Process Evaluation Insights on Program Implementation

Prepared by:
Jane S. Peters, Ph.D.
and Marjorie R. McRae, Ph.D.
Research Into Action, Inc.

Prepared for:
CIEE Behavior and Energy Program
Edward Vine, Program Manager

California Institute for Energy and Environment
1333 Broadway, Suite 240
Oakland, CA 94612-1918

February 2009

DISCLAIMER

Table of Contents

Executive Summary I

Lessons Learned for Program Implementation I

Program Design I

Program Implementation II

Program Administration II

Reaching Market Actors – Trade Allies and Professional Service Firms II

Reaching Market Actors – Retailers, Distributors and Manufacturers III

Reaching Customers – Residential III

Reaching Customers – Commercial III

Reaching Customers – Industrial III

Recommendations for Improving Process and Market Evaluation IV

1. Introduction 1

1.1 Scope of this White Paper 1

1.2 Acknowledgements 1

1.3 Organization of this Paper 2

2. Project Purpose and Approach 3

2.1 Purpose of this Study 3

2.2 Study Approach 3

2.2.1 Interviews 3

2.2.2 Secondary Research 4

2.2.3 Notes on Data Quality 4

2.3 Terms and Concepts 5

3. Description of Process and Market Evaluation 6

3.1 Methods and Data Sources 7

3.2 Benefits of Process and Market Evaluation 8

3.2.1 Evaluations as a Management Tool 8

3.2.2 Evaluations to Improve Effectiveness 9

3.2.3 Evaluations to Understand Customer and Market Perceptions 11

3.3 Weaknesses of Process Evaluation 11

4. Program Design Lessons 13
4.1 Program Design Process 13
4.2 Lessons Learned About Technologies 14
4.3 Incentives as Motivation 15
4.4 Implementers 16
5. Program Implementation and Delivery Lessons 18
5.1 Barriers to Energy Efficiency 18
5.2 Communication 19
5.3 Marketing and Outreach 20
5.4 Training and Education 22
5.5 Behavior Change 23
6. Program Administration Lessons 24
6.1 Management 24
6.2 Reward Systems for Implementers 25
6.3 Administrative Processes 26
6.4 Databases 28
6.5 Quality Control Systems 29
7. Lessons in Reaching Market Actors 31
7.1 Building and Construction Trade Allies 31
7.2 Professional Services Firms 33
7.3 Manufacturers, Retailers and Distributors 34
7.4 Industrial Process Engineering and Suppliers 36
8. Lessons in Reaching Customers 37
8.1 Residential 38
8.2 Commercial 40
8.3 Industrial 43
9. Improving Process Evaluation 46
9.1 Methods 46
9.1.1 Surveys 46
9.1.2 In-Depth Interviews 48
9.1.3 Focus Groups 49
9.1.4 Other Methods 50

9.2 Gaining the Implementers' Attention 54
9.2.1 Evaluability Assessment 54
9.2.2 Theory and Logic Models 55
9.2.3 Recommendations 55
9.3 Opportunities and Challenges 55
9.3.1 Arms-Length Evaluation 56
9.3.2 Market Assessment or Market and Process Evaluation 57
9.3.3 Coordination with Impact 57

10. Conclusions 59
10.1 Lessons Learned for Program Implementers 59
10.1.1 Program Design 59
10.1.2 Program Implementation 59
10.1.3 Program Administration 60
10.1.4 Reaching Market Actors 60
10.1.5 Reaching Customers 61
10.2 Recommendations to Improve Process and Market Evaluation 63

11. References 65

Appendix A: Approach 76
Interviews 76

Appendix B: Questionnaire 79

Appendix C - List of Contacts 82

Appendix D – Definitions of Terms 84
Energy Efficiency Terms and Concepts 84
End-Users and Customers 84
Market Barriers 84
Program Effectiveness and Program Cost-Effectiveness 85
Split-Incentives 85
Summative and Formative Evaluation 85
Traditional Energy Segments 85
Definitions of Acronyms 86

Executive Summary

This white paper has the explicit intention to draw lessons learned from the past 30 years of energy efficiency program evaluation in order to facilitate improved program design and implementation going forward. The discussion in this white paper is developed based on interviews with 43 individuals who are either practitioners or users of process and market evaluation. In addition, we obtained references to published materials from our contacts and reviewed conference proceedings dating from 1992 to 2008, which resulted in a review of nearly 100 articles or reports documenting the results of, or commenting on, process and market evaluations.

The results of this investigation provide two areas of illumination: lessons learned for program implementation, and recommendations for improving process and market evaluation.

Lessons Learned for Program Implementation

The dominant approach to process and market evaluations over the past 30 years has been to focus on single programs. As a consequence, evaluators rarely have the opportunity to develop cross-program lessons learned, yet the evaluators who do the work have recognized that there are important lessons that span programs, and it was these lessons that we sought to explicate in this project.

While the lessons learned may appear to be common sense, evaluators commonly find that these ostensibly "common sense" lessons have not been applied. The following are the key lessons learned across five areas of program implementation:

Program Design

The primary lesson learned about program design is that programs would benefit from an increased understanding of the market – such as comes from market research – before programs are launched.

- Market research is used to assess customer networks, gain knowledge of customer interactions with market actors, understand barriers for customers and market actors, and understand the role of different program features in influencing customer behavior. Market research should be conducted prior to program design and development, and should inform those activities.

- Customer contact makes a difference. Using outsourced services or market actors to reach the customer will work if the message is clear, if the target is clear, and if the program team is knowledgeable of the market.

Program Implementation

There are real barriers to the adoption of energy efficiency products and services. Evaluators note that it is hard to imagine the possibility of too much communication with the market: it is critical that programs both learn from the market, as well as reach the market with the program message.

- Programs should set clear targets for the intervention.
- The theory and logic of the changes expected on the part of customers and market actors should be clearly defined, and clearly result from program activities.
- Communication with the market should be an integral part of program design and implementation.

Program Administration

Simplicity for the customer and assurance of process and product quality are the bywords of effective program administration. Multiple programs targeting the same customers are confusing to customers and market actors. Program administrators need to streamline access to their programs to be effective.

- Simplify, simplify, and simplify for the customers and the market actors.
- Set up reward systems to ensure that third-party delivery agents and market actors provide the quality and quantity of services desired.
- Use quality control procedures that start with census verification and inspection, followed by sampling after third parties and market actors demonstrate competence.

Reaching Market Actors – Trade Allies and Professional Service Firms

Market actors can be valuable partners in delivering energy efficiency products and services. A key first step is to understand the business models and businesses of trade allies and professional service firms in the building and construction industry. Once these are understood, the goal for the program should be to integrate the program into the existing business models.

- Train trade allies and professional service firms in program rules prior to launching programs, provide notice in advance of programmatic changes, and publicly announce any changes.
- Simplify program processes so that even non-computer savvy market actors can participate and have staff or service providers available to assist market actors.

Reaching Market Actors – Retailers, Distributors and Manufacturers

Retailers, distributors, and manufacturers of energy efficient products also have their own business models. Furthermore, the business models tend to vary greatly by product and relative to the manufacturer.

- Upstream approaches are a cost-efficient way to attain installation of energy-efficient products, but sales data are key to tracking success and access to the data should be linked to program benefits.
- Training of retailers is necessary and an ongoing need due to turnover.
- Residential, commercial, and industrial products have different market channels, many of which require coordination regionally and nationally to maximize effectiveness.

Reaching Customers – Residential

The cost of serving residential customers can be high, so reducing transaction costs is a critical goal.

- Leverage existing market relationships.
- Leverage regional and national efforts to promote energy efficiency.
- Leverage local groups.

Reaching Customers – Commercial

Commercial customers range from the very small to the very large. Keeping transaction costs low is important with small commercial customers, while one-on-one contact is important for large commercial customers. For both groups, energy costs are a small portion of their budget (less than 5%) and typically are treated more as a fixed cost than a variable cost; thus, interest in energy efficiency is often very low.

- Understanding the business case for efficiency in each market segment will facilitate communication.
- Leverage existing organizational ties of the market segments whenever possible.

Reaching Customers – Industrial

Industrial customer opportunities are typically greater than commercial opportunities; however, industrial process improvements are unique to each plant and, therefore, require highly skilled and knowledgeable people to conduct the analysis of opportunities.

- Work closely with engineering consultants familiar with process improvements.

- Reach decision-makers at multiple levels within industrial companies and their local facilities.

Recommendations for Improving Process and Market Evaluation

At this point, the methodological tool bag for process and market evaluation is full of underutilized options. Process and market evaluators rely too much on surveys and don't use the full range of approaches that are available. Evaluators also need to look more deeply at programs by drawing on their social science backgrounds and thinking about how social science theory explains what is and what is not happing in the programs that they evaluate.

To maximize the benefit of evaluation, program implementers and administrators need to use process and market evaluations earlier in program cycles. Such evaluations should be research projects that are formative and explore the range of program issues pertinent to the specific program: the program processes, the market components, and whether measures are performing as intended. Toward these ends, we offer the following recommendations:

- Move to a framework for evaluation that promotes formative evaluation during the program implementation cycle and summative evaluation to explore program effects and impacts after reasonable periods of time to obtain results, rather than process or impact evaluation.

- Increase the use of process and market evaluations to test assumptions and market conditions early in program implementation.

- Expand the range of methods used for process and market evaluation research to include on-site observation, engineering process evaluations, geographic information system (GIS) analysis, market simulations, social network analysis, concept mapping, mental or cultural models analyses, and the use of pilot programs and experiments.

- Require that process evaluation teams include experienced social scientists that use social science theory in the design of projects and analysis of findings.

- Encourage greater connection to the general evaluation community, which serves a wide variety of disciplines, and expect process and market evaluators to have training in evaluation.

1. Introduction

This white paper seeks to provide a resource to energy efficiency program implementers and designers by extracting lessons learned from process and market evaluation experience over the past 30-plus years (1975 to 2008) in which energy efficiency programs have operated in the United States. Because process evaluations often are unpublished and focused narrowly on a single program, lessons learned are difficult to extract through a literature review. Thus, this paper, like its predecessor (Peters 2007), draws on interviews and reviews of conference proceedings and reports suggested by those interviewed.

1.1 Scope of this White Paper

There are many lessons that have been learned over the course of over 30 years in implementing energy efficiency programs; key among them is that process evaluations are useful. Most of the interviewed contacts with more than 15 years of experience described a process among program administrators of slow and steady recognition that evaluation is important. Process evaluation should be included from the beginning of program implementation (not as an afterthought), since process evaluation functions best as a management tool, not as a grading system.

This paper, therefore, seeks to focus on two things: one, the lessons learned about program implementation and, two, a discussion of evaluation methods. Some of the lessons have been covered in an earlier white paper (Peters 2007), and those lessons learned are revisited and enhanced by the additional research conducted for the current white paper. In addition, this paper includes a substantial section discussing process and market evaluation methods to help implementers gain a greater understanding of what is and is not a process evaluation, and to help evaluation practitioners assess how to handle challenges in evaluation practice.

In contrast to the previous examination of process evaluation lessons learned (Peters 2007), this paper is more formal in nature, with more references to the literature. At the same time, this paper does not address every issue about process evaluation. There is a desire by some practitioners to conduct in-depth assessment of the methods used in process evaluation; this was not the task of this white paper, and it remains a project for the future.

1.2 Acknowledgements

This paper was funded by the California Institute for Energy and Environment (CIEE) and the California Public Utilities Commission's Energy Division. It is hoped that this document is useful to the Energy Division as they carry out their challenging work in shepherding energy efficiency efforts for California ratepayers.

It is important also to thank the process evaluators, program implementers, and evaluation managers from across the United States who willingly shared their insights and their recommendations of good examples of process and market evaluation research. The interviews

for this project were conducted by Dulane Moran and Nathaniel Albers of Research Into Action, Inc.

The list of references covers the documents cited in this white paper. Additional references are noted in the appendices, which also provide the names and affiliations of those interviewed. In the course of searching for documents, we were continually amazed at the number of papers that had been presented on interesting related topics at conferences such as the International Energy Program Evaluation Conference (IEPEC), the American Council for an Energy-Efficient Economy (ACEEE) Summer Study Conferences, the ACEEE Market Transformation Conferences, and the National Energy Services Conferences sponsored by the Association of Energy Services Professionals (AESP). These conference proceedings have a wealth of information in them that are readily available over the Internet.

1.3 Organization of this Paper

Subsequent to this introduction, the paper comprises ten chapters, a list of references, and three appendices. The key focus of this paper is the lessons learned from process evaluations; these are described in Chapters 4 through 8. Chapters 2 and 3 describe this project and what process and market evaluation seek to accomplish. Chapter 9 discusses how process evaluation can be improved going forward, and Chapter 10 provides some conclusions from this research effort. References cited in the paper are noted in Chapter 11, and the three appendices include the questions asked contacts, the list of contacts interviewed, and additional relevant literature to that cited in the paper.

2. Project Purpose and Approach

2.1 Purpose of this Study

Energy efficiency is growing in importance as a resource, not just as a lower-cost alternative to generation, but also as a stop-gap replacement while the nation develops alternative sources of energy to current power supplies that release greenhouse gases. Yet energy efficiency is not something that can be easily observed to be working or not working. The efforts to increase energy efficiency investments require actions by each home owner, apartment dweller, business owner, and developer, as well as countless retailers, vendors, manufacturers, and trade allies that provide products and services for buildings. Whether an energy efficiency effort is effective is a matter of judgment and systematic scientific inquiry; evaluation provides a systematic tool for making that determination.

The goal of this study is to benefit from evaluation research that has been conducted and to make those lessons learned accessible in a single resource. Our intent is to save program implementers from having to reinvent the wheel as energy efficiency expands into new markets that have not yet been fully explored, or as organizations start to promote energy efficiency for the first time.

2.2 Study Approach

The approach for this research was interviews and a review of secondary data; details on the characteristics of those interviewed are provided in Appendix A.

2.2.1 Interviews

The authors and the CIEE project manager generated a list of 58 process evaluators and program implementers from utilities, governmental organizations, public benefits organizations, program implementation contractors, and, of course, evaluation consulting firms. Eighteen of these individuals (including the two authors) had been interviewed in 2007, which left 40 to be contacted in 2008. Of these 40, 25 agreed to be interviewed, 7 refused, and 18 were unavailable or did not return phone calls and emails seeking their participation.

The result of these efforts provided interviews, over two timeframes, with a total of 43 individuals who conduct or manage process and market evaluations or who, as program implementers or program managers, are consumers of process and market evaluations. The interviews were completed either in August 2007 as part of the previous study or in September and October 2008. Appendix B provides the interview questions and Appendix C provides the list of contacts.

2.2.2 Secondary Research

We took several approaches to identifying process evaluations to review. One, we reviewed the electronic conference proceedings of the International Energy Program Evaluation Conference (IEPEC), the American Council for an Energy-Efficient Economy (ACEEE), and the Association of Energy Services Professionals (AESP). Two, we asked contacts to recommend any documents that they believed demonstrated points that they were making during their interview. Three, there are some documents that we have found particularly useful for their insights, and these are included as well. This search resulted in nearly 100 documents, all of which are listed in Chapter 11. Those directly cited in the paper are also included in this listing.

One particularly noteworthy paper was written by Ingo Bensch and Scott Pigg (2002), in which they reviewed over 311 documents pertaining to process and market research. Their focus was not on generating lessons learned, but on identifying the gaps in the literature. Their research strongly supports our contention that the published process evaluation literature is not satisfactory for gleaning lessons learned. Bensch and Pigg note there is a great deal of redundancy across studies (these would be the lessons learned) and that much of the research that has been done is not referenced by those conducting subsequent studies. Bensch and Pigg also point out that most of the evaluations are single-program focused; they found fewer than ten documents (in 2002) that focused on questions addressed through a cross-program focus.

It is this conclusion of Bensch and Pigg on the paucity of cross-program thinking that led us to focus on interviews as the primary data source, with the secondary literature as supporting documentation, rather than the driver of the process for seeking lessons learned.

2.2.3 Notes on Data Quality

To reiterate, we relied principally on interviews because process evaluation reports are typically not in the public domain, and the published articles that are available typically focus – like the original research – on a single program, making them of limited use to a broad audience of program administrators and evaluators. Thus, it is the process evaluators themselves that provide the best source for cross-program conclusions, and we employed an interview approach to investigate those conclusions.

However, interviews are by their nature subjective. This subjectivity makes it difficult to test the conclusions in an objective and scientific fashion. The question remains: *Are the conclusions of a single evaluator worthy of note?* Given this concern, we focused on those conclusions that are mentioned by multiple evaluators. As with all qualitative data analysis, it does not serve to focus on the comments of a single person. The task of the analyst is to sort through various threads and comments to identify those findings that have the most reliability (i.e., the results that are consistently revealed by the comments).

Of course, despite our efforts to be inclusive, we recognize that there are process evaluators and implementers who may have useful ideas to contribute but who were not asked or who did not have time for an interview when they were contacted. We apologize if anyone feels that they were left out and encourage them to contact us and contribute to future efforts.

Regarding the secondary research, we recognize that there are likely dozens of articles that were not included in this review. Many process evaluations (especially those conducted outside of California) are not publicly available, and conference proceedings prior to the advent of the Internet and electronic publications are not readily available, making access difficult. Our efforts included a review of conference proceedings back to 1994, plus inclusion of sources that our contacts suggested, though few of those preceded 1994. It is noteworthy that the website for the California Measurement Advisory Council (CALMAC), which can be reached at *www.calmac.org*, holds monitoring and evaluation documents since 1990.

2.3 Terms and Concepts

Appendix E includes some definitions of terms, noted below, that may be unfamiliar to those outside of the energy efficiency world.

- Customers and End-Users
- Market Barriers
- Program Effectiveness and Program Cost Effectiveness
- Split-Incentives
- Summative and Formative Evaluation
- Traditional Energy Segments – Residential, Commercial, Industrial, and Agricultural

There are many other terms of importance, and the reader may want to review the California Evaluation Framework (TecMarket Works Framework Team 2004) for additional definitions.

3. Description of Process and Market Evaluation

The history of evaluation for energy efficiency programs is substantial. Its application began in the mid-1970s, as policymakers began to ask questions about the effectiveness of the various efforts to increase energy conservation in homes, businesses, and industry. Since that time, evaluation for energy efficiency programs has been increasingly formalized, with protocols and guidelines developed to address issues specific to energy efficiency.[1]

Process evaluation and *market evaluation*, as we use the terms in this white paper, refer to two types of evaluation activities for energy efficiency programs. Process evaluation and market evaluation are discussed jointly in this paper due to the similar nature of the approaches in the broad field of energy efficiency program evaluation. However, market evaluations have typically been conducted for programs that target market change, while process evaluations typically are conducted for any type of program, including non-energy efficiency programs. Market evaluations are less common outside of energy efficiency, as few public policy efforts so directly seek to change market behavior.[2]

Definitions for *process evaluation* point to several key features of process and market evaluations, specifically that they are systematic investigations for the purpose of improving program implementation.

> "A systematic assessment of an energy efficiency 'program' for the purposes of (1) documenting program operations at the time of the examination, and (2) identifying and recommending improvements that can be made to the program to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction." (TecMarket Works Team 2006)

> "The systematic assessment of a utility energy program for the purposes of improving its design; its delivery; and the usefulness and quality of the services delivered to the customers" (Spinney et al. 1992)

> "The review and assessment of program implementation" (Hirst & Reed 1991)

These definitions are consistent with definitions within the broad field of evaluation. For example, Davidson (2005, 56), a leading writer in program evaluation methods, says:

> "When we evaluate the 'process' of a program or policy, we are talking about taking a critical look at the quality or value of everything about the program (what it is and does) except outcomes and costs." (Emphasis in original)

Thus, the focus of process evaluation and market evaluation is very broad. There is scarcely any aspect of a program, other than the direct outcomes and costs, that are not worthy of

---

[1] The history of this process for California is discussed in the California Evaluation Framework (TecMarket Works Team 2004).

[2] A search on the American Evaluation Association website for "market evaluation" found 53 results, including conference presentations, resumes, and company profiles; a search for "social marketing" found 15 results, most of which were for health communications, or energy efficiency studies.

investigation via process evaluation. It is not surprising that the conference of the American Evaluation Association is largely focused on process evaluation studies across a variety of subject areas: education, health care, public policy, etc. And it is similarly not surprising that the methods of process evaluation – qualitative interviewing and surveying, along with program theory and logic modeling[3] – are among the most common approaches employed by conference presenters.

Such is not the case for energy efficiency program evaluation conferences, where the focus is largely on impact evaluation results and methods. Confirmation of this can be seen in reviewing the paper and panel sessions for the 1987, 1995, and 2007 International Energy Program Evaluation Conferences (IEPEC). In 1987, two (6%) of the 32 sessions at the conference included process evaluation in the title of the session. At the 1995 conference, none of the 40 sessions included process evaluation in their title. And while five papers included process evaluation in their titles and throughout their discussions, three papers are typically required for a session; thus, these process evaluations collectively comprised fewer than two sessions. The 2007 IEPEC agenda shows some resurgence of interest in process evaluation. Of the 39 sessions, process evaluation was the primary focus of two (5%), although the term *process* was not included in any session titles or paper titles. Using the more advanced electronic searching possible in 2007, it was easy to confirm that despite the re-emergence of process evaluation, it remains under-reported in the literature. At the 2007 conference, there were 25 papers with process evaluation results reported and 41 with impact evaluation results detailed.

3.1 Methods and Data Sources

The methods used for process and market evaluation include: project scoping activities; data collection activities, such as in-depth interviews with individuals or groups; survey research by phone, Internet, or mail; reviews of data-tracking systems, program documents, and materials; direct observation; focus groups; and data analysis using quantitative and qualitative techniques.

Data sources include the staff of program administrators, as well as third-party program implementation staff, stakeholders (who can be any number of people concerned about program progress), program participants, program nonparticipants, and participating and nonparticipating market actors (including trade allies, vendors, design and construction professionals, retailers, distributors, and manufacturers).

