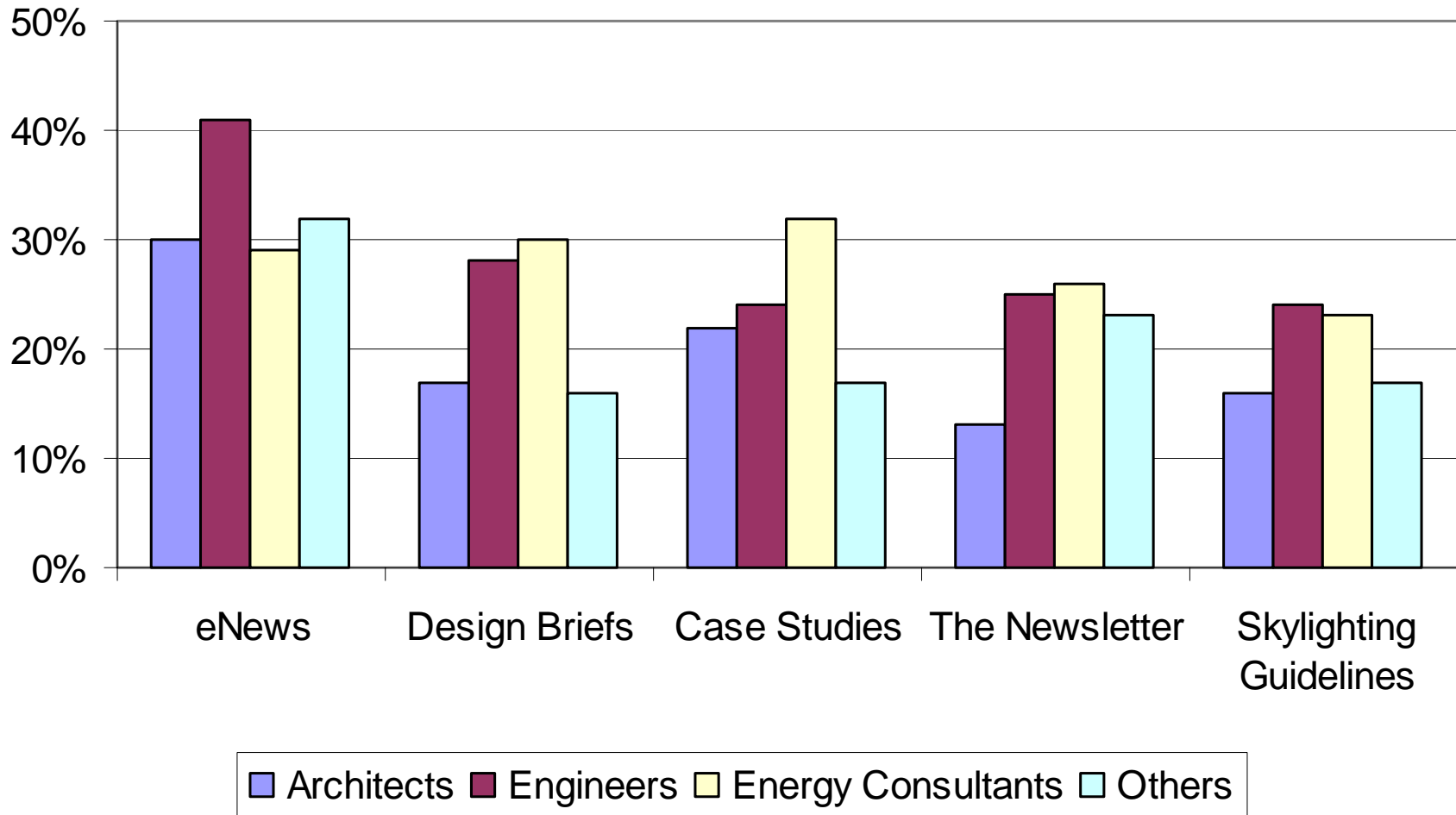
Who is EDR Reaching?