As will be discussed in Chapter 9, *Improving Process Evaluation*, there is a concern that some process evaluations tend to be very narrow in their use of methods and their selection of data

[3] Theory and logic models are the combination of a narrative theory for how a program is expected to achieve outcomes and the graphical representation of that theory. A theory and logic model does not guarantee that the theory is logical or that the outcomes will happen as depicted in the theory and logic model; rather, it is a draft of the intention. Theory and logic models typically include the program activities, the immediate outputs, and the short-, medium-, and long-term outcomes for the program (Knowlton & Phillips 2009; United Way, 1996).

sources. At its best, process and market evaluations seek to understand the entire scope of the program and to provide feedback to the program from all angles. That this does not happen is sometimes a reflection of a lack of resources allocated to evaluation generally, or to process evaluation specifically, as happened at the New York State Energy Research and Development Authority (NYSERDA) for the first evaluation cycle (Peters et al. 2007a) and in California during the 2002-2003 program cycle (Hall et al. 2005).

3.2 Benefits of Process and Market Evaluation

A key concern with evaluation is whether the results are used. In the field of evaluation, this is termed *evaluation utilization*. Evaluation utilization, or evaluation use, refers to the degree to which the findings of evaluation influence the programs, processes, or policies investigated, or affect the organization in which these occur. The degree to which evaluation information is disseminated and used varies widely from one organization or study to the next. There is a great deal of discussion within the evaluation profession on the conditions that lead to improved utilization, as well as the kinds of utilization that are legitimate (and valuable) outcomes of evaluation (Dahler-Larsen 1998; Forss et al. 2002; Grasso 2003; Hodges & Hernandez 1999; Mark 2004; Valovirta 2002; Weiss 1998).

There are several types of evaluation use (Owen 1999; Weiss & Bucuavalas 1980) including:

- **Instrumental Use** – evaluation directly influences decision-making or the program itself
- **Conceptual Use** – evaluation influences thinking about the program, even if it does not lead to decision-making
- **Legitimative Use** – evaluation is used to justify decisions made and respond to concerns of policymakers for continued support
- **Process Use** – cognitive and behavioral changes result from the user's involvement in the evaluation process (enhanced skills in evaluation, routine incorporation of evaluation in the organization's processes, and program improvement – also termed capacity building)

Process and market evaluations, if they are to benefit the programs they evaluate, need to be useful and used. There are three ways that process evaluations benefit programs: as a management tool (instrumental, conceptual, and process use); to improve cost effectiveness (instrumental and legitimative use); and to understand customer and market perceptions (instrumental and conceptual use).

3.2.1 Evaluations as a Management Tool

Process and market evaluations are first and foremost a management tool. Process evaluations should be useful for program implementation managers, as well as the program administrative management that oversees program implementation managers. Yet it is more than just an instrumental tool for program oversight; it also can provide an understanding of the conceptual and process aspects of a program, which can improve program managers' ability to design and

manage their programs. As Janda (1994) noted in her review of two utility demand-side management (DSM) programs in the early 1990s:

> "An analysis of rejected EEMs [energy efficiency measures] suggests that lessons about non-technical barriers may be lost or obscured because of the predominant focus on technical/economic criteria over social, institutional, or cultural constraints."

Process evaluations provide the social, institutional, and cultural analysis needed.

At a fundamental level, process evaluations can alert management to possible fraud. For example, according to one interviewed contact:

> "Twelve million dollars was stolen through an EE [energy efficiency] program in New Jersey because no one was looking at the program. No one was verifying if equipment was being installed, if incentives were processed correctly, etc."

A second contact also mentioned a case where a process evaluation had uncovered fraud, and another noted where mismanagement had been identified.

Process evaluations help management know when to cancel a program and when to shift strategies.

> "When we did the evaluation, it became clear that there was just no marketing possibility there. Technically, it may have made sense, but they could not figure out how to make money. We looked at the market and concluded there wasn't an opportunity."

> "[Process evaluation is not] this-guy-doesn't-like-that-guy's findings. It's more about strategies – are the strategies right? Are they way off?"

> "Process evaluations reveal places where programs break down. A demand response program required potential participants to do an audit and then identify the next steps. In practice, there was no follow through – no one forcing the next step."

These comments point to real situations where the process evaluation exposed opportunities and provided reflections on the way a program was designed and conceptualized. As one contact put it:

> "The best way to do process evaluation is to take a quick look at a program and then sit down and focus on a few issues that are likely to benefit from improvement."

3.2.2 Evaluations to Improve Effectiveness

Process evaluations can improve both cost effectiveness and program effectiveness. Program effectiveness pertains to the program's ability to effectively achieve its goals and objectives – specifically, in gaining participation in order to increase installation of energy-saving features or behaviors. Sometimes, cost effectiveness is elusive because improving overall program effectiveness requires increased expenditures for marketing, incentives, training, or even general oversight. Yet, at least in theory, a more effective program will also be more cost-effective.

As Feldman and Titus (2004) note:

> "In essence, these criteria come down to asking how the selected set of intervention activities fits both the energy-efficient products whose market penetration we intend to improve, the objectives

> of the sponsors, and the resources available. In doing so, it is appropriate to document the issues, the answers, and the decision process. As with most such efforts, this is likely to help improve the initial decisions, to clarify subsequent process evaluation, and to provide guidance for subsequent reviews and enhancements of the portfolio strategy."

Areas of focus to improve effectiveness include quality assurance/quality control (QA/QC), exploring what is actually occurring among the nonparticipant market, and returning to programs over time. Just because one process evaluation has been done and the program has been enhanced does not mean the program will run flawlessly from then on or has no opportunity to further increase its effectiveness.

> "Sometimes process evaluation takes the place of QC/QA, which should be under the purview of the program, but which program staff often omit."

Another contact noted:

> "It is hard to draw a line between process evaluation and quality control/continuous improvements. When process evaluation is done by a third-party contractor, the sponsoring organization still needs to remember to do continuous improvement and quality control."

As noted, sometimes the results of a process or market evaluation lead to a program being canceled, or lead to incentives being increased.

> "We learned that nonparticipating gas furnace vendors are installing as many high efficiency furnaces as the participating vendors… We're phasing out funding for that in the next year."

> "Process evaluations help answer questions like: Is the size of the rebate big enough to force participation?"

Sometimes evaluations confirm what has been found before:

> "Every evaluation of a loan program tends to show it's a tough sell."

As one contact noted:

> "The very involvement of an outside party creates a focus on accountability. It makes program implementers more self-reflective."

Evaluations help improve program effectiveness as implementers reconsider what they are doing. This re-examination on the part of implementers often begins at the point where they are asked questions by the evaluators, long before they are presented with the evaluation findings.

One contact suggested that, after 30 years, he could conclude that:

> "Programs seem to drift toward reduced effectiveness over time. Process evaluations can keep programs on track and reverse this trend."

Such a tendency provides a reason, not just for process and market evaluations, but for repeated evaluation efforts conducted every few years. Evaluations keep accountability and effectiveness topmost in the minds of program staff.

3.2.3 Evaluations to Understand Customer and Market Perceptions

Both process and market evaluation should be looking at what participating and nonparticipating customer and market actors are doing relative to energy efficiency products and services generally and to the program specifically. Several contacts pointed out that an essential aspect of process and market evaluations is to look at and test the assumptions of the program, so that program staff can be informed of what is really happening.

> "There is a lot of on-the-ground information that program designers should have, and process evaluations are the way to get that. That is an essential value of any process evaluation."

Most programs are designed in a manner consistent with a physical-technical-economic model (PTEM)[4] of energy consumption, as described by Lutzenhiser (1993), and assume the rational actor model[5] of decision-making. In reference to this, one contacted pointed out that:

> "Process evaluation is actually quite useful in reminding the economists and the engineers how people actually behave. Process evaluations tend to find that programs that adopt realistic assumptions about human behavior tend to experience more success."

As another contact noted:

> "The overarching challenge is to understand the markets. Often there are great technical fixes, but people running the programs haven't thought about the motives of the consumers, businesses, and trade allies that we are trying to target."

Even when program staff have done a great deal of research on their markets, another contact pointed out:

> "I'm sure program staff often already know about issues and barriers, but process evaluations can reinforce which areas to focus on more than the others."

3.3 Weaknesses of Process Evaluation

From the points-of-view of process evaluators, program implementers, and managers, process evaluation has many benefits, but it also is subject to some weaknesses.

Any evaluation is just a snapshot, a single point in time of a program when the evaluators observe what is happening. Process and market evaluations particularly need to be careful.

Evaluators typically will spend 400 to 1,000 hours on a process evaluation, with many fewer hours of observation or interviewing time. Yet the program staff – frequently multiple people – are engaged with the program all year long. Thus, program staff experience far exceeds evaluator experience with the program and, consequently, a process evaluator can miss a great deal.

---

[4] The PTEM refers to the assumption that energy consumption is a physical problem that can be solved by technical solutions using an economic analysis framework (Lutzenhiser 1993; Lutzenhiser 2009; Sullivan 2009).

[5] The rational actor model is the fundamental assumption of neo-classical economics that consumers and business behave as rational actors when making purchase decisions.

One of the contacts with a program implementation focus noted:

> "You need lots of persistence and long-term presence in the market to get at who you need to talk to. I have reviewed some process evaluations [that didn't reflect this] and wondered, 'Would a program designer be able to learn enough from this process evaluation to be able to grasp issues?' The research just didn't go deep enough."

Process evaluators need to be humble. They need to be aware of the limitations of their knowledge and understanding. But not all are. In a paper by O'Drain and Peters (1993), the experience of the evaluator is compared to that of an anthropologist who slowly learns about a community, siding with each group they interview until, having conducted sufficient interviews across the entire community, they can become an objective observer. As the paper suggests, not fully completing the entire range of interviews will bias the evaluator's perspective.

Another weakness of process evaluation is what one contact referred to as "no more than gossip." In such cases, the evaluator focuses on "who said what" or, as the following contact notes, focuses on whether participants like the program or are satisfied with the program:

> "One thing has gone wrong with process evaluation: they can ask a lot more than, 'Do people like the program?' But thousands of program evaluations done over the past 30 years have just focused on that question. Process evaluation is way more than that. But many reports spend way too much time analyzing that question, not enough on all the other information that process evaluation can provide."

Process evaluations must go beyond satisfaction and gossip to understand the internal workings of organizations – the organizations of the program administrators and, with respect to the decisions and activities of program participation, the organizations of the customers and trade allies. Doing less than that is a great weakness, one that occurs due to lack of training and experience in sound social science research methods.

4. Program Design Lessons

This section reviews some of the issues of program design that have been identified through process and market evaluations. These include the design process itself, the choice of technologies, incentives, and implementers.

4.1 Program Design Process

Process evaluators have probably spent less time evaluating the program design process than processes for implementation and delivery. We have done a few projects focused on program design; more often, the design issues are considered relatively less important in comparison to the implementation process. Yet, it can be extremely worthwhile to address such questions as: *What was the process by which program goals were established? What were the key issues considered? Where did the assumptions come from?*

More focus on the program design process is something that could prove useful. As one program implementer who uses evaluations noted:

> "Process evaluations consistently tell us that had we taken more time to think about what we were going to do, how the pieces would work together, and who would do what, we would have been better off. Take the time to work that out before hand."

Another evaluator noted that evaluations tend to note management problems, often resulting from the phenomenon that "everyone tries to move too quickly." The key issue is "to set the program up to meet the goals. Are the goals realistic?" Clearly more evaluation of program design processes could prove beneficial.

Process evaluations more typically assess whether the program was designed with a market intervention strategy (or not!) and review the goal-setting process. One contact noted how a logic model illuminated the unrealistic nature of program goals "to educate all Californians!" When the logic model was revised following input from all program stakeholders, program goals were revised to be realistic, doable, and measureable.

Key findings from program design reviews are that program designers need an "understanding of the whole market and the role of the program in that market." An evaluator that worked on several upstream lighting programs pointed out that the program designers "really understood the market, anticipated changes, and knew the implications of what they were doing relative to regulatory requirements for net saving." This helped make the programs effective.

When looking at the program design as part of the process evaluation, one is assessing the assumptions, how they were derived, and how the approach is structured to address them. For example, it may make sense on paper to distribute compact fluorescent lights (CFLs) to farms during visits, yet the assumption that they would be installed only in appropriate places turned out to be faulty once the evaluation examined the actual applications in the field.

One of the key tools that process and market evaluators have been bringing to the evaluation process is program theory and logic modeling. Developing a program theory and logic model can illuminate weaknesses in a program, which in turn can focus the evaluation on those areas or alert a program manager to flaws in the program theory that should be addressed. In Peters et al. (2004), the authors discuss how the development of a logic model for a commercial new construction program pointed out that working with designers in general would not be as effective for the program's objective of changing the market as working with designers targeted on the basis of being influential in the market.

One contact pointed out that logic models are valuable for use as early as possible in the program's evolution, often when roles and responsibilities have not been clearly defined, nor have goals and objectives.

> "Logic models – or the lack thereof – are tied to this: Has anyone thought through the logic of the program, written it down and tried to communicate that?"

The establishment of clear goals and objectives and logic helps a program, and also helps an evaluation.

4.2 Lessons Learned About Technologies

Over the years, process evaluators have been on the front lines of understanding how businesses and consumers respond to energy-saving products. Unfortunately, some of the products did not work well when they were first offered: energy-efficient motors, electronic ballasts with T-8 lamps, and CFLs. Many early energy-efficient motors and electronic ballasts with T-8 lamps had problems with reliability and high failure rates. Businesses that adopted these technologies when they first were offered were reluctant to continue to use them and became slow adopters once the technology worked better.

A process evaluation found that credibility dropped when measures were installed in inappropriate locations in grocery stores, such as CFLs in freezers where they do not work well. Insufficient training of installers led to a misapplication of the technologies that otherwise could have been installed correctly (Quantum Consulting 2004). The end result of a poor technology application is the reduced acceptability of the program by end-users.

Technologies installed inappropriately cause the technology to fail or even the entire application or end-use to become problematic. Examples include indoor air quality and radon problems from "too-tight houses" and installation of standard CFLs out-doors or in refrigeration systems, where they failed from exposure to cold and wet conditions. As another example, solar homes built in the Southeast in the late 1970s used designs developed for the Southwest, which proved to be too hot for the Southeast's humid conditions and had room configurations that were different from those standard in the Southeast market. As a result, no solar homes had been sold after a year on the market.

Similarly, an early solar hot water program successfully made its initial goal, yet the process of purchasing systems in bulk had the effect of stifling technology advancement. When the program

sought to meet goals that had increased ten-fold, the process evaluation found that the fledgling solar firms had left the market. Such findings helped to point to the development of a program that facilitated the development of a private market in which solar contractors could develop and submit their systems for approval and incentives.

Typically, a process evaluation is conducted and the evaluator hears stories about technologies failing, or they ask participants why they are unwilling to accept a particular product although they accepted others. The answers are often a surprise to program staff.

CFLs had many reports of problems in the first ten years: slow starts, poor color rendition, low levels of illumination when used for reading, etc. At the same time, the utilities were concerned about harmonic disturbances on their networks and other possible effects of the electronics. There was a slow development of standards, culminating in the ENERGY STAR® ratings, which are given to lamps that meet specific quality guidelines. However, in the process, many people who had the less-than-effective early lamps developed negative perceptions of the technology and remain unwilling to try current CFLs, even though, by and large, the product now has good quality and acceptance.

By talking with customers and trade allies, process evaluators have learned that technologies are not failsafe. Evaluations have generated the lesson that it is important for program administrators to promote new technologies because it is only through the technology adoption process that real-life problems emerge and a product can be improved. Evaluations have also concluded that it is important to return to those customers who have had bad experiences and attempt to improve their perceptions through exposure to the improved technologies.

4.3 Incentives as Motivation

Incentives are assumed to be effective inducements for end-users to install measures, yet a common concern among process evaluators and program implementers is that end-users and trade allies typically want higher rebates. Process evaluators have a difficult time sorting out the importance of rebates without the collaboration of impact evaluators. Nonetheless, process evaluators have learned that the financial terms employed by end-users and trade allies, and their interpretations of those terms, differ from the language and definitions used by program implementers.

As an example, a primary task of the BetterBricks Initiative of the Northwest Energy Efficiency Alliance (NEEA) is to develop a value proposition that conveys the significance of energy efficiency investments to each of three unique markets: grocery stores, hospitals, and commercial office real estate. Once the value proposition is adopted, the BetterBricks Initiative program theory posits that the businesses will then incorporate the value proposition framework into decision-making about equipment purchases, about maintenance and operations, and about new construction decisions. As described in Peters et al. (2008), this articulation of the value proposition requires several iterations and direct engagement with the marketplace until terms are found that are meaningful to the targeted end-users and their trade allies.

Mast and Ignelzi (1996) reviewed the literature on the effectiveness of incentives from studies conducted during the 1980s and early 1990s. Among their findings, they discussed a study completed in 1990 for Niagara Mohawk by Cambridge Systematics dealing with short-term payback measures. This study compared the responses of five different treatment groups to information and rebates for the purchase of CFLs: a direct-mail information group, a direct-mail partial rebate group, a direct-mail full rebate group, an in-person full rebate group, and a supplier-based partial rebate group. According to Mast and Ignelzi:

> "The [Cambridge Systematics] study found that the mail-based rebate offers did not increase the intention to install efficient lamps beyond the rate of the information treatment, though they did produce earlier measure implementation. Furthermore, full rebates ($0.80 per lamp) did not significantly improve participation over partial rebates ($0.40 per lamp)."

In other studies Mast and Ignelzi reviewed, incentives explained a portion of the investment behavior, but in some cases this was as little as 30%. Payback information, in particular, is difficult for end-users to interpret, which is one of the reasons that audits are slow to be implemented. What is likely is that financial incentives may offset the costs of long-term payback measures, but they are often, according to Mast and Ignelzi, "a token that increased credibility and gets the customer's attention."

A couple of contacts addressed financing programs rather than incentives generally, noting that evaluations of financing programs have found that the logistics of these programs are difficult and that financing is typically only needed by those customers who are struggling to get credit – in other words, the very customers to whom the program administer should not offer financing.

While at the time of this writing (in late 2008), there is a global credit crunch that is making the need for financing more common, so that the current issue is the ability of anyone to get credit for anything, rather than the availability of credit for energy efficiency projects specifically. Generally, process evaluators have found that the key financial problem for those who express interest, but are unable to make an energy efficiency investment, is not the customer's inability to borrow, but a general lack of funds to do any improvement projects. Thus, they typically don't qualify for funding from any source.

4.4 Implementers

Who should implement energy-efficiency programs? The answer to this question constitutes another aspect of the program design process. A key process evaluation finding has been that the correct reward structure (discussed below in *Administrative Issues*) will address many of the challenges that arise regarding who should implement a given program.

Process evaluators typically find utilities are perceived as a trusted source of information on energy efficiency, and on the use of energy in homes and businesses. So, if someone comes to the door with a utility insignia on their badge, people tend to trust that these people are there to do the right thing. As a consequence, third parties and non-utility agencies, such as public benefits organizations, can run into more difficulty delivering a program if they are not able to portray themselves as associated with the utility.

Third-party implementers have been observed to focus on meeting the metrics of their contract. Thus, as with financial rewards for staff, if the metric of the contract is to obtain a certain amount of savings or a certain number of projects, these metrics will be the key drivers of the process: seeking measures with the highest savings or seeking to enroll large numbers of participants, irrespective of savings value. It is more difficult to set up a metric that includes goals of high customer satisfaction, reduced energy use for customers, and availability of high quality data to meet regulatory needs. Such goals are easier to establish and reward for utility implementers than for third-party implementers.

Process evaluations have also shown that utilities, because they have access to energy-consumption data and the trust of their customers, can be effective in delivering programs. Organizations such as public benefits groups and third-party turn-key providers of programs do not automatically have this information. While these organizations can provide the services and offer the advantage of being more able to easily staff up and down, they need access to energy consumption data to optimize program delivery. Gaining access has been difficult in some jurisdictions; yet, where there is good cooperation with the utility, as well as consumption data transfer, third parties can be equally effective as the utility.

In a review of Energy Trust of Oregon's contracting and delivery models, Peters et al. (2007c) found that it can be very important to minimize the management levels between the end-user and the program administrator, especially for large commercial and industrial customers. Such customers prefer to have direct negotiations with someone who can sign a contract. It is critically important that program implementers have the ability to sign a contract, as well as access to consumption data.

Finally, several of the process evaluators reported that program success is driven more by the characteristics of the program manager than by the nature of the organization that serves as program implementer, and even more than the program's design. The program manager needs to be enthusiastic, proactive, and able to identify and adapt his or her efforts to the needs of the target population. A well designed program implemented by a program manager with little enthusiasm or commitment to make the program work will not be successful. Such a situation will be even worse if the program manager is focused on her or his own goals and objectives instead of the market success of the program.

Bensch and Pigg (2002) completed a literature review addressing the issue of who should implement programs. They concluded that utilities, third parties, public agencies, and public benefits organizations can each be effective implementers, having found "*nothing driven by empirical evidence*" to indicate one is better than the other. However, as also has been clear to other evaluators, they noted certain criteria are important:

> "One, is having an organization that really believes in what it is doing, is mission-based and advocacy-oriented rather than one that treats it like a business. Two, that the right kind of incentive structure makes a difference. Three, it is important that implementers want to learn as they go – are interested in self-improvement – as opposed to those who emphasize 'cookie cutter' approaches only because they are good business models."

5. Program Implementation and Delivery Lessons

The areas of discussion for program implementation and delivery include barriers to energy efficiency, communication, marketing and outreach, training and education, and behavior change. Other lessons learned from implementation pertaining to market actors and customers are discussed in the following chapters.

5.1 Barriers to Energy Efficiency

Fundamentally, the purpose of energy efficiency programs is to reduce the barriers to energy efficiency by addressing the market barriers and failures that keep consumers and businesses from changing their investment behaviors to include energy efficiency products and services, and from changing the way that they operate their buildings.

Process evaluations have been a primary vehicle for uncovering the barriers that programs address – as well as the barriers that programs create! – to investment by consumers and businesses. As discussed in Chapter 6, *Program Administrative Lessons*, many administrative processes create barriers to program participation, and these should be addressed. Other factors that affect program implementation and delivery include the credibility of the information and the people involved in implementation.

In Peters et al. (2008), the authors discuss how the BetterBricks Initiative seeks to build credible relationships with market actors and how difficult it has been to find market-specific tools in which the business owners have confidence. An energy efficiency engineer experienced in hospitals and the state regulatory issues for hospitals can gain a great deal of traction with a hospital customer, while a general energy efficiency expert that is on target 95% of the time can lose credibility for the program with one recommendation that runs counter to state regulations. Similarly, a refrigeration expert for food processing warehouses is not equivalent to a refrigeration expert for grocery stores – at least not in the eyes of the grocery store owner.

Reinforcing these conclusions, another contact said:

> "People working in energy efficiency programs need to understand the layout of the industry that they are working in. Relationships are important, and it takes time to develop these relationships."

Previous process evaluations have shown that utility account representatives need preparation in how to implement the programs; some account representatives are not well prepared:

> "Customers listen to people who best understand their industry. When talking to customers in the medical field, it is good to have experience in medical efficiency solutions; it is good to have someone with a real estate investing background when talking to real estate investors."

Efficiency programs by their nature seem to improve customer satisfaction:

> "We have found that participation in energy efficiency programs improves customer satisfaction with the utility. I think that this happens even with nonparticipants because, at least, they are aware that the utility is trying to reduce energy use and save customers money."

Yet some customers are uncomfortable with efficiency programs. One contact suggests his research shows that it is not so much customers' mistrust of energy savings claims but rather that "people want to know the dollar value of how much they will save on their bills." This conclusion is similar to a consistent finding in market progress evaluation reports developed for NEEA in the late 1990s and early 2000s. Architects indicated that if they were to have the numbers to show their clients as to the energy savings value of different design strategies, they would be able to convince their clients to proceed; absent "the numbers," they could not be persuasive. It is not the existence of energy savings that customers distrust; it is the likely dollar value of the energy savings relative to the likely dollar cost to install.

These issues are more specific to individuals and businesses than the barriers identified in the Scoping Study (Eto et al. 1998) might imply. One contact noted the following barriers:

- **Trust Barriers** – these may be reduced through marketing, case studies, references, and demonstrations
- **Enrollment Barriers** – includes forms, but also includes the process of learning about and following through with the enrollment process
- **Timing Barriers** – includes how long the program processes take, as well as how long it can take to get the energy-efficient equipment, which may have to be special-ordered
- **Information Barriers** – includes whether people understand what energy efficiency means and whether they understand why they should choose one product over another

While the Scoping Study clearly identified conceptual problems, when it gets to the consumer and businesses, the barriers are more specific to the program and to their particular experience of the program and the products or services being offered.

5.2 Communication

Communication largely concerns the relationships within the implementation team, while marketing and outreach (below) largely concern how the implementation team communicates with the target market. Contacts most commonly identified concerns arising from communication issues between program administrators and outsource or third-party implementation contractors. However, communication can also be a concern in very large organizations, as reflected below.

One program administrator noted that:

> "[Process evaluation had identified communication issues and] found that we needed to depend more on regular communication with our delivery channels. We now have more meetings, regularly scheduled. We need to constantly attend to communication or it goes poorly."

One contact pointed out:

> "Communication is the kind of stuff you deal with when you're trying to sell anything. You must define the market; get everyone who is involved with delivering the product on the same page. It seems obvious, but it's not always done."

Another contact pointed out that:

> "One of the most important lessons learned is the importance of communicating goals from top to bottom in an organization. Good communication about the purpose of program and goals and objectives is vital. Communication is important not just for the program manager but also for the people doing the program. Without good communication, the program is not as effective as it could be."

E-mail has certainly improved certain types of communication, as has the cellular phone, both of which make it possible to be in immediate contact with key program staff.

The primary lesson learned from process evaluations is that ongoing communication must occur. Whenever communication is not occurring among implementation team members, whether they are program administrator staff or third parties, there will be problems.

5.3 Marketing and Outreach

One would expect that marketing and outreach would be key aspects of energy efficiency programs, and efforts to improve these aspects would be a major focus of process and market evaluation research. Yet, as Feldman and Titus (2004) suggested:

> "[A common weaknesses in programs is the lack of] strategic analysis of the program intervention options, including retrospective evaluation of the process by which the program targets are translated into the implementation strategy. What appears to happen most often is that program staff members take their lead from and replicate program activities that have been effective in other states or service territories, with relatively little attention to issues of transferability over time and space. Moreover, since the program design was not grounded in decisions about meeting criteria relating to market conditions specific to a time and place, that design may continue beyond the point at which it would be prudent and cost efficient to change strategies."

Many of the contacts noted that this type of lack of market knowledge is a frequent finding in market and process evaluations. At the same time, contacts reported that market analyses are rarely undertaken because market response (e.g., program participation) usually has been adequate relative to budget availability. In fact, market response frequently exceeds budget availability. As one program evaluation manager noted:

> "Don't run out of money in the first month. Marketing things up front, too aggressively, can result in irate customers if you run out of money right away."

Another reason for limited marketing efforts is described by a contact for a program with a sophisticated marketing campaign:

> "Marketing became a political issue because the marketing was effective enough that people noticed it, and said, 'Why are you spending money on high priced marketing?'"

So, while program response is often satisfactory or even larger than expected, much market knowledge is less than adequate and, thus, there may be opportunities missed. There is a lack of

firsthand knowledge of the market of interest, and there is a lack of market segmentation work. As one contact put it:

> "It is not simply the economic and technical potential, but rather the market potential that needs to be understood."

Most products and services have a market channel that already exists. Expanding products and services to include an energy efficiency option is accomplished by going through the channels that already exist. However, one contact discussed one problem with relying on existing marketing channels:

> "A utility found that they were not getting responses to their marketing, which relied on bill stuffers. The evaluation team talked to customers and asked if they were familiar with the program. When they said that they weren't, the evaluators asked customers if they ever looked at bill stuffers. The customers said no."

In another example, a contact noted that research on what type of inserts is read helped to improve the marketing for the program:

> "Bill inserts have some effectiveness. The bi-fold has information that seems to get read more than other types of inserts."

Process and market evaluations have been very important "to reveal if targeting was successful. What was the program designed to do? Was there a clear marketing plan with specific objectives? Process evaluations help to determine if messages are not targeted appropriately to the segment desired."

But the most important reason for improved market knowledge is not how to reach people, but how to get them to take action. As one contact put it:

> "There are two parts to marketing. One, get people's attention. Two, get people to take action. Programs are far worse at getting people to take action than at getting their attention."

This shortcoming may be because most programs treat potential participants as rational actors. As one program implementer noted:

> "We always overestimate the importance of telling people things that we think they don't know. We tend to presume that this is a rational thing. All I need to do is to explain to you the economics and comfort benefits, and you'll choose energy efficiency over a new car."

Another noted a recently emerging marketing lesson:

> "[We have to] sell it like they sell toothpaste. Focus the message. Focus on what they care about. Get beyond segment analysis tied to account numbers. We need to go to trade shows and breakfasts. Premier companies do this. As long as the attribution stays difficult [attributing what causes the consumer to take the energy efficient action], this type of marketing will be hard do to. The guy at Proctor and Gamble doesn't necessarily need to know that it was this ad or this coupon that caused the purchase of P&G toothpaste."

Another said a key marketing lesson from process evaluations has been:

> "You can't assume the target audience is concerned about energy efficiency. You have to figure out what the hook is to get them interested. On the residential side, they are interested in saving money, but also interested in other things, like being more comfortable in their homes – but they

> don't understand how that links to energy efficiency. Marketing has to show them the link. Money is a bigger factor for business customers, but also corporate image, making doing business more convenient, making it easier for customers."

One contact elaborated further on the need not just to target a program, but to focus on multiple sides of the market. In this case, the contact was discussing the demand and supply side of the market in a new construction program:

> "The program had less focus on the demand side – getting home buyers interested in E-STAR Homes. But if consumers are not interested in buying, there's little motive for the builders to do ENERGY STAR®. Following the process evaluation recommendation, the program recently revamped to put more emphasis on building consumer interest through marketing."

The same experience was reported by another contact concerning a different program. Getting the builders involved only works if the consumers are also demanding the ENERGY STAR® home.

As also noted in Sullivan (2009), one contact described how research on industrial programs has shown that distinct marketing messages for facility-level and for executive-level plant staff are needed to facilitate interest in and acceptance of an energy efficiency message:

> "The facility managers do not always have the 'buy in' from the upper management, so they are not able to implement energy efficiency measures because managers are not on board."

So, the lesson of process and market evaluation is that market knowledge is most important in relation to learning how to persuade customers to change their behavior to invest in energy efficiency and to purchase energy efficiency-based services.

5.4 Training and Education

Targeted training and education for market actors is an important part of many programs. Typically, market actors at a minimum need training in how to work with the program. But many programs also expect market actors to design solutions, sell products, or install equipment in a more energy-efficient manner than standard practice. Process evaluations can provide useful assessments of such components. Evaluations also often identify a need for more training and education within programs:

> "Efficiency training should be an ongoing process where educators meet on a regular basis to discuss technical issues, education methods that have been working well, and how program procedures should be revised. As auditors gain experience and skill, and with this opportunity to share learning, the auditors will increase each other's knowledge, and improve the delivery of energy education. Ongoing opportunities for sharing experiences will help the education delivery to improve as the program matures."

Measuring the effects of training and education efforts takes a highly focused effort. McRae (2002) and Bensch et al. (2006) discuss some of the challenges of exploring the effects of education and training efforts. According to Bensch et al.:

> "The art of measuring training impacts on energy efficiency is not nearly as well-developed as many other aspects of energy evaluation, so all attempts to measure training impacts add to our collective understanding of how training events contribute to energy savings. In this context, it is

> important to note that education and training approaches tend to be much more varied than other efforts to stimulate energy efficiency, and not all approaches are designed to produce demonstrable changes in behavior."

This is especially an issue for programs targeted at school children, an approach that is often thought to be key to long-term energy efficiency, but needs to be cognizant of the real influence children can have on their parents. One contacted noted that:

> "Kids can influence parent behavior on recycling, but they have less impact on the temperature of the house and little to none on the type of heating, ventilating and cooling (HVAC) system purchased. Often, children are marketed to so that can create behavior change at home. Auto manufacturers market to kids all the time. But, it is harder to do with the energy industry."

Some of the programs targeted to schools are well integrated into the science curricula; others are not. There is a large literature on how to educate children and adults. A key lesson learned by evaluations of adult education and training is that the educational literature is valuable and should be used (Tannenbaum et al. 2006). We have also found that this is true for programs targeting schoolchildren.

5.5 Behavior Change

In Section 5.3, we noted that the key problem with marketing and outreach is not the challenge of reaching the market (though that is sometimes a concern), but the challenge of actually getting people to make a behavior change. Behavior change issues comprise the frontier of process evaluation:

> "We are on the verge, or I could say, on the dawn of new interest in the behavioral aspects of energy efficiency and climate change. Process evaluations have helped us. And as we get better, we take lessons learned from previous process evaluations and ask better questions. Now, we are asking how people make decisions, not what it was that pushed them over the edge ('was it our money??'). We need to spend more time understanding how decisions are made and targeting interventions to the most important points."

In Peters and McRae (2008), we point out that a key problem over the past 30 years has been a focus on free-ridership measurement as the primary means of understanding decision-making about energy efficiency decisions already taken. This type of research is backward looking rather than forward looking and runs into several psychological measurement problems: social desirability bias, cognitive dissonance and attribution effects, to name the most notable. Because of these problems, we recommended that future efforts focus more directly on decision-making. To date, we have inklings of some of the true decision-making factors, but much more research in needed in the context of program design, implementation strategies, and tactics, and in the market and process evaluations conducted to support programs.

6. Program Administration Lessons

Program administration is at the heart of how programs operate. The delivery and implementation teams go into the field, work with customers and trade allies, get them interested in participating, and then the administrative system comes into play. Customers have to complete forms and have to submit invoices. Program staff have to track their contacts with customers and trade allies. In the end, program management wants to be able to report accurately to the regulators and upper management that specific equipment or services were provided and specific incentives paid, and to assure these parties that everything is working and energy is being saved. This chapter discusses lessons learned about management, reward systems, administrative processes, data-tracking, and quality control.

6.1 Management

Process evaluations have found that eventually all issues will surface in a program; therefore being prepared ahead of time helps to facilitate program participation. It is important to know the size of incentive projects that require senior implementation management approval and what agreements can be signed by the implementation team. Program consistency is important: having different incentive amounts or different forms to complete for the same measure in different sub-programs confuses the customers and compels them to trade programs off against each other. Fairness requires common metrics for all applications to complete. While these may seem like issues out of the past, arising from our collective inexperience, we find that these issues persist in today's evaluations.

One of the key issues with program management concerns the proliferation of programs. A program for lighting may be easy for the lighting firms, but what happens when a customer wants to do an HVAC upgrade. A different contractor is needed and often a different program with different forms. Process evaluations find that customers need "a single point of contact for all projects." *One-stop shopping* is the catch-phrase and an all-too-illusive ideal.

One contact identified another key management issue:

> "The common lesson learned is the importance of keeping programs running continuously and not changing the rules too often."

Keep rules consistent, especially across markets, which usually are larger than utility boundaries. Make it easy, make it consistent, and make it straightforward.

Whenever process evaluators learn from a contact of a need to change a program's management or administrative system, the evaluators need to be careful:

> "Evaluators need to keep in mind that with any firm you are dealing with self interest. Our industry sometimes takes an insufficiently critical perspective on what firms tell us in interviews. They are in business to make money. They have or potentially could have interaction with the program, and there is a way that they anticipate or may actually benefit: remember this in interpreting the results. Keep in mind the profit motive at all times."

Such a warning comes from process evaluators' experience and suggests further why it is important to have fair and transparent processes for evaluation.

6.2 Reward Systems for Implementers

Whatever is rewarded will be done, whether it was intended or not. Some call this "the perversity of incentives." Evaluations have found that when administrative rewards are structured to induce account representatives, program staff, or others to increase savings, perverse outcomes are common. "Managers pay attention only to the things that get measured." If energy savings are being measured, or if the number of measures installed is being measured, but not both, then the one being measured will be the focus of attention. The continuous process improvement approach to management sums up this phenomenon as: *What gets measured is managed*.

The potential perversity of incentives is difficult to address in energy efficiency programs. On the one hand, it is clearly important to obtain savings; but a system that rewards immediate savings can lead to "cream-skimming," where easy-to-identify and easy-to-install measures with immediate savings are targeted (often lighting), while measures that are more difficult to identify and install – such as HVAC equipment or industrial process equipment – are ignored.

It is easy to devise a set of metrics – such as "100 widgets are installed each month" or "so many contacts are made each month" – yet evaluators have seen situations where all of the metrics were achieved, but the impact evaluation found that savings were considerably lower than the goal. A contact who is primarily an implementer noted that a process evaluation can help identify certain types of problems before they are identified in an impact evaluation:

> "[This contact has seen] the potential within the implementation team for conflicting goals. We may have an energy advisor who wants to help his customer and a program implementer that wants high net savings. We may have one person looking for high gross savings and another focused only on what the program will be judged on… Individual performance goals create odd motivations…Everyone ends up chasing the big project that gets the glory and meets 'my' goals but ignores the smaller projects."

Process evaluations will identify these issues and can help point out when the rewards are working and when they are not working.

As well known as this problem is, it crops up over and over again because structuring effective rewards is difficult. For example, consider an organization that has separate goals for diverse programs, with specific staff assigned to each program. In such organizations, staff typically interpret their responsibility as achieving their program-specific goal and do not invest effort in aiding other programs. Frequently, they do not recommend to their customers that the customer pursue other programs, and they do not think it is a problem to focus solely on their own.

Many process evaluations have shown that having turn-key implementers can be a hazardous way to run a program, because they often are not rewarded for energy savings. This occurred in a refrigerator pick-up program, as one contact mentioned:

> "The implementer was supposed to pick up only operating fridges, because their removal would reduce energy consumption. Yet, the guy who picks up fridges gets paid if he picks up a fridge,

> and customers are angry if they don't get their fridge picked up, and the manager wants to report that so many fridges were picked up. Evaluators found energy savings in only half of the regions."

A well-known example of an attempted solution to the problem of narrow goal focus by an implementer is the contract between the Vermont Energy Investment Corporation (VEIC) and the Vermont Public Service Board. VEIC is able to earn different rewards through their contract – one for just meeting the goal and others for exceeding the base requirements. This sets up a motivation for VEIC to examine how they are doing things and make improvements that will lead to above-goal performance.

6.3 Administrative Processes

The energy efficiency improvements customers can make are not necessarily obvious or straightforward. Several of the process evaluators commented that business customers are skeptical about energy efficiency because they have heard lots of promises over the years. The same is true of residential consumers. A major benefit of programs is to help people to learn about the choices that make more sense – to learn what really works and what does not.

But programs all too often make the process harder. Forms generally ask for energy and cost information at a level that is more detailed than a customer (or even an energy process evaluator!) is familiar with. The requirements of programs typically follow from the regulatory need to avoid fraud and to fund those things that are truly cost-effective for society. One contact commented on a 2007 program that had a 10-page application form for a rebate of less than $40.

Not surprisingly, process evaluators consistently find customers wanting simpler programs: one-page applications; applications that can be completed on-line; or applications with technical information completed either by the trade ally or the program administrator, rather than the customer.

Trade allies also want to have simple systems, contracts lacking in onerous clauses, and requirements that they understand. One contact noted:

> "This is a classic example: With the first process evaluation we did, it became abundantly clear that our contracting process was not working for our weatherization contractors. We took the results to our Executive Director and changed the process in two days."

"Simplify, simplify" is a common mantra. "Simplify the paperwork. Minimize the hassle and the burden." Making it easy for customers to participate is an overriding message from process evaluation.

Two contacts mentioned utility programs that were run parallel to state programs, each with a unique application. Participants were required to provide duplicate information or, even worse, slightly different information to the two organizations. This was costly to the applicant. In one case, it was resolved when both organizations agreed to accept a common application. But the process of achieving a common application is one that takes time and effort.

A common solution to the need for simpler forms was identified in the 1980s: if customers assign the incentive to the contractor, the contractor has the burden of completing the form. Given that the contractor has access to most of the technical information and, in theory, can gain some economies of scale in completing multiple similar applications, this practice has been adopted by many organizations. As will be discussed in a subsequent chapter, cooperation from trade allies is key to the success of this approach.

A program administrator noted:

> "We always learn that the forms are too long. It's hard to figure out from evaluation how to fix this."

Similarly, an evaluator noted that linking monitoring and evaluation at the outset of a program has an advantage of ensuring that paperwork and data infrastructure are considered and in place early in the program. In fact, without these features in place, he agreed that it is difficult to figure out what to do to simplify the process.

Another contact noted that *simple* means not expecting the customer "to find the efficiency information of the specific measures that they want to install." Too often, process evaluations fail to specify what the issues concerning the forms are for customers and trade allies, and this comment captures the real problem. Customers and trade allies have a very difficult time knowing the conditions of their preexisting equipment and, even though it may be possible to extract information for the new equipment, it is often very difficult even for trade allies, let alone customers, to understand what information is being requested on the forms. The contact noted: "Automatic look-up tables hooked to the web can help." Of course, model numbers literally can change any day of the week, so these links need to be maintained and updated so that they are useful to customers, trade allies, and program staff. Moreover, the need for item-by-item accounting to know where a specific piece of equipment is located has limited the ability of residential lighting programs to reach large numbers of people. When this requirement is relaxed, buy-down programs can be offered, where the incentive goes to the manufacturer who then works with retailers. The retailers provide sales data and, while the installed location of each CFL is unknown, the overall trend in CFL sales can be monitored and compared to the trend in sales of standard incandescent lamps.

Several contacts familiar with performance contracting programs, where monitoring and verification (M&V) is required to confirm savings, noted that participants often prefer the simpler processes with lower incentives if that enables them to avoid complex requirements on the program forms:

> "We started with rigorous data requirements for the applications. When the process evaluation surfaced complaints, we changed the process so that customers could go with an estimate and get less money per kWh or do the M&V at a more rigorous level to get the extra money per kWh. We were surprised at how many customers opted for the simpler process and lower incentives."

Several evaluators noted that in addition to customers and trade allies wanting shorter and simpler forms, "Delays with checks drive people crazy!" Streamlining the incentive payment process is one of the most important aspects of program simplification. It is important to realize that what seems streamlined to a program administrator (45 days or even 30 days) is a long time

to customers and market actors. They typically want to be informed how long they will have to wait and then be paid in no more time than that. Frequently, a week or two is the maximum time that participants are willing to wait, given that the incentive is reimbursing them for money that has already been spent to install the measure.

6.4 Databases

Process evaluators have traditionally reviewed databases to see if the data are being collected in a manner that will facilitate program management and evaluation. The requirements of these two functions are not always congruent – what a program manager thinks is needed to manage a program is not necessarily what is needed to meet regulatory requirements for the evaluation of program effects. So, it is not surprising that most databases are found to be inadequate for evaluation and, therefore, inadequate to meet regulatory requirements.

One contact noted that:

> "Program administrators for all types of programs should do what works best for them in tracking programs – whether paper records, spreadsheet, or a complex tracking system. But at the same time, they need to be trained early on as to what data are required for assessing performance, evaluating impacts, and why it should matter to them."

Evaluators have often encouraged organizations to develop comprehensive databases, but it is difficult to know what data and tracking systems will be needed until programs have been in operation for a while. In one program that one of us evaluated, the staff had a comprehensive database; but as the program grew, it became impossible to work with the database because the volume of data slowed its function. A new database had to be created. A positive aspect of the situation was that the program team was able to identify a clearer set of parameters for the database at that time.

Process evaluators frequently find program-specific databases that lack key information needed for the evaluation. Databases tend to be incomplete because program staff see no value in the missing information for program management, or insufficient resources have been allocated to input the available data.

One manager of program evaluations mentioned how they had used a process evaluation to look at 50 third-party implementation contractor-operated programs:

> "The evaluators looked at what data were being collected and told the 50 contractors what data needed to be collected across all 50 programs to demonstrate savings. This report helped us identify data that would be good for future evaluations, while simultaneously helping us streamline our processes, making it easier for customers to participate."

The data that need to be collected include contact information, as well as information on the measures installed or the services provided. Lacking this information, it is difficult to meet the requirements of regulators to confirm how money was spent or how much energy was saved. One of the critical issues for database development is establishing a way to identify participants consistently so cross-program comparisons can be made. Utilities can usually do this for residential customers, although often with some effort. However, consistently identifying

commercial and industrial customers is often difficult due to the presence of multiple meters, multiple addresses, or billing addresses that are different from facility locations. If the implementer is not a utility, then it is even more critical that the implementer develop a process to consistently identify unique participants.