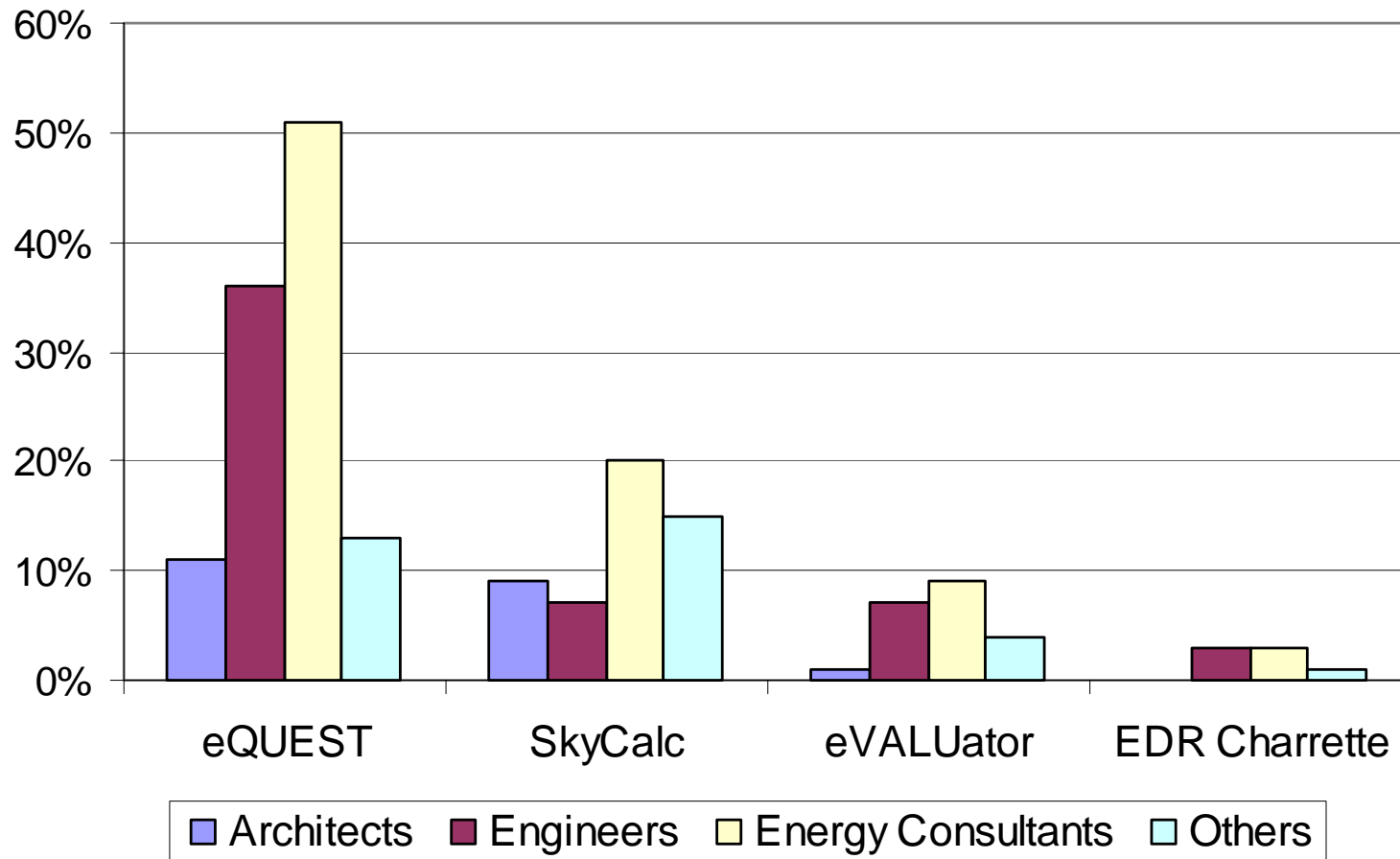
Which Tools are Most Utilized?