Fundamentally, programs need to allocate sufficient resources for data collection, for building databases, and for putting the data into the databases. Database creation is as much a specialized skill as is installing electrical systems. A key lesson for database development is to keep it simple at the outset and increase the complexity over time as the data that are needed to support reporting requirements become clear.

6.5 Quality Control Systems

Quality control is the process whereby program administrators and implementers ensure that equipment is being installed correctly, that assessments are being completed correctly, and that installed measures are working as designed. Unfortunately, the importance of quality control is most evident when it is lacking. Good quality control enables evaluators to do their jobs more effectively as well, because high quality data are collected and become available. Some organizations think quality control can be done in lieu of evaluation, yet the opposite is true. As one contact said:

> "We have to do process evaluation in order to learn if the protocol is appropriate. In many cases, there is fiscal oversight, but not procedural integrity."

Quality control includes systems that ensure data are collected, and inspections that ascertain whether field implementation staff and trade allies are implementing the program the way it was designed and intended. Because these functions are also objectives of process evaluation, some people may confuse the two and think that only one of them is needed. But quality control is usually conducted using internal resources, and process evaluation is conducted using third parties. There have been many instances where process evaluations found quality control was not adequate:

> "On-line data is quick and sometimes people do not concentrate – it still needs to be verified, completed, and saved."
>
> "Contractors did not turn over a two-sided form, which lead to incomplete data."
>
> "We've learned that you get out what you put in."

The quality control and inspections procedures commonly used by program administrators have often evolved as a result of evaluations. As one contact noted:

> "Process evaluations have been used to assess the appropriate rate of inspections. A common resulting approach is to use 100% inspection for third-party contractors' first projects and, as the inspection process reveals fewer errors, to convert to a sampling approach."

In addition to having quality control processes in a program, some programs are operated first as pilots to quality-control check the entire process before launching to a full-scale program. The general ideas and all of the procedures are tested in the pilot. In this way, "the business systems

are addressed ahead of the program and… it makes sure that the people who interact with customers are trained."

7. Lessons in Reaching Market Actors

Market actors are the firms, businesses, and individuals who offer services and products to consumers, businesses, and industry. These include the plumbers, electricians, contractors, designers, architects, and engineers whose services enable energy-efficient products to be installed and maintained. Market actors also include the distributors, wholesalers, retailers, vendors, and manufacturers who make and sell the products installed in buildings. In the industrial sector, a supply chain of market actors – comprised of consulting engineers and equipment suppliers – has evolved differently from that serving the commercial sector. This chapter presents lessons learned about building and construction trade allies, professional services firms, manufacturers and retailers, and industrial process engineering firms and suppliers.

No matter what the type of market actor, a key complaint that they voice is about programs that stop-and-start or change dramatically. Change is difficult for building tradesmen, professional services providers, manufacturers, and vendors. Most businesses operate year in and year out. They do not have regulatory cycles. Different seasons come and go and, in some cases, drive sales (Christmas for retail merchants, summer hot spells for air conditioner sales, spring and summer for housing sales and associated appliance purchasing, etc.). In anticipation of these seasons, market actors tend to prepare three to twelve months ahead of time. Because of these factors, it is difficult for trade allies to understand why a program structure changes when it does. As one contact put it:

> "You can't stop and start programs – it upsets vendors when they promise things to people and then can't deliver."

Some program administrators have learned that they need to inform the market actors and trade ally networks in advance: e.g., they hold meetings with the local building association or electrical union to explain the program changes before they are implemented. They meet with design and engineering firms. Some programs contract with a firm that recruits trade allies and retailers into the program, trains them, and then keeps them informed as program changes occur.

As discussed in the next chapter, a key point for reaching consumers and businesses is at the time that purchases are made or when a consumer or business owner is choosing to remodel their home or building. If the program is not working with every type of market actor, then those natural market-decision points are missed.

7.1 Building and Construction Trade Allies

The construction trade allies are the plumbers, electricians, contractors, and others in the building trades who build and maintain residential, commercial, and industrial buildings. It is common for the owners of electrical or mechanical contracting firms to have been in the construction trades all of their working life – to have been apprentices, then journeymen, and eventually earning enough to create or buy their own contracting businesses and obtain contractor's licenses. These

are skilled professionals, but they are skilled in building and construction, not energy efficiency program paperwork and regulatory requirements. A contact commented:

> "The challenge for utilities is to learn to insert themselves into the business model of the trade allies."

In working with construction trade allies, it is important to remember that they are in the market to make a living. When they have invested time – both their staff's and their own – to learn program requirements and procedures, they have a legitimate expectation that the program will continue, and continue in much the same way. Program changes about which they have not received advance notice can leave them with excess inventory.

Not informing trade allies about changes can make them reticent to participate in the future. Several of our contacts noted situations where trade allies were reluctant to participate in programs due to prior experiences with programs that changed direction too rapidly or with no warning. As one contact said:

> "It is important for market actors that programs be consistent. They need an ongoing way of participating. It is important for program implementers to build and maintain relationships with the market actors. It is hard to build relationships when programs come and go. It is vital to give customers and market actors notice of changes and not surprise them."

Another reason to stay in touch with construction trade allies is the help that they can provide to improve program design and performances. Contacts recommend trying the program first with small groups of trade allies to see if you can find what one contact called the "leverage points… the place where your goals and their goals intersect*."* He noted a rooftop air conditioning maintenance program that was piloted:

> "We had what we wanted, but couldn't give the service providers anything that they wanted. Unless we were giving out a zillion dollars in rebates, it would not work. You have to communicate to them in a way that they understand, identify what they talk about and what they want. Use their language."

In the words of another contact:

> "Utilities need to engage these folks to get the programs out."

Training about program rules and procedures is helpful in improving the trade ally's ability to participate. Yet if the processes are too complicated, even for trade allies who are knowledgeable about the technical aspects of the products and services, the cost of retrieving that knowledge on a customer-by-customer basis to complete program forms is too much.

Training centers work well, as one contact noted, "but they don't get to everyone." This situation has led some program administrators to set up mobile training vans. It is important to train as many construction trade allies as possible; even if they do not participate in a program, they can change the way they do their work.

Process evaluators have found that when trade allies are able to receive the incentive payment directly, rather than the incentive going to the consumer, the trade allies tend to be more willing to complete the paperwork and meet other program requirements. There are risks in doing this (e.g., customers may complain about the waiting time), but inspections and quality assurance

oversight can be used to manage the risk and improve the ability of the program to deliver savings. As one contact said:

> "[If you are going to use construction trade allies to drive your program], you need to expect failures and make sure that they won't be tragic."

7.2 Professional Services Firms

Engineers and architects have been the most common targets of professional service providers. There has long been an implicit expectation that architects and engineers should understand energy efficiency and that, once understood, they would then be able and willing to market these capabilities and ensure that buildings were designed in an energy-efficient fashion. Part of this expectation likely arises from the fact that many energy-efficiency program designers and implementers are themselves engineers or architects.

Yet, architects and engineers face considerable challenges in the marketplace. They typically are not the decision-maker, but rather the consultant or service provider to a client – the building owner or manager is the person who makes decisions. If the owner does not explicitly call out a requirement for energy efficiency, then the service provider is unlikely to put that need in the building program.

Evaluators have learned that architects and engineers will contend that they are familiar with the design issues of energy-efficient buildings because, after all, they studied energy systems in school. However, the principles and the practice are not the same. Process evaluators of programs that seek to work with architects and engineers hear from these designers that it is only through participating in programs that target energy efficiency in their practice that they learn the practical application skills necessary to implement energy-efficient designs. Thus, there is a need to work closely with professionals to aid them in developing energy-efficient skills and practical knowledge.

In developing these relationships, it is also important to realize that professional services firms, like all trade ally groups, are comprised of individuals; programs typically work with individuals, not firms. As one contact described it:

> "You may have ten people responsible for day-lighting in a firm. You may have only reached one in a company who is using the program in the field. He may be using program incentives as a selling tool to get them bigger commissions and keeping the information from his colleagues. They may or may not disseminate information to the organization."

Working with a single individual in a firm is most typical, and yet, all of the other members of the firm are desirable contacts as well. Process evaluators have found that program information is sometimes lodged with the "green partner" or shunted off to the "green team," who don't really have the attention of the senior partners or the ability to influence many clients. It is, therefore, very important to build relationships with multiple members of a firm in order to spread the program in the market (Sullivan 2009).

Another lesson learned from process evaluations is that once design and engineering professionals believe that the savings are there, they may implement the solutions without doing extensive analyses of each option compared with standard practice:

> "You'd think people like saving money, but it turns out that if they are convinced it is a good idea, they often don't care about the documentation. They don't keep the documentation, they don't care… they don't calculate every rate of return… lots of other things play into the decisions… corporate priorities, marketing position."

Doing measure-specific analyses just adds time and money to the project. So, while documentation may be needed to get program incentives, it is common for documentation to be lacking or difficult for the design team to produce. This situation arises once the design professional believes the solution is a good one and has begun incorporating it.

However, in order for design and engineering professionals to believe that the savings are there, they need to have access to technical information from a trusted source that indicates that the efficiency measures are known to work in buildings like theirs, and are known to cost about $X to implement and to save about $Y in energy and other cost reductions. In our work, we have repeatedly heard design and engineering professionals say, "We need the numbers!"

7.3 Manufacturers, Retailers and Distributors

Programs that target retailers, distributors, and manufacturers have been termed "upstream" programs because they work with the product delivery chain upstream from the consumer, such as by providing an incentive to manufacturers thus translating into a discounted product at the retailer. This type of approach has come to dominate efforts with residential customers and, increasingly, with small businesses.[6]

An upstream approach has several benefits. The total incentive cost can be less, as it is leveraged in the upstream role. Gaining attention of manufacturers and retailers minimizes the transaction costs for the program as there are fewer people to deal with and less people to persuade to support the energy-efficient product; manufacturers and retailers can use their own marketing capital to further sales.

The primary disadvantage of an upstream approach is the difficulty in conducting measurement and verification. Targeting upstream market actors instead of consumers means that the product usually cannot be tracked to an electric billing meter, making it difficult to confirm whether savings have occurred.

---

[6] The most common example has been for manufacturers of CFLs to be offered an incentive for providing lower-priced products to retailers. This translates into a lower-cost product for the consumer without using a rebate coupon that the consumer and retailer need to process, and actually turns out to lower the retail price more than a rebate coupon would.

In the mid-1980s, one of us was conducting research for the California Energy Commission (CEC) to obtain manufacturers' appliance-sales data for California. One of the biggest surprises of that project was that, although California represented 10% of the market for appliances in the United States, it was still not large enough to have a significant influence on the products that manufacturers produced. Manufacturers were ensuring that the products they distributed in California complied with California requirements, but those who did not have products that met the California requirements satisfied themselves with selling to the rest of the country. So, California requirements could be ignored.

The manufacturers commented that only when more states joined together would it be sufficient to influence their actions. The Consortium for Energy Efficiency (CEE) and the ENERGY STAR® labeling efforts of the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA) have had a significant impact in this regard. A study by Shel Feldman Management Consulting (2001) documented how some of this joint effort came about. In looking at the effect of the energy efficiency industry on the development of resource-efficient clothes washers, Feldman et al. reported how multiple utilities formed a partnership with manufacturers to do studies demonstrating how working together could create an energy-efficient product acceptable to the market.

Manufacturers – and the distributor and retail vendors who market their products – are a key component of a successful effort to change the use of energy. Process evaluations have sought to understand what is necessary to influence the vendors. Some products are sold seasonally. These products are ordered about one year before the selling season, are marketed by vendors during the season, and, once sold, are not available until the next year. Knowing the ordering cycle, and then timing program and promotional activities to those ordering cycles, is key to making a difference. Room air conditioners are ordered at the end of one summer for sale at the beginning of the next, and weatherization materials are typically sold in the early fall as temperatures start to dip, not in the summer when consumers are doing their home improvement projects. Water heaters are typically bought year-round by consumers in a rush, because the existing one is leaking or has totally failed.

Training retailers about products is useful when the retailers actually interact with purchasers. Training, however, is not a one-time thing. Retailers tend to have substantial staff turnover. Repeated visits using "circuit-riders" – who visit retailers to monitor the stocking practices and provide promotional materials, as well as training – can have a substantial effect on product performance. Such a practice mirrors that of other products and, thus, is both understood by retailers and respected.

One of the contacts noted that construction and building trade allies tend to either want to be the low-cost provider or the high-quality provider, and it is important to understand the product market where the high-quality providers are strongest. She noted:

> "It is easier to work with people who want to be known for a good job. For heating and cooling systems, the savings come from quality installation. Low-cost providers do not want to do the follow-up necessary to make sure things are running well. Installations on apartments, where the owner is not paying utility bills, this is a low-cost market. People need to understand the layout of each industry. Engaging allies through distributors is where program implementers have a natural relationship."

7.4 Industrial Process Engineering and Suppliers

A key lesson learned from process evaluations and program implementers is that industrial market actors differ from those that service residential and commercial buildings. While it is often true that the architects and engineers who work on commercial buildings are different from those that work on residential structures, the architect and engineers who work on industrial facilities are not only different firms and people, but they are organized differently.

Firms serving the industrial sector are highly specialized, typically working in one or two industries, but not others. The process equipment suppliers are also highly specialized, and they are not suppliers of motors or air compressor equipment. Furthermore, firms that specialize in process equipment for the pulp and paper industry, the chemical industry, and many others, are global providers; they are rarely local or even national firms. This organization reflects the fact that most industrial firms operate in a global economy, and many of the industrial firms in a particular state or utility service territory are just branches of a global corporation.

As noted previously, successfully reaching market actors typically necessitates understanding market relationships. This understanding is even more important when trying to reach industrial market actors. With company headquarters often located outside the program administrator's jurisdiction, and process equipment suppliers and consulting engineers similarly scattered throughout the world, it is very challenging to develop a message that reaches industrial customers and induces them to pursue measures beyond lighting, air compressors, and motors.

An idea discussed above regarding the design of buildings and building systems is also true for developers of equipment for a factory. In a study of the microelectronics industry (Peters et al. 2001), the authors found that if the specifications for the equipment to be designed include a requirement to meet some energy-usage threshold, then the engineers will meet the requirement; if a threshold is not required, then the engineer will not consider the issue.

Service providers of all types must respond to the client's specifications and requirements. When energy usage is included as a parameter, the service provider will address that requirement along with other specifications. In considering climate change, the same issue is likely to emerge – if the specific greenhouse gas output is specified as a requirement, then it will be addressed; but if it is not mentioned, it will be ignored.

An area that is the major focus currently for intervention in industry is continuous process improvement. There are standards, such as the International Organization for Standardization's (ISO) 9000/14000 standards for quality and the environment, and the American National Standards Institute (ANSI) Management System for Energy (MSE) 2000, as well as the Plant Energy-Efficiency Certification Program (Plant E^2 Certification), which complies with MSE 2000. The evolving development of standards points to another role for market actors that is very important in the industrial sector and one that is anticipated to have a substantial effect on energy efficiency of industrial facilities.

8. Lessons in Reaching Customers

As noted in Appendix D the term *customer* refers to the person or persons who pay the energy bill, while *end-user* refers to the person who uses the electricity or natural gas supplied to the building. The distinction is important within the energy industry, but it is doubly important to consider both the end-user, as well as the customer, for facilitate program design and implementation. As Tom Peters and Bob Waterman (1982) suggested, being close to the customer is important to business success. Process evaluators find that what customers consider important or unimportant about a program, and about their experience with it, are among the most important information learned in a process evaluation.

Communication is important for programs to be effective, and it must occur in both directions between the program implementer and the customer. Process evaluations provide feedback to the program from customers. Customers often want to tell their story. Business and industrial customers have concluded interviews with us by saying, "I did not realize I had so much to say," or, "It was really good to have someone to tell all of that to."

Program participants frequently appreciate the opportunity to provide feedback. One of the contacts talked of a residential new construction program where, through talking with builders, the evaluators learned:

> "Customers were not being marketed to in order that they would understand the extra cost was worth it. They were not brought into the loop to create the demand necessary to make it easy for the contractors to sell the program."

Without that feedback, the program would have continued to observe low home purchase rates, and contractors would have become disenchanted and likely left the program. The contact noted that that problem was probably the result of limited implementation resources, rather than the lack of intention to do marketing. As a result of the evaluator providing feedback about the customers, the program identified another low-cost source for marketing – realtors.

Nonparticipants were also interested in communication. In an example cited by one contact, nonparticipants expressed considerable interest in the program when it was described to them, but they had been unaware of it. This example of a communication shortfall also points to a key lesson – nonparticipants are often only *temporarily* nonparticipants. With more awareness and outreach, nonparticipants may become quite interested in participating.

For evaluations to be effective tools for program change, program staff need to believe what they hear from the market, whether or not they think the customers' perceptions are warranted. As one contact put it, "Perception is reality." It does not matter whether a program manager or an advertising contractor for the program thinks they have been clear, the customers' perceptions are the reality. When a customer says a payment was late, even if the payment was within the schedule the utility promised or it met the utility commission guidelines, the customer still considers the payment to have been late.

In studies of service quality (Rust & Oliver 1994), understanding a customer's expectations and satisfying customers beyond their expectations are keys to success. Merely because the advertising firm thinks the ad is persuasive and clear does not make it so. That is why focus groups and market tests are so important. If the focus group or market test suggest a message is persuasive and clear, it is more likely that it will be clear to the market.

The fundamental finding about customers of all types over the past 30 years is that customers are not interested in energy efficiency – they are interested in being cooler or warmer, having better light quality, or having a high quality of power so their equipment perform at optimal levels. They aren't interested in *measures*[7] – they want a motor to run their equipment or an air conditioner to cool their building.

The language of programs often reflects the planning and engineering process that was used to decide which products and services would meet a cost-benefit requirement. One of the contacts put it this way:

> "What sells efficient clothes washers, for example, is that they are better for clothes, save water, can be stacked. Think from the customer's point-of-view."

The following sections present some of the lessons learned from different customer types.

8.1 Residential

Energy-efficiency efforts targeted to residential customers dominated the industry in the 1970s and 1980s, while in the 1990s and recently, business and industry have been the largest budget item for most program administrators.[8] Despite the years of experience, there remain many challenges in the residential sector. The savings on a house-by-house basis tend to be fairly small, and because each household makes its decisions independently of other households, the transaction costs are quite high – both to induce the household to invest in efficiency and to deliver services to households at the time they are ready for services.

It is clear there remains a substantial energy savings potential in the residential market. But the higher transaction costs have led to a focus on finding the residential consumers' market activities that could be most easily and cost effectively influenced: purchases of appliances or a new home; energy-efficient mortgages for a new or existing home; linking interventions with decision-points, such as when households choose to remodel their homes; and the use of codes and standards to ensure that homes and appliances in the market are efficient at these points. Process evaluation findings led to recognizing most of these intervention points.

---

[7] Measure is the term used by energy efficiency program designers to describe the specific technology to be provided by a program such as a window, insulation, motor, lighting fixture, or lamp.

[8] See CEE (2008) for the most recent analysis of energy efficiency program spending.

An important finding from several evaluations in the early 1990s is that consumers believe the products in the market are already energy-efficient as a result of government requirements. This finding suggested a focus on decision events in the marketplace. If consumers believe the house or refrigerator they are considering purchasing is already energy-efficient, then it becomes necessary to try to persuade them at the point-of-sale that there are other, more energy-efficient options that could be purchased. This research has influenced the development of the ENERGY STAR® label and the expansion of the label to more and more products, including those for business.

Consumer survey responses suggest that the majority of consumers would like to purchase energy-efficient products. There are barriers due to the difficulty in knowing what *energy-efficient* is, and in a willingness to pay additional first costs because the operational benefits are difficult to estimate or hard to believe. There are also issues with the technologies, such as whether a CFL will provide truly comparable light as an incandescent bulb, or how much will really be saved when purchasing a more efficient (e.g., 14-SEER) air conditioner compared to a less efficient (e.g., 13-SEER) air conditioner. However, one only needs to look at the most all-encompassing energy-efficiency effort ever implemented in the United States – the Hood River Conservation Project, conducted between 1983 and 1985 – to recognize the appeal of energy efficiency to consumers. When the citizens of Hood River, Oregon, were offered full weatherization of their homes, at nearly no cost, fully 91% of the households participated.[9]

A key reason for the success of the Hood River project was not mass marketing, but rather effective grassroots marketing. Local organizations, churches, civic organizations, and schools were contacted, and their members informed of the program service. These local people then told their friends and neighbors about the program. This effort points to how a community-based focus can be effective. One process evaluator noted that community involvement also tends to maintain satisfaction with a program. Community organizations working with the market providers can "translate" the message before it gets to the customer. An evaluator who also works with program implementation noted that the involvement of community organizations also introduces uncertainty and risk, making it all the more important that the program be simple:

> "Simpler is better. Be careful that your message doesn't get convoluted out there."

Some of the programs that have recently emerged as good examples of community-based efforts include: the Porchlight Project, Positive Energy, and Interfaith Power and Light.[10] Unlike the vast majority of programs offered from 1980 to 2000, these programs were not created by the utilities or government agencies. They are emerging from communities and/or an understanding of social relationships: in the case of the Porchlight Project, from a university project seeking to

---

[9] Many reports have been written on the Hood River Project. A key website for an introduction is the Bonneville Power Administration website. Bonneville co-sponsored the project along with PacifiCorp. See: *http://www.bpa.gov/Energy/N/Reports/Results_Center/ProfileInfo.cfm?ID=12*.

[10] See the Behavior, Energy and Climate Change Conference website for presentations by and about these various projects for 2008: *http://piee.stanford.edu/cgi-bin/htm/Behavior/2008_becc_conference_online_program.php* and for 2007: *http://piee.stanford.edu/cgi-bin/htm/Behavior/2007_becc_conference.php?ref=nav4.*

test a concept; in the case of Interfaith Power and Light, from a grassroots organizing effort in faith communities; and in the case of Positive Energy, from a for-profit business seeking to implement a program using principles of social psychology. Process evaluations of these programs (still to come) will shed light on whether these approaches have learned lessons of implementation.

Fundamentally, the key lesson from the process evaluations of programs targeted to residential consumers is that programs need to be simple and need to be available at those times when customers are ready to invest in a product or a service. At those points in time, customers can make the energy-efficient choice if it is easy for them to do and the additional costs are reduced through incentives to make the decision less difficult.

8.2 Commercial

There is an enormous technical potential for energy-efficiency improvements in business and industry – especially industry, as discussed in the next section. And much of the technical potential is also sound economically, with less than two-year paybacks for many energy efficiency measures. However, many investments in energy efficiency are yet to be made, and energy efficiency programs sometimes lack for participants. What is the problem?

One of the reasons is that the internal focus of these customers is on the business and not on energy, or even saving money with energy. Process evaluators have found that, typically, no one in a business knows much about energy. Energy costs are usually less than 5% of the total cost of doing business and often are less than 2%. In some industrial firms, energy costs can approach 20%, but most commercial and industrial businesses are concerned about labor costs, business cycles, wholesale and raw materials costs and sourcing, and dealing with health, safety, and other regulations.

Energy costs almost never make it onto the agenda of a budget meeting; energy costs tend to be treated as a fixed cost. Because of this perception, commercial customers have difficulty in seeing the value in saving 10%, or even 20%, of a line item that is 2% to 5% of costs – essentially savings of less than 1% of total costs. Yet, for those businesses where the profit margin is less than 5%, these savings can be appealing if explained to them in relation to their effect on profits. It is also important to help customers see energy as a *percent of variable costs*, rather than a *percent of total costs*. Process evaluators have pointed out that shaping the message so it is consistent with the business financial model of the specific business is effective.

It is commonly believed that businesses take a more rational economic approach to decision-making. However, as one of our contacts noted:

> "Businesses want a higher rate of return or shorter payback period than programs expect; first cost is a big issue. Different kinds of businesses have different issues. Even bigger businesses have split incentives in their internal operations – e.g., between operating and capital budgets."

As discussed previously, a split incentive occurs whenever the investor in a project does not receive the benefit from reduced costs of operating the equipment. This situation is not limited to landlord/tenant relationships; for example, it can occur within large organizations, where the

operating budgets and capital budgets are treated separately. In such cases, the group budgeting for the efficient equipment purchase will not benefit from the savings that accrue to the operating budget. Even operations departments may not benefit from reductions in operating costs, as management may reduce their budgets commensurately.

Businesses often claim certain payback periods as their benchmark for project viability. As one contact described:

> "In a study of chain accounts – restaurants, banks, hotels – we found that everybody, even the banks, were operating on simple payback. No one was using net present value. Surprising, but true."

Yet, many program evaluations find payback periods to be much longer than the asserted benchmarks, indicating non-financial benefits were part of project decisions. Conversely, customers were found not to do projects that were within their payback parameters, because other projects were deemed more important or because the strictly economic basis was insufficient. Thus, non-energy costs and benefits are critical criteria for decisions about investments involving energy efficiency.

This situation of split incentives, the disconnection between stated benchmarks and actual investment behavior, and the need to state financial benefit in the terms of the business (such as its profit margin) is one of the reasons for increased interest in developing business cases and value propositions for energy efficiency for specific business types. In Peters et al. (2008), the authors describe how the BetterBricks program develops a business case and clear statement of a value proposition to persuade different market segments of the benefit of energy efficiency to their bottom line, rather than to their operating budget. This approach has evolved because many program implementation lessons learned suggest that changing business practices – which all focus on the bottom line – is key to changing investment decision-making in commercial businesses.

Because businesses need to operate a business and have little tolerance for the distraction of participating in energy efficiency programs, as one contact put it:

> "Commercial [energy efficiency] programs that are designed and run poorly are basically customer alienation devices – [they] can turn customers off and reduce satisfaction."

While the same can be said of residential programs, it is especially true of commercial programs. And a key issue, as stated previously, is simplicity (or lack thereof!).

Because commercial projects are more expensive than residential projects, there is a greater need for a variety of information. There may be a need for tax information, account release, information on the hours of operation of different applications, or for agreement to monitoring and verification:

> "[The business may have to] provide information it considers proprietary. Confidentiality issues are more of a problem with businesses than residential customers. I have heard of companies not participating because they didn't want to have a credit check done."

All of this requires attention on the part of the business owner and can put a limit on their willingness to participate.

Business cycles affect the firms' ability to invest in energy efficiency – but not necessarily as expected. There are boom times and slow times for every business, and there are patterns in how businesses are affected by the business cycle. If homebuilding drops, this affects the suppliers of materials used in building homes: lumber, plumbing and electrical supplies, paint, drywall, etc. Some businesses are more insulated from business cycles because they serve multiple industries; others are hugely affected.

Conducting evaluations for over 25 years, each of us has noticed that some businesses (especially those that expect to be around for the next boom) are more easily able to participate in programs during slow economic periods because their permanent staff is more available to deal with the paperwork and other issues of project implementation. On the other hand, there are businesses that operate on slim margins and make no investments during slow periods, because they judge the risk to be too great. Typically, business cycles will affect which firms participate in programs, much as higher education sees enrollment increase during down business cycles. It is important for programs to continue to reach out to customers during both down and up cycles.

Beyond the business cycle, there are annual cycles that programs need to consider for businesses. Many businesses have annual cycles that affect their ability to participate. Many retailers depend on the period from Halloween to New Years for their major sales and will not be able to do any projects during that time period. Other businesses, especially some industries, have an annual plant shutdown, and they like to schedule all projects to occur during that time period. Programs that are effective learn how each business is organized and the pace of their annual cycles, and then work the cycles into program implementation process and budgets.

The effect of these business and annual cycles on programs are, first, that program administrators, policymakers, and regulators need to respect them and recognize that businesses need to take the time to respond to program offerings. Typically, few businesses can respond in the annual program cycle. Second, it is important that program names and rules be as stable and consistent as possible. Businesses will plan to participate in programs if they know the programs will be there in the future; but if programs are unstable, businesses will learn to ignore them. Third, the long-term effects of programs on business decision-making are likely substantial, but they are likely difficult to trace within an annual program cycle.

Communicating with businesses about energy efficiency is difficult; there is no generic message that appeals to all business people. One of our contacts noted:

> "Mass marketing works to build awareness, but doesn't do much to affect behavior change, except in a crisis period. The business world is relationship-based. Understanding relationships and building on them, not just providing information, will build successful results."

Process evaluators often ask people in business the names of publications that they read and how they get information about their business; in addition to some of the larger national business publications, the answer is usually one or more trade publications specific to the industry, sometimes even specific to their region of the country. They may read the general business press, but it is examples of success in their trade industry publications that make the difference in whether they believe an idea is relevant to their needs or not.

The challenge of this response is that placing communication pieces in every trade publication that might be read by local businesses is pretty difficult due to the cost. However, what these comments also are pointing to is the need for case studies of projects for each and every industry and business type in a market. For commercial businesses in the Pacific Northwest, BetterBricks is working to do this in a less-costly manner by using the *betterbricks.com* website as a vehicle for displaying case studies.[11] Having found through process evaluation (Dethman et al. 2001) that designers were using the *betterbricks.com* website as a tool in their discussions with clients, BetterBricks is using case studies from around the country in order to expand the types of businesses that they have represented on the website and provide sufficient examples to appeal to the target markets that they are addressing. Our research has consistently found that businesses are more influenced by a success story from a similar firm located in another part of the country (and, therefore, participating in a different efficiency program) than by the story of a firm in a different business nearby, participating in the same program.

Finally, it is important to note that institutions such as hospitals, municipal governments, and schools require energy efficiency solutions similar to most commercial sector buildings; however, the nature of the decision-making process within these institutions is very different than within for-profit businesses. The decision-making time is very long, political priorities can change the focus, funding is often driven by political processes (such as bond approvals), and contracting requirements can limit these entities ability to contract for services. Several of the evaluators that we spoke with mentioned the value of working with other organizations, such as trade associations – for example, the Building Owners and Managers Association (BOMA).[12] For institutional customers, working with industry associations is important – such as school associations, hospitals associations, and waste and water utility associations. In accessing these associations, it may be possible to not only gain access to decision-makers in the targeted customer group, but also gain opportunities to develop case studies and access to the trade publications.

8.3 Industrial

More than in the other sectors, industrial energy efficiency requires program administrators to have direct contact with potential participants – with both the customer and the end-user. Each industrial facility has unique process requirements that require specific solutions. Lighting, motors, and compressed air solutions can be generally developed for most industrial facilities, and these measures have been a target for many industrial efficiency efforts to date.

Improving the energy efficiency of industrial processes requires a different type of program strategy, as pointed out in McRae et al. (2005):

---

[11] The website address is: *http://www.betterbricks.com*.

[12] BOMA is the largest trade organization for owners and managers of commercial buildings. See: *http://www.boma.org/*.

> "Process efficiency projects, in contrast to those for equipment replacement alone, imply larger energy savings and typically have lower per-unit energy-acquisition costs. These projects often have relatively greater non-energy benefits as well. For example, projects may reduce facility down-time and substandard output, or improve labor utilization. And process improvement projects can set the stage for the transformation and revitalization of aging, unprofitable facilities that may have otherwise faced closure. Thus, the program is capable of serving as an economic development tool."

Process evaluations have found that success with industrial firms requires not only one-on-one relationships, but that the relationships are conducted by people whose knowledge and skills are commensurate with those of the firms' staff. As Skumatz et al. (2001) point out:

> "High quality, experienced auditors are especially important for credibility with valued non-residential customers. Cross-training across utilities (for example, teaching electricity auditors about water conservation measures), and some specialization in business types can help improve skills and manage costs."

In a series of process evaluations of industrial programs conducted in the early 1990s, Seratt et al. (1994) found that contacts for projects that failed to reach completion were almost exclusively in engineering, maintenance, or facilities. In contrast, for those projects that went on to completion, contacts were more evenly distributed among both those areas and middle and upper management. The research led to the following topology of decision-making roles in industrial firms (Seratt et al. 1994):

> "Upper management is more actively involved in large capital purchases. Small capital purchases require only their approval. Financial considerations are expressed in terms of payback ranges.
>
> Middle management has the authority to make decisions on small capital purchases and to provide input on large capital purchases. However, the decisions are based more from a production-level rather than financial basis.
>
> There is less active involvement in the decision-making process at the engineering level. Instead, engineers assemble information and documentation needed by upper management to make decisions. Engineering contacts report the lowest level of knowledge concerning internal hurdle rates.
>
> Maintenance and facilities contacts represent a wide range and variety of involvements and responsibilities. They viewed the decision-making process as informal and largely executed at the middle or upper management levels."

Evaluations over the intervening years have concurred with this typology and have demonstrated that it is not only important to have an internal champion who supports the project, but that it is also important to reach senior management and obtain their commitment to projects. As Nicol and Schepp (2005) report:

> "Findings in this and other industrial market research have indicated that the most critical barriers to industrial energy efficiency are the lack of motivation and commitment of CEO's, the limited time available for staff, the inability to identify all good opportunities (lack of expertise), and the inability to affect process energy use."

Solutions to these barriers begin by having knowledgeable and skilled consulting process engineers involved in program delivery and using those skilled process engineers to complete the administrative requirements for the program: the technical analysis and the applications for incentives. Industrial facility staff need to be able to focus on their product process and

throughput, rather than the details of program participation. They need to be able to focus on getting the project implemented, as many industrial projects are done by facility staff rather than by contracted labor. As McRae et al. (2005) report:

> "[A program strength occurs when the program] uses 'established market actors'… the engineering consulting firms and vendors that have served the industrial firms prior to the creation of the program, and potentially will continue to offer their products and services long after [the program] is terminated."

Another key issue for industrial firms is their planning cycle. One contact noted how energy efficiency programs need to extend beyond annual cycles to be responsive to the industrial business cycles:

> "Most industrial entities plan major equipment purchases a year or two out. [In an annual program] many customers did not participate, not because they weren't interested, but because they had already made their major equipment purchases. The utility had talked to facilities engineers, who had been interested, but the financial person was not familiar with the technology. The process evaluation explained why the program staff didn't get the results they wanted. The utility had to revise its projections based on its new understanding of the business cycle, and eventually reached the revised projections."

9. Improving Process Evaluation

One of the contacts commented that it was very important that evaluators and program implementers recognize that process evaluation is an "assessment of the program as designed, intended, and stated in the goals and objectives." Process evaluation is not solely an exploration of whatever issues or concerns are occurring to the program staff; it has a specific intent. Process evaluations are appropriate in nearly any situation where the program management wishes to learn how to improve a program, to make sure the program is being implemented as intended by all implementers.

While process evaluations may be appropriate for virtually all programs, the adage "one size does *not* fit all" applies. Conducting a process evaluation for a program in China required sensitivity to the culture of program implementers (including cultural styles of learning and self-assessment), as well as the culture of the Western program funders (Peters et al. 2005). The previous chapter offered distinctions among residential, commercial, and industrial customers from a programmatic perspective; from an evaluator's perspective, cultural competence is needed for these different customer groups and for segments within these groups, such as limited-income residential customers. A market transformation program may have a different cultural basis than a resource acquisition program, and programs operated in Wisconsin are unlikely to have the same regulatory culture as those in California.

Improving process evaluation begins with the process evaluator improving his or her cultural competence relative to the program, about the organization operating the program, about the target market for the program, and about the regulatory and legislative environment in which the program operates. Such cultural competence will enable the evaluator to be sensitive to the issues, be thoughtful about the recommendations, and be considerate of the market. At the same time, the methods to be used and the challenges faced will be those of conducting research that is fair, objective, and meets the cultural needs.

This chapter discusses opportunities to improve process evaluation. The topics include methods, gaining the implementers attention, and challenges and opportunities for process evaluation.

9.1 Methods

The primary methods used for process evaluation are surveys and in-depth interviews. The result of using these two methods is a combination of qualitative and quantitative data that must be analyzed and interpreted in order to create an understanding of the program experience from multiple points-of-view. There are also a variety of other data collection techniques and a variety of ways of handling these types of data.

9.1.1 Surveys

Survey research is a core methodological element for evaluating energy efficiency programs. Most process evaluators use surveys as a component of their investigations. Surveys of

participants, partial participants (those who have had contact with the program, but exited the program without completing a project), and nonparticipants (those who when screened are found to qualify, but have not had contact with the program) are key tools for assessing how the program is operating in the field.

Several contacts, however, noted that surveys can comprise too much of the evaluation efforts. As one contact put it:

> "We rely too much on surveys. We need to do more open-ended interviews and process analysis. Not enough attention is paid to existing records and data. If survey data could be joined with other data sources, it might be more powerful."

Clearly, surveys are not used as well as they might be. Process evaluators typically use surveys to assess program satisfaction and to understand the experience of the program during a specific time period. This is a fairly narrow focus and tends to narrow the scope of the investigation, often to the determinant of the evaluation. The challenge for the analyst is to identify what is really important among the responses on satisfaction and program processes. As one contact noted:

> "There will always be people who will be dissatisfied, no matter how good a program is, and there will always be people who will be satisfied, no matter how bad it is. It's the evaluator's responsibility to be able to frame those findings in a way that makes them visible but puts them in context. Some evaluators consider these 'major findings', but they're not important in terms of program improvement and efficiency."

Process evaluators need to look for more than just satisfaction or dissatisfaction when they develop survey questions. As contacts pointed out, satisfaction with programs is typically quite high:

> "The cooperation rate for participants completing satisfaction surveys is high when people are happy with the program. If the program realizes savings, comfort levels, etc., the program will get positive results from participants."

> "When you ask satisfaction questions, it is not always clear what the underlying reasons are for the reported satisfaction. [Exploring this is] hard because we are providing a service that is invisible to people in their daily lives. Questions need to be higher level, less specific."

Hall et al. (2005a) reviewed the process evaluations for the 2002-2003 California program cycle. They found that the satisfaction questions tended to be poor, while in-depth questions on operations were better. They recommended that satisfaction questions be focused on program improvement recommendations and be designed to enable comparisons across programs. Satisfaction questions certainly should be asked, but program features and program operations should be primary areas of exploration for a survey.

An approach that can be more effective than asking about satisfaction is to examine service quality (Rust & Oliver 1994). Service quality is an approach that questions whether the program experience met or exceeded expectations and examines the value obtained from the program. Questions can also identify what expectations were held by participants, thus revealing opportunities for improvement and enhancement to the program.

Another concern with surveys and in-depth questions raised by one contact was the potential for bias and a threat to validity when process evaluations rely too greatly on participant and partial participant points-of-view. Unless nonparticipants are sampled as well, there is an unrealistic perception of the market reaction to the program. At a minimum, process evaluations should be clear as to what are the biases in the results, rather than assume that the participants and partial participants represent the market.

The use of surveys primarily to gauge response in a program year is important, but this approach misses an important opportunity to use surveys to assess program progress over time. As Barata and Anderson (2008) point out, the evaluation of social marketing programs requires repeated survey research over time to assess whether the campaign has affected anyone. However, there are few examples of this type of approach.

Repeated surveying can also be used advantageously with any energy efficiency program. The key step that needs to be taken, as Barata and Anderson note, is that the evaluator needs to establish a benchmark early on, possibly before program implementation begins:

> "A benchmark survey should be a fundamental component… providing key insights into how to change beliefs, judgments, and ultimately behavior."

The benefit of a benchmark would be both to provide a basis for assessing change and for gaining insights into how to improve the program at the outset of the implementation period.

Conducting systematic survey research at the outset of energy efficiency programs, especially if they are social marketing programs, will likely improve the ability of process evaluations to draw conclusions about the effects of the program on customers and market actors, and could improve the ability of evaluators to assess such difficult issues as free-ridership and spillover, and to understand customer decision-making more thoroughly.

9.1.2 In-Depth Interviews

In-depth interviews are the other core methodological component of process evaluations. When done well, in-depth interviews are very effective; when poorly done, they can be "little more than gossip," as one contact put it. Bensch and Pigg's (2002) review of process evaluations and market research found that:

> "[Well designed] in-depth interviews – by themselves or in conjunction with other qualitative data… provide a window to the decision-making process and the world of the market actors that energy-efficiency programs have been trying to influence – particularly when [the interviews] address the perspectives of multiple market actors in the context of a specific product or service."

In-depth interviews require interview guides in order to be effective. Nicol and Shepp (2005) noted how they failed to have a detailed guide and tried to complete the interviews in a short time, missing many opportunities to get more detailed information. The guides need to be structured and, as one of the contacts pointed out, they need to be developed "in conjunction with program procedures and data" in order to get a more complete picture of the program.

Nicol and Shepp (2005) also noted that they should have allocated at least 30 minutes for the interviews. In-depth interviews often take an hour or more. While everyone is very busy, there is a need to take the time to find out what has really happened in a program.

In addition to allocating sufficient time and having a structured interview guide, it is also optimal to have more than one person involved in conducting the interview (Peters et al. 2005). When two people conduct interviews, one researcher can focus on the respondent while the other takes notes and manages the audio recorder. After the interview, the two can discuss the interview, identify opportunities to improve future interviews, and begin to generate hypotheses for further investigation during forthcoming interviews and in the analysis process. While these steps can and should be conducted by the individual interviewer working alone, two interviewers tend to improve the reflection and analysis process; however, the costs will be higher.

Process evaluations with in-depth interviews are expected to tell program managers both where they are succeeding and where they are still not succeeding. The latter information can sometimes be difficult for program managers to hear. One of the contacts who had been in the field for over 20 years noted:

> "The broad lesson I came across early is that process evaluation tends to be failure analysis. It looks at differences in how people perceived specific aspects of a program and tries to understand what aspects of the process make people unhappy."

When this is done, the process evaluator is likely to find opportunities for program improvement. Yet, program managers, and the stakeholders and regulators who oversee the programs, tend to take assessments of problems or failures as if the program received a grade of "D". Process evaluators believe that failure analysis is important, and they would rather have managers and other stakeholders focus on the opportunity the evaluation provides for the program to get an "A" once the issues are addressed.

It is in the examination of problems that evaluations uncover missed or new opportunities. Doing in-depth interviews is a primary tool for getting deeply into the program experience.

9.1.3 Focus Groups

Focus groups (in which the evaluator moderates a discussion with a group of contacts that focuses on a specific or narrow aspect of the program) are not used as frequently as surveys or in-depth interviews, but they are useful for data collection on program features. As one contact noted:

> "Focus groups with participants, nonparticipants, and trade allies have all shed light on aspects of a program. Focus groups are valuable in identifying marketing improvements and program processes. Focus groups can help you determine which application form is helpful and what TV ads work."

Focus groups risk being overused. They are perceived as being inexpensive, since one can talk to ten to twelve people in a 2-hour period, instead of over 10 or 12 hours, as would be required for in-depth interviews. It is this ability to get several people to respond at one time that makes focus groups good for focusing on program features, but not very good as replacements for systematic

survey research (since too few people can be included to generalize to the population) or in-depth interviews (since there is so little time with each respondent).

The key to when to use focus groups is to make sure that they are used to center on program features, such as marketing messages, team processes with account representatives, or what it is about a form or a program participation letter that does and does not work. They can also be effective when used to gain insights into what to center on in a survey, or at the end of a project to gain insights into why respondents provided certain findings, or to obtain reactions to conclusions or findings. When focused on a narrow topic such as those noted, they can be very effective tools to augment and enhance other data collection efforts.

9.1.4 Other Methods

This next section addresses some of the other methods that can be used for process evaluations. As more than one contact put it:

> "We need to rely on information other than surveys… look for ways to verify what they are saying."

There is a variety of additional data collection methods, as well as analytical methods that can be applied and have been applied in process and market evaluations.

Onsite Data Collection

Collecting data onsite, rather than by phone, mail, or the Internet, "increases insight" as one contact put it. Onsite data collection takes a variety of forms. Care must be taken when conducting onsite investigations to draw samples appropriately and to draw conclusions consistent with the data, but these approaches should be used whenever possible.

The first type of onsite data collection is based on the premise that in-depth interviews are best when done in-person, at the business location of the person being interviewed. This sometimes is beyond the resources available for the evaluation, but it clearly is optimum. Contacts spend more time with the interviewer and, because they are on their "home turf," they feel more comfortable and more willing to discuss their point-of-view. Other information (e.g., reports, memos, filings) may be easily obtained at the time of the visit.

Onsite data collection can also include investigations of installations and engineering process evaluations as described by Kallock (2005). These efforts enable the evaluation to observe early in the program history how installation and procedures are being implemented in the field at a sample of sites.