Who is Using the Tools?- Publications



Who is Using the Tools?- Software



Why are Some Tools Underutilized?

- Low levels of Awareness
 - More awareness of the software tools, than publications
 - Participants least aware of EDR trainings
- For Specialized Tools,
 - like Commissioning Handbook or SkyCalc,
 - EDR is not reaching the intended audiences

What are the Largest Barriers To Use of EDR?



- Limited amount of active promotion,
- Overwhelming amount of competing information,
- Not thought of as ‘the virtual education center for energy efficient integrated design’,
- Hesitancy of design professionals to change current practices.

What Can Be Done to Increase the Use of the EDR Tools?



- More closely associate “efficient design” and the EDR tools.
- Provide additional formal training to SBD field staff
- “Cross promote” EDR tools
- Actively promote EDR through established communications to design professionals

What Can Be Done to Increase the Use of the EDR Tools?



- Create an EDR summary sheet
- Provide additional support and training for users
- Encourage collaborative design
- Integrate and leverage existing information
- Leverage existing organizations to raise awareness of EDR

Evaluation of the 2002 Statewide Emerging Technologies Program

MAESTRO Workshop April 1, 2004

Richard Ridge, Ridge & Associates

Mary Sutter, Equipoise Consulting, Inc.

Angela Jones, MA&E Liaison

Agenda

- Program Description
- Review of Program Goals
- Evaluation Objectives and Activities
- Evaluation Results
- Evaluation Conclusions and Recommendations

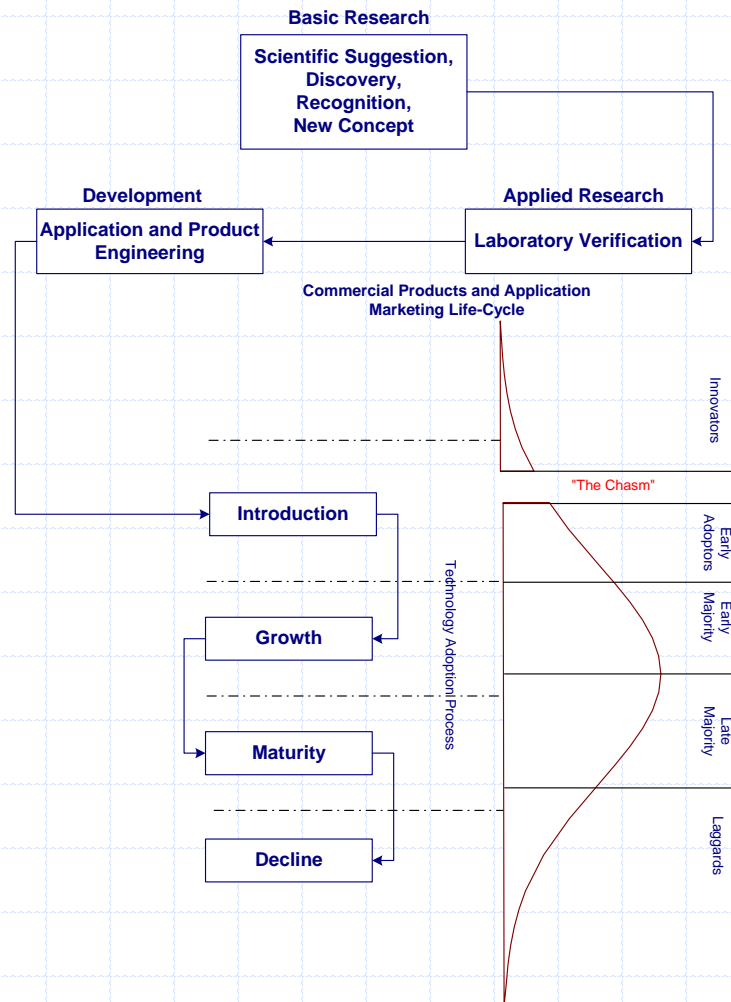
The ET Program

- Information only
- Targets nonresidential customers
- Seeks to accelerate the introduction of EE technologies, applications, and analytical tools
- Two key components:
 - Demonstration & Information Transfer
 - Emerging Technologies Coordinating Council (ETCC)