A third approach to onsite data collection is to conduct "ride-alongs" with the implementation, sales/circuit rider, or energy assessment teams. This provides an opportunity to see what is really happening in the customer interaction; there is no better way to assess procedures than to ride along with the crews, unless one could become the "fly of the wall" to observe.

The fourth type of onsite is what is called in market research "mystery shopping." In this approach, the researchers send professional shoppers into stores to shop for products or to make calls for services. It is a well known way to understand what the customer experience might be like.

Verify Market Information

We found several examples of how to verify market information. Two contacts discussed how they had used Geographic Information Systems (GIS) data to locate participants in the utility service territory. One contact analyzed GIS data for a low-income program, which enabled the program to target census tracts with door-to-door appeals. Another contact examined participants in California programs to determine if there were geographic areas with high and low participation rates. As an example, Wirtshafter and Sammiullah (2005) noted:

> "The study did find that some areas in the state received no PGC [Public Goods Charge[13]] funded rebates from any program in 2002 and 2003."

Another example of market information verification was a market simulation of market conditions by Peters and Tannenbaum (1997):

> "The project randomly assigned survey respondents to receive marketing materials from one of the five potential delivery agents and included descriptions of the selected delivery agents' role in the program. This provided the framework for testing reactions to the program concept, as well as the different delivery agent."

Focus groups were mentioned especially as a way to test-market information. Conducting a focus group for a program called the *Water Heater Control Program*; the evaluators found customers did not like the name. After the focus group, the program staff changed the name to *Water Heater Cycling Program* and participation increased; the idea of "control" was too "big-brother" for some customers.

Data Collection and Theoretical Approaches

The following approaches demonstrate how a different analytical or theoretical approach can result in unexpected or newly revealing findings and how process evaluators, by taking a different strategy from that typically used, may provide new insights to program effectiveness.

Real Time Data Collection – Real time data collection and analysis is the Holy Grail for process and market evaluation. Data are collected during program implementation, analysis proceeds at staged intervals, and short reports are provided to permit mid-course corrections in

---

[13] A public goods charge (PGC), public purpose charge (PPC), or system benefits charge (SBC) has been used in several states to generate funds for energy efficiency or renewable energy research, development and demonstration, and projects for low-income assistance. The charge is typically a nonbypassable surcharge applied to the energy portion of a utility customer's bill. Specific processes for collecting and distributing the funds are set by either the state legislature or the utility commission.

the program. While there are many examples of this approach, it is still limited, and requires coordination with the program team and the evaluation team at the outset of the program design process to ensure that data collection points are integrated. One of the most readily accessible projects that used this approach was the evaluation of the WashWise program by NEEA. The first three reports were completed at six-month intervals. Subsequent reports were increasingly less frequent as the market transformation continued and NEEA determined less intervention was required.[14]

Social Network Analysis – Social network analysis examines the network of relationships between people who are in communication with each other and measures the strengths and weaknesses within the network. The method initially was used to explore friendship and family networks. With the advent of electronic data and advanced computing capability, one can explore electronic information (emails or Internet traffic) flow whenever the data analyst can obtain email traffic for actors in a program. For example, for the process evaluation of California's 2006-2008 Statewide Marketing and Outreach Program, the authors used social network analysis to assess the communication patterns among the stakeholders and team members based on the email traffic between the various team members.

> "[Social network analysis] provided a more objective assessment of communications beyond the self-reports of how often everyone 'thought' they were communicating with each other" (Opinion Dynamics Corporation 2008).

Concept Maps – Concept mapping is an approach developed by William Trochim (see, for example, Kane & Trochim 2007) to collectively bring groups to a common understanding of a problem or issue. It is essentially a consensus-building tool that uses multi-attribute analysis to find commonalities across statements and ratings made by a group of people regarding a concept or idea. Process evaluators are occasionally asked to work within a program team to sort out the purpose and direction of the program, sometimes this is as simple as developing the theory and logic model. Other times it might be to resolve the future direction for a program.

Lee (2007) used concept mapping to develop a program theory and logic model for a program, something process evaluators often need to do:

> "A program implementers' concept map can be used to reveal their perceptions about assumed linkages between program activities and expected outcomes (essentially the program theory). To test the theory, pattern matching is used to compare designer/ implementer ratings of a program's expected effects on key outcomes, with findings based on data from participants and differences observed between participants and non-participants."

Mental Models – Mental models are a theory-grounded strategy for exploring how and whether change has occurred as a result of program interventions. Respondents (program staff as well as program participants and dropouts) are asked about their views (their mental model) at various times in the intervention process. In the analysis, the evaluator compares the manager and

---

[14] The various reports can be accessed from the NEEA ENERGY STAR® Consumer Products Reports website: *http://www.nwalliance.org/research/evaluationreports.aspx*.

program participants' statements about the program from different points in time to assess whether the program has had any effect on the participants.

The one example of this approach is Wilson et al. (2006). Wilson used mental models to explore the effects of trying to change major commercial developers' approach to the design of projects in a large city:

> "'Mental models' encapsulate the lines of causality and influence on developers' decisions to connect to the district system. Comparison of the mental models over time, as well as between the municipality and developers, allows the importance of key design features to be identified."

Cultural Models – Cultural models are another theory-grounded strategy for exploring program influence. A cultural model perspective suggests that the evaluator understand the cultural context of the program manager and program participants in order to gain greater understanding of how the program is or is not effecting change. The one example of this approach is Janda (1994).

In her paper, Janda recommended that a cultural analysis be taken in analyzing response to a program that focused on professional designers and new commercial construction, largely because designers are trained to a have a very strong culture of practice.

> "[This theory-based framework for the analysis permits one] to address a variety of issues inaccessible to an analysis based on the project literature and technical data, such as experiential knowledge gained with traditional technologies, cognitive representations of buildings as technical and engineering systems, and professional history, tradition, and purpose."

Pilots and Experiments

Before technologies are offered in programs, they can be offered in pilots and experiments. While program tests are infrequent, the limited experience suggests that coupling process and market assessments with any such tests will both improve the ability of the program to meet its ultimate objectives and warn program administrators of problems before program launch.

The Niagara Mohawk experiment described in Section 4.3 (Mast & Ignelzie 1996) demonstrates an option for experimenting and testing concepts. Such a design is rarely put forward by process evaluators, but the notion that a program can be delivered in different ways to different groups of customers in order to test delivery approaches is one that should be not be forgotten.

Process evaluators with engineering skills can be very useful in examining the effectiveness of new ideas and technologies. Gandhi et al. (2007) describes a series of small-scale programs using innovative technologies that were funded through the Southern California Edison (Edison) Company's Innovative Designs for Energy Efficiency Activities (IDEEA) program in 2004 and 2005. The process evaluations for the small-scale programs included interviews with participants that had received the technologies in their facilities. Several of the products were found to be "inappropriate for the application without further development and the selected products did not offer the claimed benefits under all operating conditions." These technologies had already been demonstrated in other locations so were considered to be innovative, not emerging technologies,

and were expected to contribute to Edison's savings goals. With the types of problems identified in the process evaluations, Edison was able to prepare for the impact evaluation.

The High Efficiency Laundry Metering and Market Analysis (THELMA) project was an energy-efficiency venture that seriously sought to address a variety of market and technology issues upfront. Designed to investigate the benefits and costs of energy-efficient clothes washing machines, the project included detailed impact evaluation efforts, along with market and process assessment components. The researchers conducted in-depth interviews with customers to understand their experiences with the energy-efficient washing machines that they were testing, and the manufacturers cooperating in the project were able to use this information to improve the machines. The result was that when the utilities offered rebates to support the purchase of these new washers, by and large, the machines were technological winners (Electric Power Research Institute 1998; Shel Feldman Management Consulting et al. 2001).

The reader can probably think of many more approaches that can be transferred from social science theory and research to be applied in conducting process and market evaluations. The examples given here are not the limit, rather the beginning of possibilities.

9.2 Gaining the Implementers' Attention

Another aspect to improve process evaluations is to ensure that implementers' attention is gained and that they seek more research support in order to improve the efficiency and effectiveness of the programs. Three areas are of particular note: evaluability assessment, theory and logic modeling, and improved recommendations.

9.2.1 Evaluability Assessment

Evaluability assessments have been used in the general evaluation community for many years. An evaluability assessment typically will be conducted at the early stages of program implementation to investigate whether a program is collecting the right data, and whether the goals and objectives are sufficiently defined so that an evaluation can be conducted and draw meaningful conclusions (Bronfman et al. 2008). One of the contacts who had just begun to use evaluability assessments noted:

> "[It is] always in the literature [and] makes a direct connection about how process evaluation could be a useful thing for evaluators and for program managers. Managers get information about how well they are managing the program, including the data collection needs. This effort often discovers new things on the program. [It] helps you scope the evaluation, quickly assess, [and] avoid wasting evaluation resources."

The program managers found this very helpful, as they could ensure that data were going to be collected, so that the later evaluation activities would have what was needed.

9.2.2 Theory and Logic Models

Theory and logic models have become a major component of program evaluation. While theory and logic models in an ideal world should be the province of program managers, many evaluators have found that program managers are uncomfortable and unfamiliar with how to develop them. It often falls to the process evaluation team to develop the program theory and logic models for the program managers to review and comment on. Program theory and logic models are very useful for delineating key issues for the process and market evaluations to explore and, when used in conjunction with evaluability assessments, can alert both program managers and evaluators to important issues.

9.2.3 Recommendations

Vine (2008) points out the importance of using evaluation to improve program implementation. In a process evaluation of the NYSERDA evaluation process, Peters et al. (2007b) found that for recommendations to be received and considered, they needed to be actionable and realistic, something that can be done. As one of the contacts described it:

> "[The evaluator needs to] understand the program implementer's constraints, understand the timing. If evaluation is just a regulatory requirement, it feels more like an audit. If there is lots of motivation to find something out, make sure you can target that – be useful. There is a need to effectively interact with and educate the implementation people about process evaluation. You want to make sure to get them on board, but also make sure everyone knows the 'rules': who the audience is, what the implementer's role is."

Process evaluation can feel like a report card, but if the recommendations are actionable, it is clear who can take the action, and if the action is within the scope of the program manager and their management, then the recommendations will likely be used and useful.

9.3 Opportunities and Challenges

In the introduction, we discussed some of the strengths and weaknesses of process and market evaluation. Bensch and Pigg's (2002) review of 311 evaluation reports noted that many of the reports tended to be repetitive of one another – process evaluations of similar programs across multiple program implementers. Bensch and Pigg also found a lack of depth in understanding decision-making processes.

As Kunkle and Lutzenhiser (1999) point out, there has been a great deal of effort spent on estimating free-riders, spillover, self-selection bias, and net and gross savings. This effort has kept evaluators from looking more deeply into the decision-making and the theoretical assumptions underlying the programs. They exhort the industry to:

> "[See the role of evaluation] in the context of theory that explains how we expect a particular market intervention to be successful. Evaluation must test the assumptions behind the underlying theory for a particular market intervention by determining if the expected market changes occur, identifying the motivating factors for the market actors related to these changes, and incorporating the costs and benefits as seen through the eyes of the market actors."

The opportunities to improve process and market evaluations and use them as the vehicles for testing assumptions about how the market works are the most important avenues of change that we recommend for process and market evaluation. These research efforts should be examining:

- *What is motivating the different market actors?*
- *What are the most effective delivery mechanisms?*
- *How are decisions made in organizations and in households about energy and how do these decision-making processes differ depending on the types of energy efficiency action?*
- *What type of typology can we develop for the different actions that could accelerate adoption and implementation?*

Kunkle and Lutzenhiser (1999) suggested a variety of questions that remain unanswered; process and market evaluations could be addressed to these questions. These topics have also been address by other white papers in this series by the CIEE, in particular Lutzenhiser (2009) and Sullivan (2009).

9.3.1 Arms-Length Evaluation

Process and market evaluation are tools to aid program management and are also oversight mechanisms for stakeholders to understand the inner workings of programs. The degree to which process and market evaluators should be close to program managers or maintain an "arms-length" and "objective" point-of-view is one that is difficult to resolve (see, for example, Vine 2008).

Some of the contacts noted that process and market evaluators need to be "close to the implementers" in order to have any influence on the managers' decisions or to fully understand the program and to gain "context rather than just a point-of-view." Other contacts warned of the "need to be careful," recognizing that when the evaluators get too close to the program implementers, they may fail to make recommendations or even fail to see some of what is occurring in the program. For example, when a program manager provides a list for interviews, is it a complete list of the population or is it a selected sample?

As O'Drain and Peters (1993) describe, there is a process that occurs when evaluators begin the data collection process that leads them to be sympathetic to the program manager (the first point of in-depth contact) and later to other parties to the program. Only through conducting a full assessment of the program from multiple points-of-view is it possible for the evaluator to gain an open and objective point-of-view.

Our perspective is that this is a tension that is actually good for process and market evaluation, if the evaluator takes it seriously. A concern that Hall et al. (2005a) expressed regarding the process evaluations for the California 2002-2003 program cycle was their lack of comprehensive assessments of the programs. If evaluators keep in mind the need to expand their data collection to multiple parties and not focus on just the program staff and participants, then evaluations will

be more likely to be objective. In addition to collecting data from all sources pertinent to the assessment, it is also important to provide an honest assessment – as one contact described, "At a minimum, the draft report should be as honest as possible." Ultimately, the more honest and direct the draft report is, the more likely that the evaluation will be effective.

Supporting these suggestions are the American Evaluation Association's (AEA) *Guiding Principles for Evaluation* that address five major areas: A) Systematic Inquiry, B) Competence, C) Integrity/Honesty, D) Respect for people, and E) Responsibilities for General and Public Welfare (American Evaluation Association 2003). Additional guidance is provided by the Joint Committee on Standards for Educational Evaluation's *Program Evaluation Standards*, which sets standards in four general areas: 1) Utility, 2) Feasibility, 3) Proprietary (legal, ethical and regard for welfare) and 4) Accuracy (Joint Committee on Standards for Educational Evaluation 1994). These principles and standards are important for energy efficiency program evaluators to adopt and practice. Additionally, they can be used by regulators and clients to assess evaluations and evaluators.

9.3.2 Market Assessment or Market and Process Evaluation

Some of the contacts expressed concern that market research should not merge with process and market evaluation to the point where marketing research is no longer done. There is a difference between market evaluation and marketing and market research. In large part, marketing and market research should be conducted while programs are being designed, and should directly influence program design and development throughout the program implementation process. As one contact noted:

> "The biggest frustration I have is that we don't do more marketing or market research…What do people care about? How do we sell this stuff?"

Market and process evaluations have clearly been a major source of information about the market and about consumer and business response to energy efficiency, but there is also a role for true market research. Evaluation can provide ongoing feedback about the market in the context of the program and should be used to evaluate how well goals and objectives – possibly set by market research – are being achieved. Evaluations should take the market context into account relative to the program, but they are not a replacement for market research.

9.3.3 Coordination with Impact

A number of contacts stated that process evaluation should be coordinated with impact evaluations. One contact noted:

> "I see a lot of mistakes in impact evaluation because of lack of focus on process. Impact evaluators feel uneasy making recommendations because they need information about processes."

Another contact noted that the key difference should not be between impact and process evaluation, but between summative and formative evaluations. This notion of thinking in terms of formative and summative is important. Impact evaluations are typically summative, completed

after sufficient data on energy use is available to ascertain if there has been a change as a result of the program. This inevitably means that the summative impact evaluation will be completed 16 to 20 months after a program year is over.

On the other hand, process evaluations are most effective if they happen early in the program implementation cycle and thus are more formative. One evaluator implementer noted:

> "Process evaluations will point out missing information that may seem obvious, but to which people had a blind side. Process evaluations need to happen earlier rather than later. It needs to happen for mid-course corrections. You need third-party overview to identify things that need to be changed."

It is also true that there are formative impact evaluation opportunities. As discussed by Gandhi et al. (2007) and described above for examining new technologies, an engineer can review program technologies as part of a process evaluation effort, or at least early in the program implementation cycle. This might be called an engineering process evaluation and is a mechanism to explore impact issues in a formative manner. Many of the process evaluations that have been conducted as part of comprehensive evaluations – including impact and process activities a year or later after program implementation – are really summative process evaluations, though few have been recognized as such.

Designing evaluation to be either formative or summative, rather than process or impact, would potentially lead to the question of what formative evaluation research is needed in year one, year two, year three, etc. and, conversely, what summative evaluation research is needed to understand what happened in year one, year two, etc. Such a consideration would lead to more process and market evaluations, with some impact components being conducted early in program implementation cycles to provide formative input to the programs. In subsequent program cycle years, there would be impact evaluations with some process and market components providing a summative assessment of the program.

The other key issue regarding coordination of impact with process and market evaluation concerns timing (see Vine 2008). As noted, summative impact evaluations typically are conducted after sufficient data are available for the analysis. Yet, evaluations are most effective if the issues of the evaluation are considered at program inception and not just at the point of the summative assessment. Rethinking evaluation in terms of what are the formative evaluation research needs and what are the summative evaluation research needs would enable evaluation designs to more effectively match the needs of program designers, planners, implementers, regulators, and stakeholders.

10. Conclusions

Process and market evaluations of energy efficiency programs have a long history, yet rather low visibility. This white paper seeks to illuminate some of the findings that have emerged from over 30 years of process and market evaluations. The primary focus of process and market evaluations has been on improving program implementation. Consequently, much of the lessons learned are targeted to current and future program implementers in hopes that learning from these past lessons will facilitate future program design and implementation. The secondary focus of this white paper is to identify recommendations for process and market evaluation going forward. This chapter, therefore, presents first a summary of lessons learned and then recommendations for improving process and market evaluation.

10.1 Lessons Learned for Program Implementers

10.1.1 Program Design

The primary lesson learned about program design is that programs would benefit from increased understanding of the market – such as comes from market research – before programs are launched. There have been limited market tests of incentives: incentives are generally assumed to be necessary and then selected based on minimal investigation. Similarly, the choice between using internal staff or an outsourced program implementer should be driven by which approach provides the most customer contact and yields the greatest customer satisfaction. Up-front market research can help clarify the type of contact with customers that will be optimal.

- Market research is used to assess customer networks, gain knowledge of customer interactions with market actors, understand barriers for customers and market actors, and understand the role of different program features in influencing customer behavior. Market research should be conducted prior to program design and development, and should inform those activities.

- Customer contact makes a difference. Using outsourced services or market actors to reach the customer will work if the message is clear, if the target is clear, and if the program team is knowledgeable of the market.

10.1.2 Program Implementation

There are real barriers to the adoption of energy efficiency products and services. While market research can help to identify these barriers, additional ones likely will surface during implementation. Many programs founder due to the lack of sufficient market knowledge, failure to set clear targets, and failure to identify the effective solution for each target. It's hard to imagine the possibility of too much communication with the market: it is critical that programs both learn from the market, as well as reach the market with the program message. The ultimate goal for any energy efficiency program is behavior change – whether the new behavior is

investing in an energy-efficient product, purchasing a new service, or changing the way equipment is operated. Training and education, therefore, is an inherent part of programs.

- ➡ Programs should set clear targets for the intervention.
- ➡ The theory and logic of the changes expected on the part of customers and market actors should be clearly defined, and clearly result from program activities.
- ➡ Communication with the market should be an integral part of program design and implementation.

10.1.3 Program Administration

Simplicity for the customer and assurance of process and product quality are the bywords of effective program administration. Multiple programs are confusing to customers and market actors. Program administrators need to streamline access to their programs to be effective. One-stop shopping is ideal when the customer has to come to the program administrator. When market actors are the key program delivery mechanism, simplicity facilitates program intervention in the "normal" market. Market actors need help as well as customers. They need simple ways of working with the program. They need tools that enable them to complete forms with a minimal of effort. While such tools should include electronic options, not all market actors are computer savvy.

Databases need to be able to capture all the data for documenting the expenditure of ratepayer or public funds without requiring multiple data entry. Quality control can be accomplished through a stepped approach: initially, all projects are all verified and inspected; as market actors demonstrate competence, samples of projects are verified and inspected until a problem surfaces that suggests a need for an increased inspection rate. Incentive and reward structures should be used to ensure that outsourced services and market actors perform as desired.

- ➡ Simplify, simplify, and simplify for the customers and the market actors.
- ➡ Set up reward systems to ensure that third-party delivery agents and market actors provide the quality and quantity of services desired.
- ➡ Use quality control procedures that start with census verification and inspection, followed by sampling after third parties and market actors demonstrate competence.

10.1.4 Reaching Market Actors

Market actors can be valuable partners in delivering energy efficiency products and services. The market channels that are most effective will be either the trade allies or professional service firms that are part of the design and construction process, or the retailers, distributors, and manufacturers who are part of the product delivery process. Process and market evaluations have been important for providing feedback to the program staff about market actor perceptions of the program and barriers created by the program.

Trade Allies and Professional Service Firms

A key first step with building and construction industry trade allies and professional service firms is to understand their business models and businesses. Once these are understood, the goal for the program should be to integrate the program into the existing business models. The program should actively train trade allies and professional service firms about the program processes sufficiently in advance of the program for the firms to prepare to effectively participate. The program should also make it easy for these firms to complete the forms and paperwork associated with the program. It also gives program staff an opportunity to obtain feedback from these market actors and ensure the program will work well from its outset. Having either dedicated staff or contracted services to aid trade allies and professional service firms will improve the accuracy and quality of data entered into the program database.

- Train trade allies and professional service firms in program rules prior to launching programs, provide notice in advance of programmatic changes, and publicly announce any changes.
- Simplify program processes so that even non-computer savvy market actors can participate and have staff or service providers available to assist market actors.

Retailers, Distributors and Manufacturers

Working upstream with distributors and manufacturers of energy efficient products will provide the greatest return for the least cost, although it will make it more difficult to track installations at the end-user level, making access to sales data critical. Retailers have substantial turnover and, thus, training of retailers is an ongoing concern and necessary in order to support efforts with distributors and manufacturers. The distribution channels for residential products are different than those for commercial, which, in turn, are different than those for industrial products. Effort must be made in each market, typically at regional or national levels, to ensure that the program works with organizations already engaged at this level.

- Upstream approaches are a cost-efficient way to attain installation of energy-efficient products, but sales data are key to tracking success and access to the data should be linked to program benefits.
- Training of retailers is necessary and an ongoing need due to turnover.
- Residential, commercial, and industrial products have different market channels, many of which require coordination regionally and nationally to maximize effectiveness.

10.1.5 Reaching Customers

Process and market evaluations have been a key mechanism to gain feedback from customers to the program. Understanding the unique characteristics of different customer groups is important, as those characteristics shape customers' response to programs and the likelihood of program success.

Residential

The key challenge with residential customers is reducing transaction costs while still maintaining quality customer relations. An effective way to meet this challenge is by tapping into residential customers' normal market activities with the trade allies and retailers that serve them. Other delivery agents that can be effective include local groups, such as school, civic or church groups, and national partners such as ENERGY STAR®.

- Leverage existing market relationships.
- Leverage regional and national efforts to promote energy efficiency.
- Leverage local groups.

Commercial

Keeping transaction costs low is important with small commercial customers, while one-on-one contact is important for large commercial customers. For both groups, energy costs are a small portion of their budget (less than 5%) and typically are treated more as a fixed cost than a variable cost; thus, interest in energy efficiency is often very low. Key to accessing this market is developing a business case for each market segment. To accomplish this, program staff need to know the business of the targeted customer segment, what they need to reduce their energy costs, and what capability they need to respond to opportunities. Annual cycles, such as sales seasons' high and low points and budget cycles, can be very important in reaching these customers. Trade associations can offer a valuable leverage point, both to understand the business and to gain access to ways to communicate effectively with the target market.

- Understanding the business case for efficiency in each market segment will facilitate communication.
- Leverage existing organizational ties of the market segments whenever possible.

Industrial

Industrial customer opportunities are typically greater than commercial opportunities due to the potential for improvements to the industrial process, not just the lighting, HVAC, and motors. However, process improvements are unique to each plant and, therefore, require highly skilled and knowledgeable people to conduct the analysis of opportunities. Working closely with industrial firms, program staffs need to engage both upper management and plant level staff to ensure that projects go forward.

- Work closely with engineering consultants familiar with process improvements.
- Reach decision-makers at multiple levels within industrial companies and their local facilities.

10.2 Recommendations to Improve Process and Market Evaluation

In 1999, Kunkle and Lutzenhiser wrote:

> "Historically, evaluation has tended to focus on a set of issues associated with the measurement of DSM program results (free-riders, self-selection bias, net and gross savings, etc.) Within this broader framework [that we propose], we believe the issues and questions become much more global. They are associated with the theory supporting the market interventions and they explore the issues of how and why."

There have been many evaluations that have sought to understand the how and why, but the key recommendation for improving process and market evaluation is to expand efforts to explore the how and why with increased emphasis on formative evaluation.

At this point, the methodological tool bag for process and market evaluation is full of underutilized options. Evaluators currently rely too much on surveys. And, while in-depth interviews are common, they are rarely conducted in-person due to increased costs. Focus groups tend to be misused as a cheaper alternative to surveys and in-depth interviews, instead of being used for their explicit purpose to focus on narrow issues that need illumination within the context of other data collection approaches.

The underutilized options are numerous and include: on-site observation; engineering process evaluations; GIS analysis; market simulations; social network analysis; concept mapping; mental or cultural models analyses; and the use of pilot programs and experiments to test new ideas and explore how effective they might be, and what is required to achieve maximum effectiveness. Additionally, we highly recommend the use of evaluability assessment and logic and theory modeling as tools to engage evaluators and program implementers early in program processes to ensure evaluations will be effective.

There are two key activities that can facilitate an expansion of process evaluators' ability to look deeply. The first is to encourage process and market evaluators to draw upon their social science backgrounds and think about how social science theory explains what is and what is not happening in the programs that they evaluate. Each evaluation should explicitly explore whether the theory hypothesized in a program theory and logic model is working as intended and, if not, what might be another explanation.

The second key activity is to encourage a greater connection to the broad evaluation community by energy program evaluators. The American Evaluation Association sponsors an Evaluators Institute[15] to train evaluators in various techniques of evaluation and provides certification to those who complete the full training series. The guidelines for evaluation practice, as noted earlier, can help guide policymakers, program implementers, and evaluators in assessing the practice of evaluation in energy efficiency.

[15] See: *http://www.eval.org/SummerInstitute08/08SIhome.asp.*

Beyond looking more deeply at programs, we believe there is a need at this point in the energy program cycle to consider whether the division of resources between process and market evaluations, as compared to impact evaluations, is truly meeting the needs of the market. Process and market evaluations remain underutilized and relatively invisible compared to impact evaluations. Impact evaluations typically occur too late in the program cycle to have much effect on the program, as they are largely summative in nature.

Evaluations that can actually improve programs need to be implemented early in the program implementation process to provide feedback. Such evaluations should be research projects that are formative and explore the range of issues pertinent to the specific program: the program processes, the market components, and whether measures are performing as intended. Such evaluations should be comprehensive and designed when programs are first being implemented. The purpose would be to improve the program and ensure that the program goals and objectives are being implemented as intended, that the intended outcomes are likely to be achieved, and that data sufficient to conduct summative evaluations will be available. Impact evaluation skills would have an important role to play in such a comprehensive approach, but program improvement is fundamentally the purview of evaluators skilled in process and market research.

In summary, we recommend the following:

- Move to a framework for evaluation that promotes formative evaluation during the program implementation cycle and summative evaluation to explore program effects and impacts after reasonable periods of time to obtain results, rather than process or impact evaluation.
- Increase the use of process and market evaluations to test assumptions and market conditions early in program implementation.
- Expand the range of methods used for process and market evaluation research to include on-site observation, engineering process evaluations, GIS analysis, market simulations, social network analysis, concept mapping, mental or cultural models analyses, and the use of pilot programs and experiments.
- Require that process evaluation teams include experienced social scientists that use social science theory in the design of projects and analysis of findings.
- Encourage greater connection to the general evaluation community, which serves a wide variety of disciplines, and expect process and market evaluators to have training in evaluation.

11. References

References cited in this paper are denoted with an "*", other references were recommended by contacts or identified in the literature review.

ADM Associates, Inc. (2003). *Process Evaluation of 2003 Statewide Codes and Standards Program*. Rosemead, Calif.: Southern California Edison Company.

*American Evaluation Association. (2003). *Guiding Principles for Evaluators*. American Evaluation Association, MA. Electronic copy downloaded 1/30/09: http://www.eval.org/Publications/GuidingPrinciples.asp. Fairhaven, Mass: American Evaluation Association.

Barakat & Chamberlin, Inc. (1992). *DSM Evaluation: Six Steps for Assessing Programs*. Washington, D.C.: Edison Electric Institute.

*Barata, S., and C. Anderson. (2007). "Making the Intangible Tangible: How to Evaluate A Social Marketing Campaign." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings,* 862-869. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Bensch, I., and S. Pigg. (2002). "Bird's Eye View Of Energy Efficiency Market Research: Time to Move Beyond the Forest." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings,* 10:23-34. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Bensch, I., S. Pigg, and M. Anderson. (2006). "How Much Is That Training Program Worth? Quantifying the Value of Training and Other 'Fuzzy' Education Events." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings*, 6:20-31. Washington, D.C.: American Council for an Energy-Efficient Economy.

Bronfman, B. (1998). "Toward A Methodology For Evaluating Market Transformation Programs." In *Proceedings of the 1998 ACEEE Summer Study on Energy Efficiency in Buildings*, 7:33-39. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Bronfman, B., S Samiullah, A. West, J. Peters, N. Gandhi, and K. Cooney. (2008) "Integrating Evaluability Assessment into the Program Planning Implementation and Evaluation Process: Case Studies from Southern California Edison's IDEEA Program Portfolio." In *Proceedings of the 18th National Energy Services Conference.* Phoenix, Ariz.: Association of Energy Services Professionals.

The Cadmus Group, Inc. Energy Services Group. (2008). *Compact Fluorescent Lamps Market Effects Scoping Study Findings And Work Plan*. Prepared for the California Public Utilities Commission Energy Division. San Francisco, Calif.: California Public Utilities Commission.

Carlson, L., T. Hennessy, P. Robertson, and S. Bisher. (1997). "Survivors: Effective Low-Income Programs." In *Proceedings of the 1997 International Energy Program Evaluation Conference*, 417-424. Chicago, Ill.: International Energy Program Evaluation Conference.

Carroll, D. (2002a). *New Jersey Comfort Partners Process Evaluation: Final Report*. Prepared for the New Jersey Comfort Partners Working Group. Trenton, N.J.: New Jersey Board of Public Utilities.

Carroll, D. (2002b). *New Jersey Comfort Partners Program Comprehensiveness Evaluation: Final Report*. Prepared for the New Jersey Comfort Partners Working Group. Trenton, N.J.: New Jersey Board of Public Utilities.

Carroll, D. (2003). *Ohio EPP Process Evaluation: Final Report. Prepared for the Ohio Office of Energy Efficiency*. Columbus, Ohio: Ohio Energy Office.

Carroll, D. (2006). *PPL Electric Utilities Winter Relief Assistance Program: Final Evaluation Report*. Allentown, Penn.: PPL Electric Utilities.

Carroll, D., and J. Berger. (2008). "Transforming Energy Behavior Of Households: Evidence From Low-Income Energy Education Programs." In *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings*, 7:49-59. Washington, D.C.: American Council for an Energy-Efficient Economy.

Clarke, A., T. Pettit, R. Allgor, D. Hill, and R. Prahl. (2005). "A Theory-Based Evaluation of LIPA's Solar Pioneer Program: Measuring Early Progress in the Transformation of the PV Market on Long Island." In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 429-440. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Consortium for Energy Efficiency (2008). *The Energy Efficiency Program Industry*. Web Report http://www.cee1.org/ee-pe/2007/index.php3 *downloaded 1-27-09*. Boston, Mass.: Consortium for Energy Efficiency.

*Dahler-Larsen, P. (1998). "Beyond Non-Utilization of Evaluations: An Institutional Perspective. *Knowledge, Technology and Policy* 11 (1&2, Spring/Summer): 64-90.

*Davidson, E. J. (2005). *Evaluation Methodology Basics: The Nuts and Bolts of Sound Evaluation*. Thousand Oaks, Calif.: Sage Publications.

*Dethman, L., J.S. Peters, and M.R. McRae. (2001). *Market Progress Evaluation Repots Efficient Building Practices Initiative, No.2*. Report #E01-085. Portland, Oreg.: Northwest Energy Efficiency Alliance.

*Eto, J., R. Prahl, and J. Schlegel. (1996). *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs*. LBNL-39059 UC-1322. Berkeley, Calif.: Ernest Orlando Lawrence Berkeley National Laboratory.

*Electric Power Research Institute (EPRI). (1998). *The High Efficiency Laundry Metering and Market Analysis (THELMA) Project August*. Palo Alto, Calif.: Electric Power Research Institute.

*Feldman, S., and E. Titus. (2004). "We Should Pay More Attention To How We Operationalize Program Interventions." In *Proceedings of the 2004 ACEEE Summer Study on Energy Efficiency in Buildings,* 6:166-177. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Forss, K., C.C. Rebien, and J. Carlsson. (2002)."Process Use of Evaluations." *Evaluation* 8 (1): 29-45.

Gaffney, K. (2007). *2004-2005 Statewide Education, Training and Services Program Evaluation*. Prepared for the California Public Utilities Commission, Southern California Edison Company, Southern California Gas Company, San Diego Gas and Electric Company, and Pacific Gas and Electric Company. San Francisco, Calif.: California Public Utilities Commission.

Gaffney, K. (2008a). *Multifamily Boiler Controls – Process Evaluation: SoCal Gas' and SDG&E's 2006-2008 Multifamily Energy Efficiency Rebate Program*. Prepared for the Southern California Gas Company & San Diego Gas and Electric Company. Rosemead, Calif.: Southern California Edison Company.

Gaffney, K. (2008b). *Process Evaluation of SoCal Gas' 2006-2008 Non-Residential Programs Volume II of III: Program-Specific Results*. Rosemead, Calif.: Southern California Edison Company.

*Gandhi, N., F. Kneipp, D. Moran, J. Peters, S. Samiullah, and A. West. (2007). "Product Selection – A Forgotten Vital Component of Program Design." *Proceedings of the 2007 International Energy Program Evaluation Conference*, 1010-1021. Chicago, Ill.: International Energy Program Evaluation Conference.

Geltz, C. R., and M.S. Martinez. (2004). "Diffusion in the Desert: Adoption of Demand Response Technology By Rural Small Businesses." In *Proceedings of the 2004 ACEEE Summer Study on Energy Efficiency in Buildings*, 7:62-73. Washington, D.C.: American Council for an Energy-Efficient Economy.

Gordon, F., J. Jennings, and D. Hewitt. (2000). "Approaches to Building Efficiency Businesses." In *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings,* 6:133-144. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Grasso, P.G. (2003). "What Makes an Evaluation Useful? Reflections from Experience in Large Organizations." *American Journal of Evaluation* 24 (4): 503-514.

Grover, S., P. Graven, and R. Rubin. (2005). "Hard to Reach? Hard to Tell Lessons Learned From California." In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 1025-1036. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

*Hall, N., M. Brown, P. Jacobs, and L. Megdal. (2005a). "Overview of the Evaluations of California's 2002-2003 Efficiency Programs." In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 41-52. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

*Hall, N., C. Best, J. Roth, P. Jacobs, and L. Lutzenhiser. (2005b). "Assessing Markets to Design Programs That More Fully Attack Key Market Barriers and Take Advantage of Market Opportunities – Why Do We Continue to Miss So Many Opportunities?" In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 697-714. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Hall, N., P. Lai, P. Jacobs, and L. Megdal. (2007). "Overview of the Evaluations of California's 2004-2005 Efficiency Programs. In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 753-764. Chicago, Ill.: International Energy Program Evaluation Conference.

*Hirst, E., and J. Reed. (Eds.). (1991). *Evaluation of Utility DSM Programs*. Oak Ridge, Tenn.: Oak Ridge National Laboratory.

*Hodges, S.P. and M. Hernandez. (1999). "How Organizational Culture Influences Outcome Information Utilization." *Evaluation and Program Planning* 22: 183-197.

Holloman, B., M. Ledbetter, L. Sandahl, and T. Shoemaker. (2002). "Seven Years Since SERP: Successes and Setbacks In Technology Procurement." In *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings,* 6:125-138. Washington, D.C.: American Council for an Energy-Efficient Economy.

Itron, Inc. (2008). *Qualitative Free Ridership Assessment of the Nonresidential New Construction Comprehensive Projects: Final Report*. Prepared for We Energies' 55 MW Energy Efficiency Procurement Plan Evaluation. Milwaukee, Wisc.: We Energies.

*Janda, K. B. (1994). "Bounded Decision Making and Analytical Biases In Demand Side Management." In *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings,* 1:75-83. Washington, D.C.: American Council for an Energy-Efficient Economy.

* The Joint Committee on Standards for Educational Evaluation. (1994). *The Program Evaluation Standards* (2nd ed.) Also available at *http://www.wmich.edu/evalctr/jc/* Thousand Oaks, Calif.: Sage Publications.

*Kallock, W. B. (2005). "The Importance of Field Observations In Evaluations." In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 389-392. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

*Kane M., Trochim, W.M.K. (2007). *Concept Mapping for Planning and Evaluation.* Thousand Oaks, Calif.: Sage Publications.

*Knowlton, L.W. and C.C. Phillips. (2009). *The Logic Model Guidebook: Better Strategies for Great Results.* Thousand Oaks, Calif.: Sage Publications.

*Kunkle, R., and L. Lutzenhiser. (1999). "Beyond Market Transformation: Some Perspectives On Energy Evaluation and Research and the Energy Efficiency Movement." In *Proceedings of the 1999 International Energy Program Evaluation Conference.* Denver, Colo.: International Energy Program Evaluation Conference.

Kyle, D., K. Galligan, E. Titus, L. Lee, C. Sabo, and T. Giffen. (2007). "Get the Government! Understanding and Serving Government Customers Through Energy Efficiency Programs." In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 457-463. Chicago, Ill.: International Energy Program Evaluation Conference.

Lee, A. D., and R. Conger. (1996). "Market Transformation: Does It Work? – The Super Efficient Refrigerator Program." In *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings*, 3:69-80. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Lee, A. D., M.S. Khawaja, and M. Levy. (2007). "Using Simplified Pattern Matching to Define Program Theory and Assess Program Effectiveness – Application to a Green Buildings Program." In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 622-633. Chicago, Ill.: International Energy Program Evaluation Conference.

*Lutzenhiser, L. (1993). "Social and Behavioral Aspects of Energy Use." *Annual Review of Energy and the Environment 1993,* 18:247-89.

*Lutzenhiser, L. (2009). *Behavioral Assumptions Underlying California Residential Sector Energy Efficiency Programs White Paper.* Oakland, Calif.: California Institute for Energy and Environment.

*Mark, M. (2004). "The Mechanisms and Outcomes of Evaluation Influence." *Evaluation* 10(1): 35-57.

*Mast, B., and P. Ignelzi. (1996). "The Roles of Incentives and Information in DSM Programs." In *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings*, 10:145-153. Washington, D.C.: American Council for an Energy-Efficient Economy.

Mauldin, T., L. Hoefgen, G. Stiles, C. Rollier, and C. Chappell. (2006). "Encouraging Efficiency in an Already Efficient Market." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings*, 4:219-229. Washington, D.C.: American Council for an Energy-Efficient Economy.

*McRae, M.R., J.S. Peters, S. Scott, and B. Bronfman. (2005). "Industrial Process and Equipment Efficiency in Oregon: An Evaluation of the Energy Trust's Production Efficiency Program. In *Proceedings of the 2005 ACEEE Summer Study on Energy Efficiency in Industry*. American Council for an Energy Efficient Economy. Washington, D.C.

*McRae, M.R. (2002). "'Sure you do. Uh-huh': Improving the Accuracy of Self-reported Efficiency Actions." In *Proceedings of the 2002 ACEEE Summer Study on Energy Efficiency in Buildings.* American Council for an Energy Efficient Economy. Washington, D.C.

Megdal, L., M.C. Grasso, E. Akley, and B. Bennett. (2005). "Learning from Successive Evaluations of a Low-Income Program." In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 619-630. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Nadel, S. (1999). "Market Transformation Evaluation: A Tale of Four Regions." In *Proceedings of the 1999 International Energy Program Evaluation Conference.* Denver, Colo.: International Energy Program Evaluation Conference.

*NAPEE-National Action Plan for Energy Efficiency. (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Washington, D. C.: United States Environmental Protection Agency and Department of Energy.

*NEEA Evaluation Reports – ENERGY STAR® Consumer Products reports. Available at http://www.nwalliance.org/research/evaluationreports.aspx. Portland, Oreg.: Northwest Energy Efficiency Alliance.

*Nicol, J., and C. Schepp. (2005). "Survey Results for the Practical Energy Management© Approach: Focus on Energy Program Response to Industrial Customer Feedback." *Proceedings of the 2005 International Energy Program Evaluation Conference*, 497-508. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Obstfeld, I., K.W. Moore, B.A. Weiner, and V.E. Espinosa. (1994). "Moving a Residential Saturation Retrofit Program From Low-Income To Higher-Income Neighborhoods." In *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings,* 1:145-151. Washington, D.C.: American Council for an Energy-Efficient Economy.

*O'Drain, M. and J.S. Peters. (1993). "The Process of Evaluation: Insights from Anthropology." In *Proceedings of the 1993 International Energy Program Evaluation Conference.* Chicago, Ill.: International Energy Program Evaluation Conference.

*Opinion Dynamics Corporation. (2008). *2006-2008 Statewide Marketing and Outreach Process Evaluation*. Study ID SCE0256.01. San Francisco, Calif.: California Public Utilities Commission.

*Owen, J.M. (1999). *Evaluation: Forms and Process*. Thousand Oaks, Calif.: Sage Publications.

Peach, H. G., P.A. DeCotis, and L.M. Freeman. (2000). "Evaluating Consumer Energy Aggregations: A Policy Perspective." In *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*, 2:241-256. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Peters, J.S. (2007a). "White Paper Lessons Learned After 20 Years of Process Evaluation." Paper presented at the *First Behavior, Energy and Climate Change Conference.* Washington, D.C.: American Council for an Energy-Efficient Economy.

*Peters, J. S., S.A. Baggett, P. Gonzales, P. DeCotis, and B. Bronfman. (2007b). "How Organizations Implement Evaluation Results." In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 35-47. Chicago, Ill.: International Energy Program Evaluation Conference.

*Peters, J.S., L. Hoefgen, S. Feldman, and E. Vine. (2007c) *Assessment of Energy Trust of Oregon's Contracting and Delivery Models*. Portland, Oreg.: Energy Trust of Oregon, Inc.

*Peters, J.S., and M.R. McRae. (2001). *Market Progress Evaluation Report Architecture + Energy Program, Final Report*. Report #E01-084. Portland, Oreg.: Northwest Energy Efficiency Alliance.

*Peters, J.S., M. McRae, D. Cohan, and R. Kunkle. (2008). "Bedpans, Baked Beans and Businessmen: Changing the Business Practices that Drive Energy Use in Hospitals, Grocery Stores, and Commercial Real Estate." In *Proceedings of the 2008 National Energy Services Conference*. Phoenix, Ariz.: Association of Energy Services Professionals.

*Peters, J.S., M.R. McRae, and S. Feldman. (2001). *Market Progress Evaluation Report Microelectronics Initiative, No. 1. Research Report #E01-089*. Portland, Oreg.: Northwest Energy Efficiency Alliance.

*Peters, J. S., D.C. Moran, S. Albert, V. Engel, and L. Megdal. (2004). "Using Logic Models to Improve and Enhance Nonresidential Programs." In *Proceedings of the 2004 ACEEE Summer Study on Energy Efficiency in Buildings*, 4:275-285. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Peters, J. S., S. Nadel, and Z. Guijin. (2005). "China Motor Systems Energy Conservation Project Process Evaluation: A Cross-Cultural Process Evaluation of a Cross-Cultural Program." In *Proceedings of the 2005 International Energy Program Evaluation*

Conference, 519-530. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Peters, J. S., M. Seratt, M., and R. Way. (1996). "Energy Investment Decision Making In Industrial Firms." *Energy Services Journal*, 2, 862-869.

*Peters, J.S., and B. Tannenbaum. (2002). "Effects of Using WebTV Graphics on the Accuracy of Self-Reports." In *Proceedings of ACEEE 2002 Summer Study on Energy Efficiency In Buildings*. 10:237-246. Washington, D.C.: American Council for an Energy-Efficient Economy.