Demonstration Projects & Information Transfer

- Primary delivery mechanism involves custom demonstration projects and technology assessments:
 - Develop comprehensive design methods
 - Analytical tools
- Information transfer:
 - Energy centers
 - Detailed project reports
 - Design documentation
 - Case studies
 - Technical & non-technical publications
 - Workshops, seminars, & conferences

Program Demonstration Process



A blank sheet of graph paper. It features a solid blue border at the top and left edges. The main area is filled with a dashed blue grid consisting of 10 columns and 8 rows of squares. In the top-left corner, there is a small semi-circle cutout.



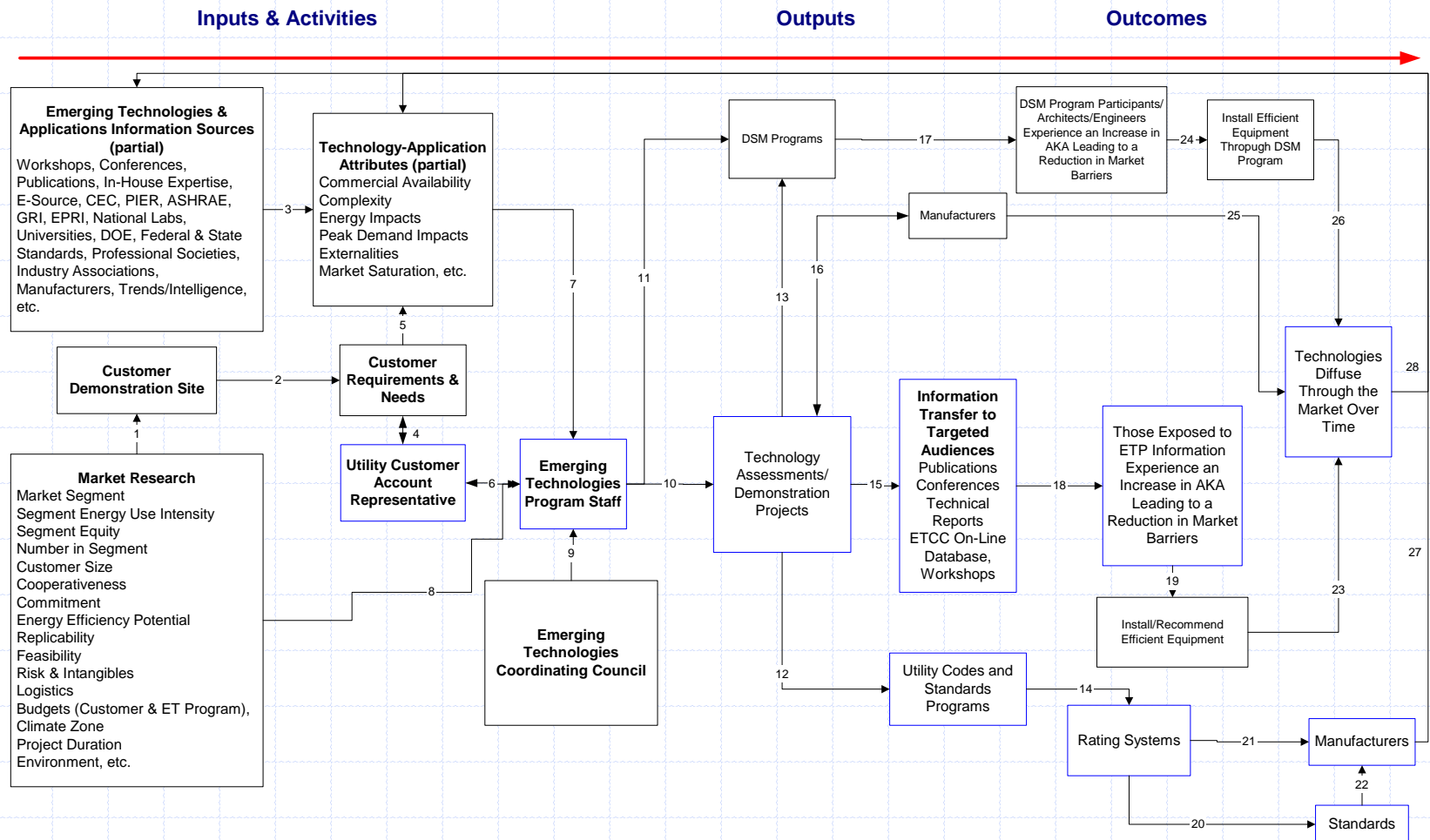
Evaluation Objectives

- Evaluate program success by measuring various indicators in order to test theoretical assumptions.
- Provide on-going feedback and corrective guidance regarding program design & implementation.

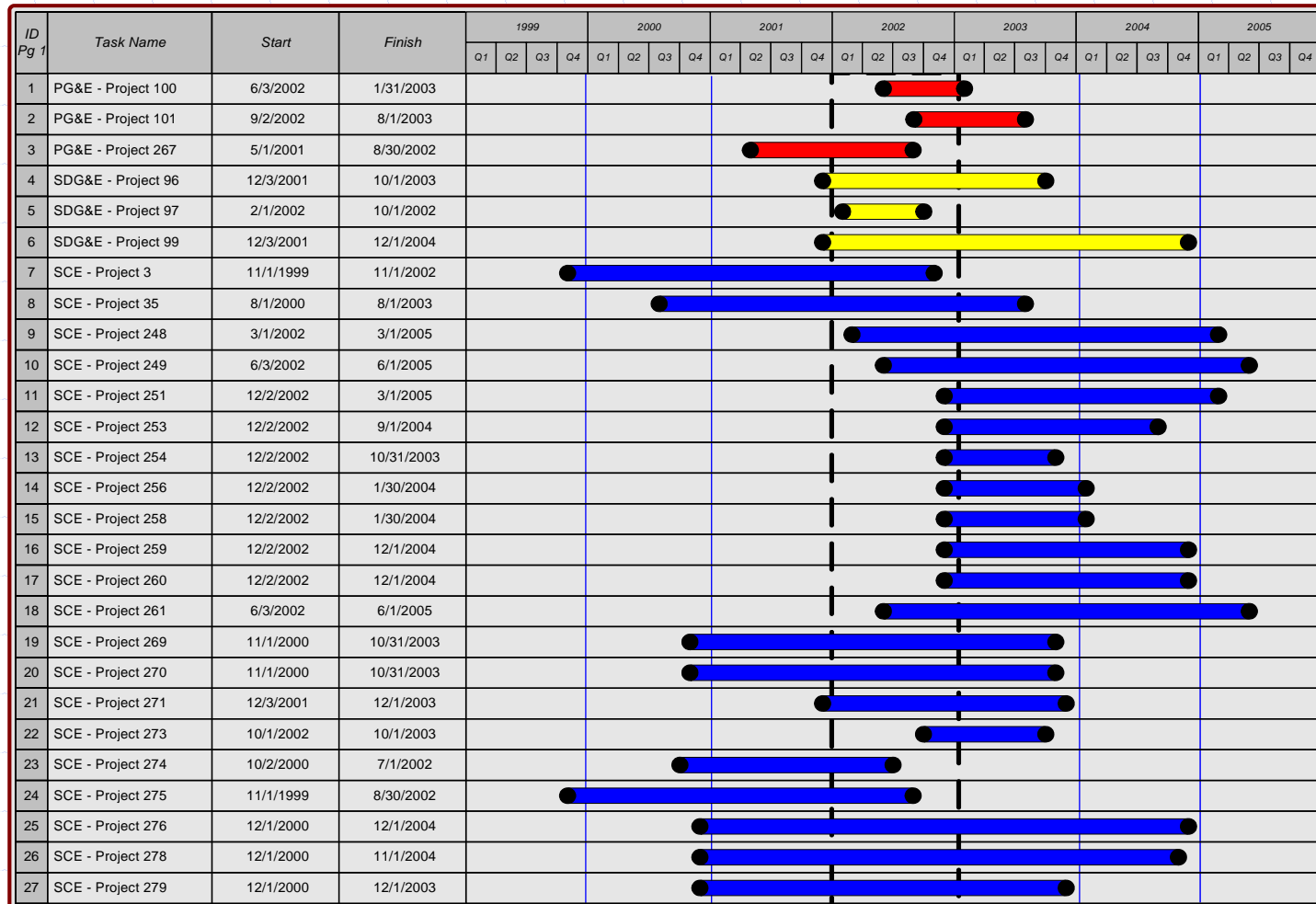
Evaluation Activities

- Conducted an evaluability assessment to determine the type of evaluation possible. Decision was made to conduct a process evaluation.
- Developed a logic model.
- From the ETCC database and program managers, determined the projects that received attention during 2002.
- A survey was conducted of project managers for the projects that received attention during 2002.

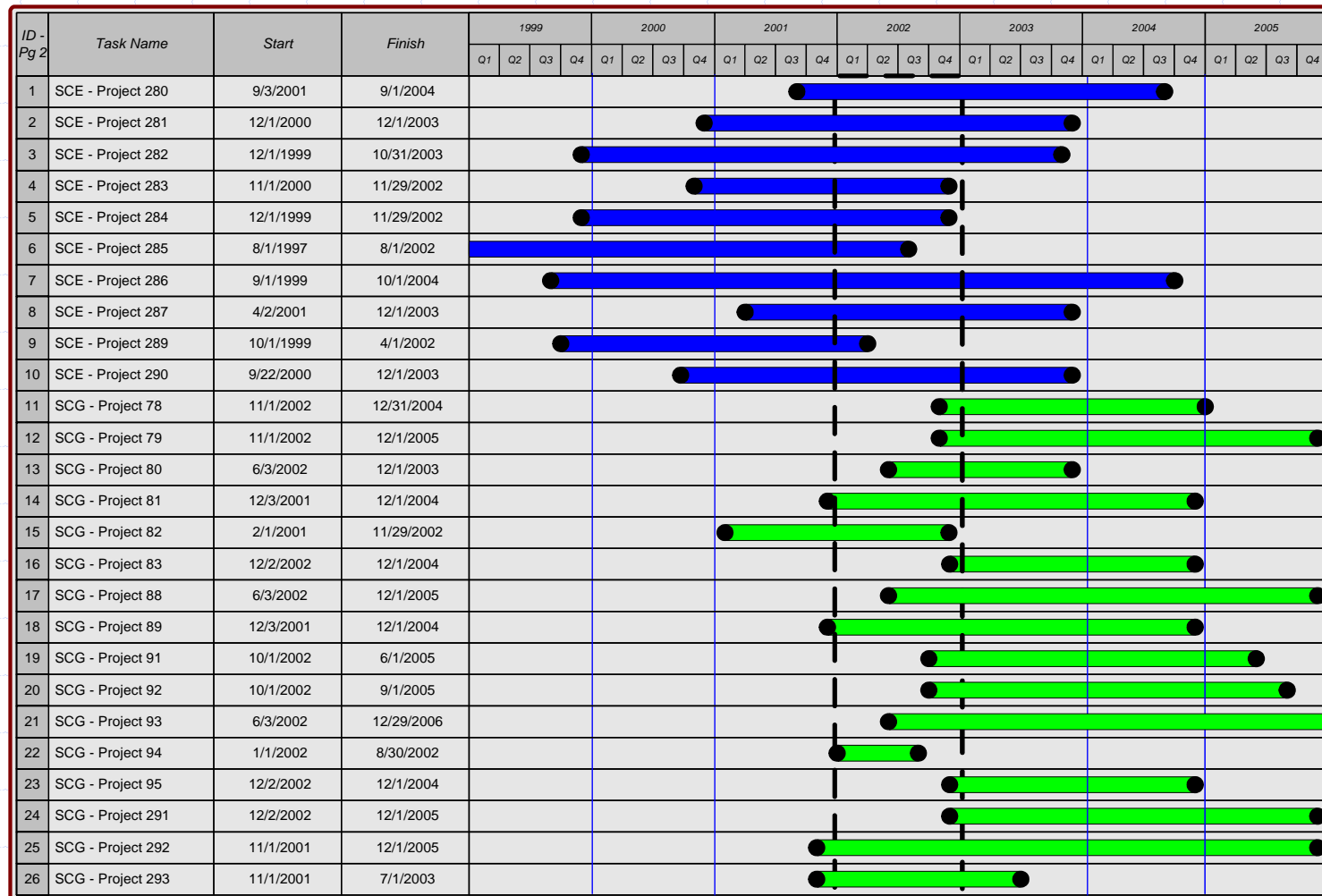
PY2002 Program Theory



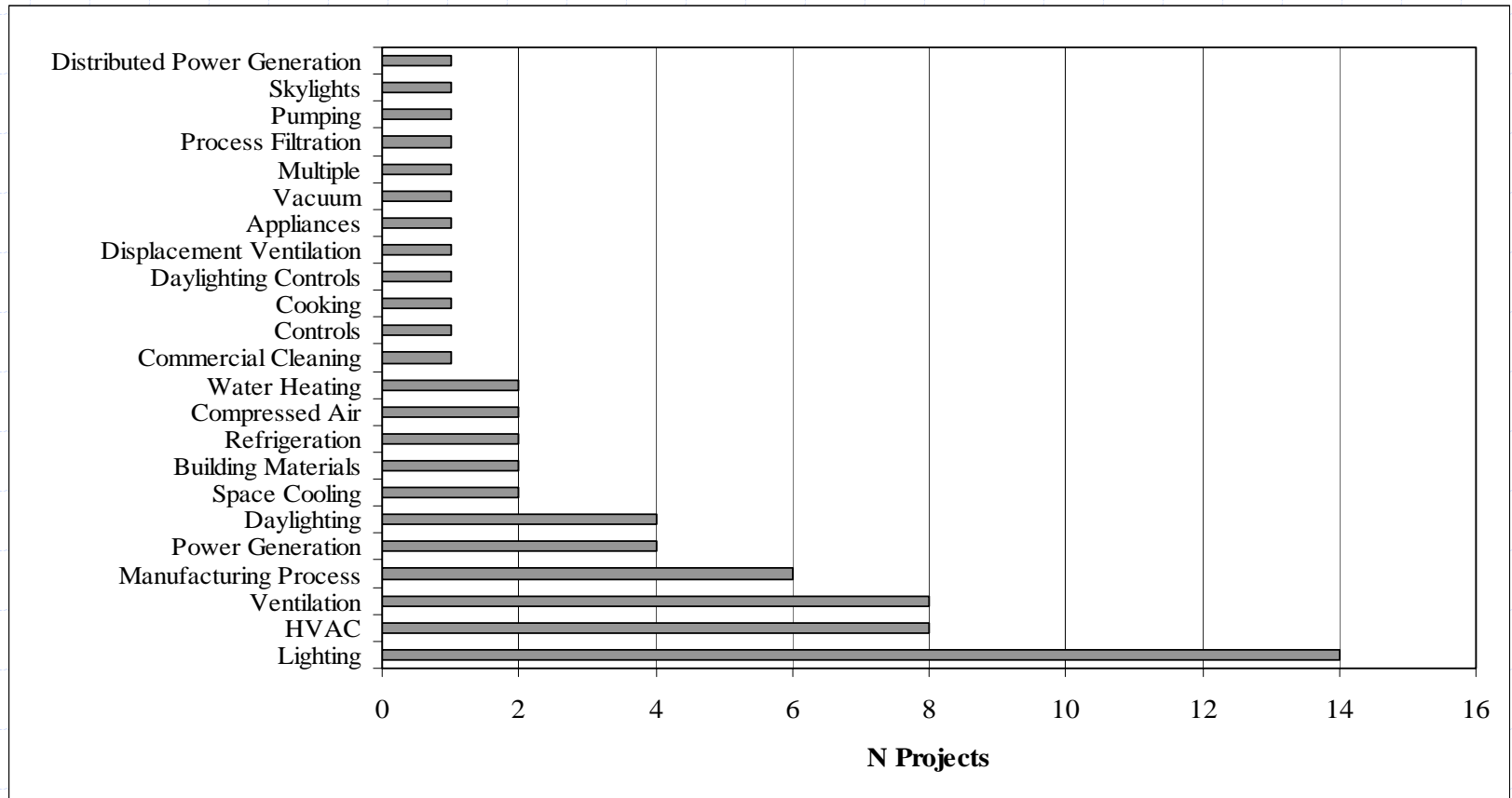
ETP Project Lifecycle (53 PY 2002 Projects)



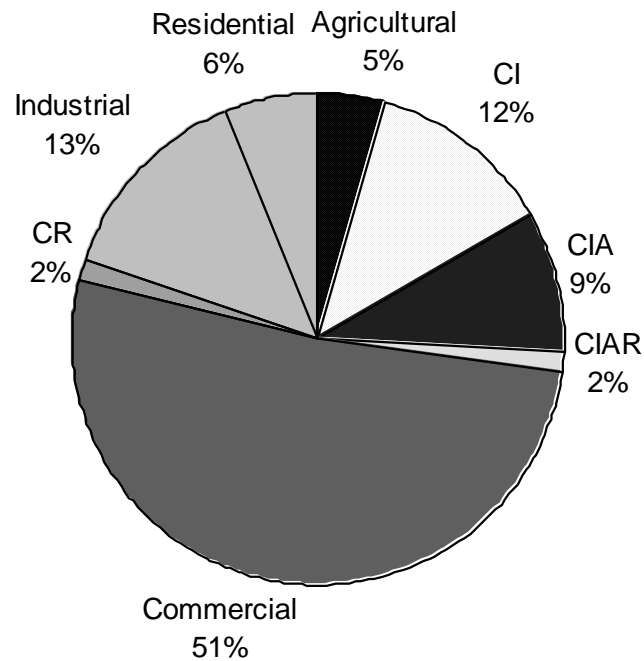
ETP Project Lifecycle (Cont.)



Technologies Addressed



Segments Addressed



Conclusions/Recommendations

- The utilities met their respective goals:
 - Completing a specified number of technology assessments.
 - Updating the ET database
- The ET database should be enhanced to meet the needs of evaluators and policy makers.

Conclusions/Recommendations

- Multi-year funding is essential for long-term stability of R&D programs.
- The type and number of projects, the time to complete them, and the rate at which they are being deployed to energy efficiency programs seem reasonable given the resources available.
- However, there are promising technologies from PIER that cannot be pursued due to insufficient funds.
- Funding for the ETP should be increased.

Conclusions/Recommendations

- With adequate funding the use of market-related primary and secondary data should be strengthened.
- The ETP should serve the information needs of both utility DSM program administrators as well as third-party program administrators.

Conclusions/Recommendations

- The evaluation of the ETP should be based on monitoring the full-range of ETP activities, outputs, and outcomes.
- A cost-effectiveness approach should be developed that recognizes that ETP benefits are difficult, if not impossible to monetize.