Peters, J.S., and B. Tannenbaum. (1997). "Market Simulation as a Method to Assess Market Potential for Solar Domestic Hot Water Program in Wisconsin." In *Proceedings of the 1997 International Energy Program Evaluation Conference*. Chicago, Ill.: International Energy Program Evaluation Conference.

*Peters, T. J., and R. H. Waterman. (1982). *In Search of Excellence: Lessons from American's Best-Run Companies*. New York, N.Y.: Harper Collins.

*Quantum Consulting, Inc. (2004). *Evaluation, Monitoring, and Verification (EM&V) Report for the Energy Smart Grocery Program*. Prepared for the California Public Utilities Division. San Francisco, Calif.: California Public Utilities Commission.

RLW Analytics, Nexus Market Research Inc., Summit Blue Consulting, Itron Inc., and The Cadmus Group Inc. (2008). *Scoping Study and Work Plan for a Residential New Construction Market Effects Study*. Prepared for the California Public Utilities Commission, Energy Division. San Francisco, Calif.: California Public Utilities Commission.

Rogers, P.J., T.A. Hacsi, A. Petrosino, and T.A. Huebner, eds. (2000). "Program Theory in Evaluation: Challenges and Opportunities." *New Directions for Evaluation*. No.87.

Roth, J., N. Hall, R. Morgan, and K. Schroder. (2007). "The Importance and Influence of Evaluation in the Early Stages of Pilot Program Design and Planning: A Case Study." In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 15-22. Chicago, Ill.: International Energy Program Evaluation Conference.

Rufo, M., A. Buege, and M. Ting. (2006). "Understanding Demand Response Opportunities and Barriers: Results from a Comprehensive Market Analysis." In *Proceedings of the 2006 National Energy Services Conference.* Phoenix, Ariz.: Association of Energy Services Professionals.

Rufo, M., R. Prahl, and P. Landry. (1999). "Evaluation of the 1998 California Non-Residential Standard Performance Contracting Program: A Theory-Driven Approach." In *Proceedings of the 1999 International Energy Program Evaluation Conference.* Denver, Colo.: International Energy Program Evaluation Conference.

*Rust, R.T., and R. L. Oliver. (1994). *Service Quality: New Direction in Theory and Practice.* Thousand Oaks, Calif.: Sage Publications.

*Seratt, P., R.E. Way, J.S. Peters, T. Newcomb, and R.W. Stolarski. (1994). "An Assessment of the Decision-Making Process Within the Industrial Sector." In *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings,* 8:187-192. Washington, D.C.: American Council for an Energy-Efficient Economy.

Share, S., K. Cooney, and T. Gross. (2007). "Independent Verification of Statewide Savings from Energy Efficiency in Texas." In *Proceedings of the 2007 National Energy Services Conference.* Phoenix, Ariz.: Association of Energy Services Professionals.

*Shel Feldman Management Consulting, Research Into Action, and Xenergy. (2001). *The Residential Clothes Washer Initiative: A Case Study of the Contributions of the Collaborative Effort to Transform a Market*. Boston, Mass: Consortium for Energy Efficiency.

*Skumatz, L. A., B. Coates, D.A. Pearson, and J. Green. (2001). "Evaluating Multi-Resource Audit Programs to Demonstrate Sustainability, Payback, and Customer Benefits: Incorporating Non-Energy Benefits (NEBs)." In *Proceedings of the 2001 International Energy Program Evaluation Conference*. Salt Lake City, Utah: International Energy Program Evaluation Conference.

*Spinney, P., J.S. Peters, and P. O'Rourke. (1992). *DSM Process Evaluation: A Guidebook to Current Practice.* PR-100647. Palo Alto, Calif.: Electric Power Research Institute.

Stockard, M., and G. Garland. (2008). "Texas SCORE – Schools Making the Energy Efficiency Grade." In *Proceedings of the 2008 National Energy Services Conference.* Phoenix, Ariz.: Association of Energy Services Professionals.

Sullivan, M.J. (2009). *Behavioral Assumptions Underlying Energy Efficiency Programs for Business White Paper.* Oakland, Calif.: California Institute for Energy and Environment.

Suozzo, M., and S. Nadel. (1996). "Learning the Lessons of Market Transformation Programs." In *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings,* 2:195-206. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Tannenbaum, B., R. Wirtshafter, and D. Laurel. (2006). "Training: Designing for Lasting Change." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings,* 6:215-226. Washington, D.C.: American Council for an Energy-Efficient Economy.

*TecMarket Works Framework Team. (2004). *The California Evaluation Framework*. Prepared for the California Public Utilities Commission and the Project Advisory Group. San Francisco, Calif.: California Public Utilities Commission.

*TecMarket Works Team. (2006). *California Energy Efficiency Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals.* San Francisco, Calif.: California Public Utilities Commission.

ten Cate, A., J. Harris, J. Shugars, and H. Westline. (1998). "Technology Procurement as a Market Transformation Tool." In *Proceedings of the 1998 ACEEE Summer Study on Energy Efficiency in Buildings,* 7:323-334. Washington, D.C.: American Council for an Energy-Efficient Economy.

Thompson, P., K. Cooney, N. Wobus, M. Thornsjo, and B. LeBlanc. (2005). *Process Evaluation of Selected California 2005 Demand Response Education, Awareness and Outreach Programs*. Prepared for San Diego Gas and Electric, Southern California Edison, & Pacific Gas and Electric. Rosemead, Calif.: Southern California Edison Company.

Thompson, P., J. Hummer, and R. Firestone. (2008). *2006-2007 Flex Your Power Now! Evaluation Report.* Prepared for the Demand Response Measurement and Evaluation Committee. San Francisco, Calif.: California Public Utilities Commission.

Thompson, P., N. Wobus, K. Cooney, and M.S. Martinez. (2008). "Outreach and Awareness Best Practices for Demand Response – The View from California." In *Proceedings of the 2008 National Energy Services Conference*, 1-12. Phoenix, Ariz.: Association of Energy Services Professionals.

*United Way. (1996). *Measuring Program Outcomes: A Practical Approach. http://www.unitedwaystore.com* Alexandria, Va.: United Way of America.

*Valovirta, V. (2002). "Evaluation Utilization as Argumentation." *Evaluation* 8(1): 60-80.

Vine, E. (2007). "The Integration of Energy Efficiency, Renewable Energy, Demand Response and Climate Change: Challenges and Opportunities for Evaluators and Planners." In *Proceedings of the 2007 International Energy Program Evaluation Conference*, 133-144. Chicago, Ill.: International Energy Program Evaluation Conference.

*Vine, E., (2008). "Strategies and Policies for Improving Energy Efficiency Programs: Closing the Loop Between Evaluation and Implementation. *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings,* 5:324-335. Washington, D.C.: American Council for an Energy-Efficient Economy.

Walsh, R. W. (1999). "From Programs to Products: Evaluation's Contribution and Future Direction in a Deregulated Energy Market." In *Proceedings of the 1999 International Energy Program Evaluation Conference*. Denver, Colo.: International Energy Program Evaluation Conference.

Webber, C. (2008). "The Evolution of a Successful Efficiency Program: Energy Savings Bid." In *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings,* 4:366-376. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Weiss, C. (1998). "Have We Learned Anything About the Use of Evaluation?" *American Journal of Evaluation* 19(1): 21-34.

*Weiss, C.H. and M.J. Bucuavalas. (1980). "Truth Tests and Utility Tests: Decision Makers Frames of Reference for Social Science Research." *American Sociological Review* 45 (April): 302-313.

*Wilson, C., T. McDaniels, and R. Bennett. (2006). "What Developers Think About District Energy: A Mental Models Approach." In *Proceedings of the 2006 ACEEE Summer Study on Energy Efficiency in Buildings*, 11:147-158. Washington, D.C.: American Council for an Energy-Efficient Economy.

*Wirtshafter, R.M., and S. Samiullah. (2005). "Who Are the Real Non-Participants in California: A Two-Year Examination of California's Residential Energy Efficiency Portfolio?" In *Proceedings of the 2005 International Energy Program Evaluation Conference*, 1049-1060. Brooklyn, N.Y.: International Energy Program Evaluation Conference.

Wholey, J.S., H.P. Hatry, and K.E. Newcomer. (2004). *Handbook of Practical Program Evaluation, 2nd Edition.* New York, N.Y.: Jossey-Bass.

Appendix A: Approach

The following describes in detail the approach taken for this paper.

Interviews

We worked with the CIEE project manager to generate a list of 58 process evaluators and program implementers. Eighteen of these individuals (including the two authors) had been interviewed in 2007, which left 40 to be contacted in 2008. Of these 40, 25 agreed to be interviewed, 7 refused, and 18 were unavailable or did not return phone calls and emails seeking their participation.

The result of these efforts provided interviews with 43 individuals who conduct or manage process and market evaluations, or who, as program implementers or program managers, are consumers of process and market evaluations. The interviews were completed either in August 2007, as part of the previous study, or in September and October 2008. (Appendix B provides the interview questions and Appendix C provides the list of contacts.)

The characteristics of the people interviewed are shown in Figures 1, 2, and 3. These reveal that most of the contacts are primarily process evaluators (24) and most are consultants (23). Thirty-five contacts have been involved in energy efficiency work for over 15 years. Although eight of the contacts have worked for consulting organizations as program administrators and thirteen have had multiple roles over the course of their time in the field, only six contacts have experiences in both implementation and evaluation; no contacts were interviewed that only had program implementation experience.

The contacts' numbers of years in the field correlate strongly with the various waves of funding for energy efficiency. The first funding wave began in the 1970s and concluded in the early 1980s with the shift in political focus away from conservation; the second wave occurred primarily in the Pacific Northwest and Northern California during the early and mid-1980s; the third wave began in New England following power outages in 1987 and grew throughout the country until 1995.

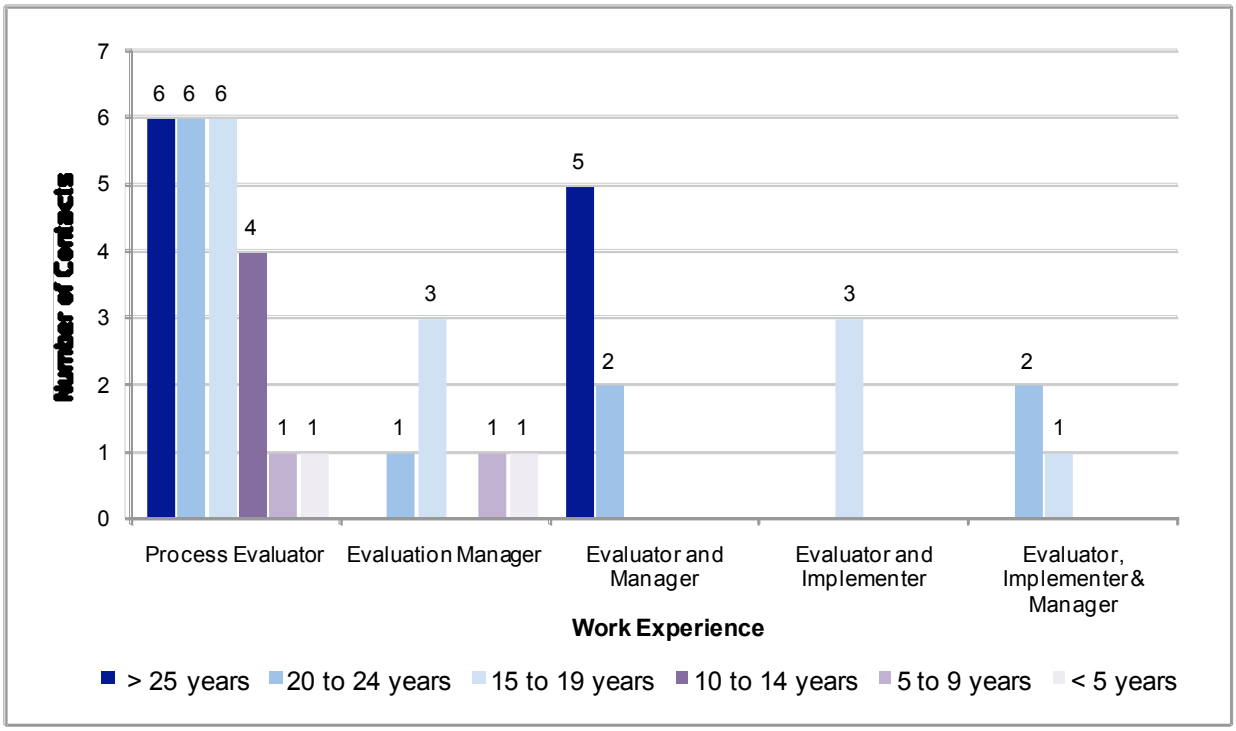
Both authors of this paper had entered the field by 1982 and, consistent with these waves of funding, the contacts included in the study number few who entered the field in the period from the early to mid-1990s. Of the many people who assumed junior evaluation roles during that time, most were unable to maintain their involvement in efficiency evaluation when energy efficiency funding slacked in 1996 due to an emphasis on restructuring.

The current energy efficiency funding wave began in the very late 1990s, as public benefit funding was approved and program evaluation efforts began to increase. It has further increased since 2006, as concern for global climate change has led to increased policy emphasis on improving building efficiency. Table 1 displays responses as to contacts' years of experience in energy efficiency process and market evaluation.

Table 1: Years of Experience and Dates of Entry to Field

YEARS OF EXPERIENCE	COUNT
Entered field by 1982 (more than 25 years post 2007)	11
Entered field 1983-1987 (20-24 years)	11
Entered field 1988-1990 (15-19 years)	13
Entered field 1991-1997 (10-14 years)	4
Entered field 1998-2008 (0-9 years)	4
Total	43

Figure 1: Number of Years in Field by Types of Position Held



Perhaps not surprisingly, contacts with over 15 years experience include all who have worked as consultants, as well as program administrators, and thus comprise the group with the broadest range of experience (see Figure 2).

Figure 3 shows the types of organizations contacts have worked for (consultant, administrator, or both), as well as the types of positions held. Among the initial contact list of 68 individuals, all of the people whose experiences were exclusively program implementation and not also evaluation declined to participate, typically commenting that they did not believe they could contribute to the study. Features of the industry that reflect the preference for third-party evaluators is visible in Figure 3, in that most of those who are process evaluators work in consultant organizations, while evaluation managers tend to work for program administrators.

Figure 2: Number of Years in Field by Type of Organizations Worked For

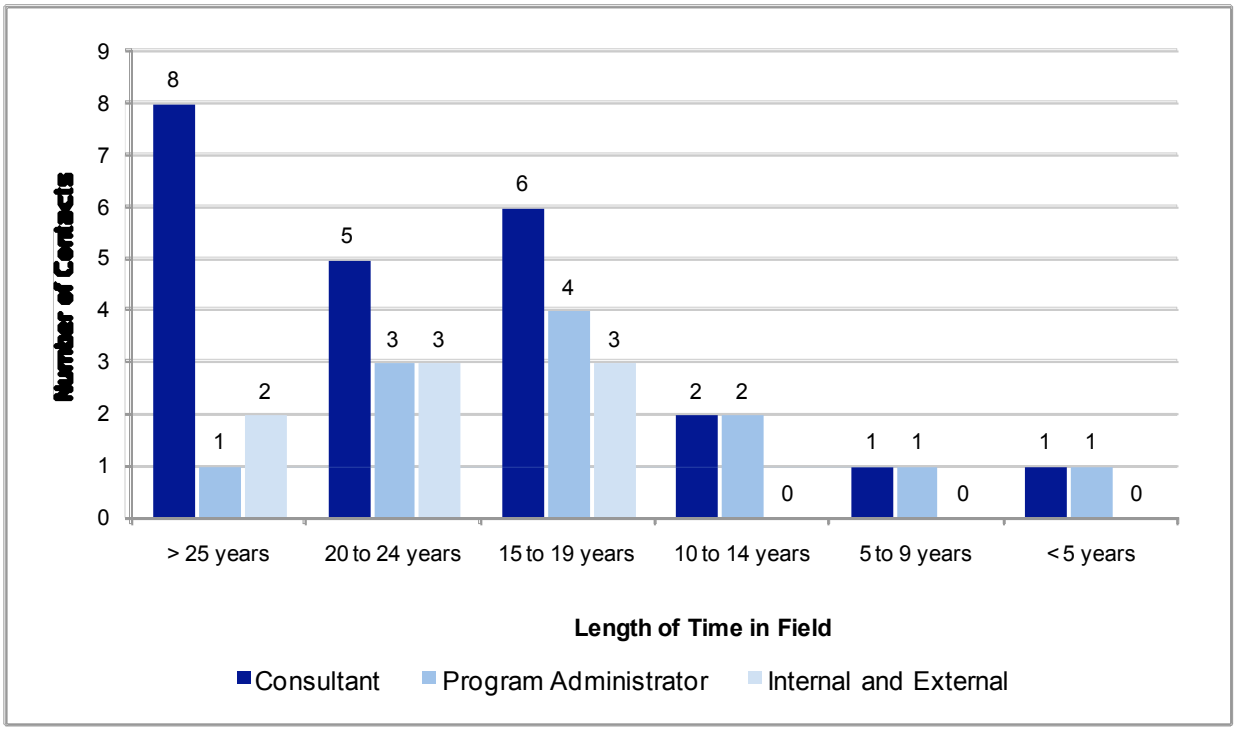
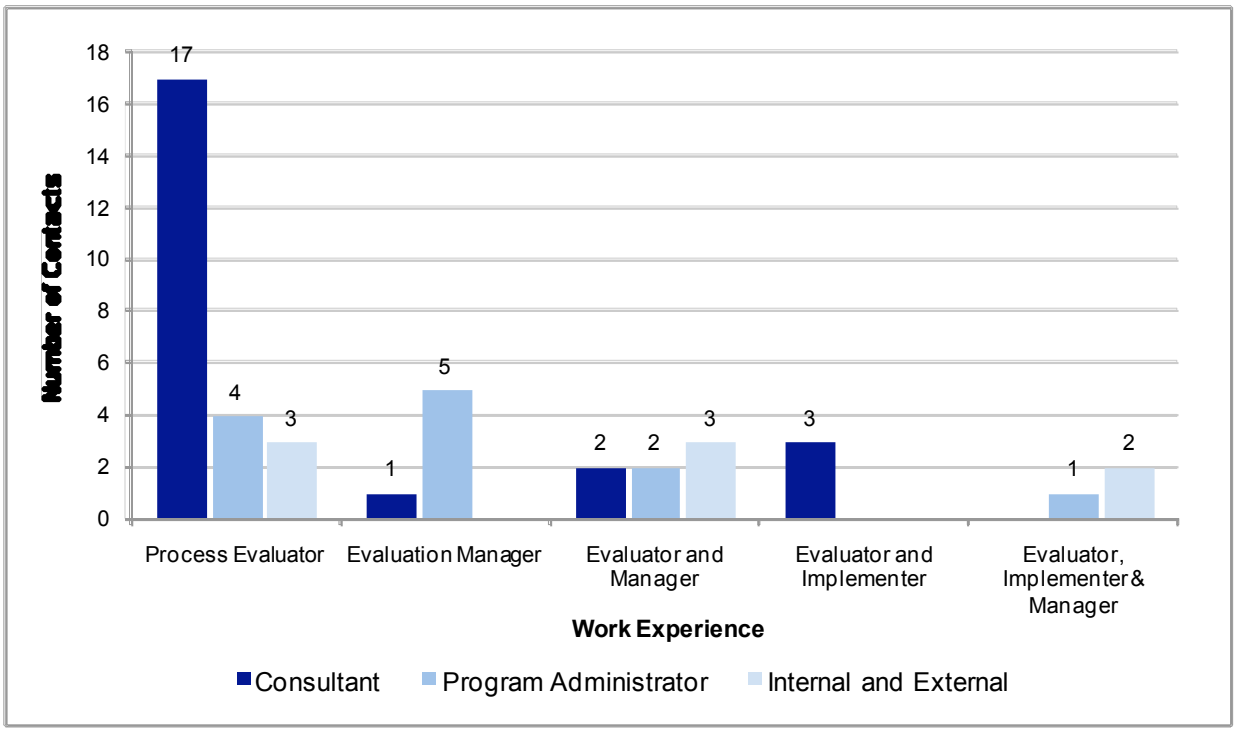


Figure 3: Type of Organization Worked For by Types of Positions Held



Appendix B: Questionnaire

Interview Questions

Improving Program Effectiveness: What Have We Learned In The Past 30 Years?

As climate change has grown as an issue, there are efforts underway (especially in California) to develop programs to reduce CO_2 emissions. It seems like a good idea to assess what we have learned over the past 30 years of energy efficiency programs so that people don't have to reinvent the wheel as they develop these new programs. So the purpose of the discussion is to pick your brain about:

- *What process evaluation has taught us in the past 30 years about how to improve the design, implementation, and delivery of energy efficiency programs aimed at the consumer and business markets? (Business = agriculture, industrial, commercial, and institutional)*

Program effectiveness for the purposes of this discussion can be affected by various program components: the administration of a program, the delivery, marketing, outreach, and implementation, and ultimately how the market and customers respond to the program through participation and later use of a service or operation and maintenance of the hardware.

My questions therefore focus on these components. In answering the questions we would like to hear examples of what occurred and what was learned. A reference or copy of a report would be great.

First, a few background questions:

1. How long have you been conducting energy efficiency process evaluations or how long have you been a consumer of process evaluations?

2. Have you ever worked in a program administrator organization or as a consultant for an administrator?

3. Is there anything in particular that immediately comes to mind as a lesson learned from process evaluations you are familiar with?

I'd like to ask about lessons learned from process evaluations in specific program components.

4. I want to start with marketing and outreach aspects of programs. What are some lessons learned that process evaluations have revealed about marketing and outreach for residential programs? *(We want an example of the problem and how it was solved, a reference to a report would be great but that might be difficult)*

    a. How about business customers?

5. How about program delivery or implementation: What are some of the lessons learned about program delivery and implementation for residential programs? *(We want an example of the problem and how it was solved, a reference to a report would be great but that might be difficult)*

    a. How about business programs?

6. Do you know of any specific lessons learned regarding the type of organization that implements a program (i.e.: whether the type of organization that implements the program affects how a program is implemented or the type of results that the program produces)?

7. The next area I want you to think about is program administration. This is the area that concerns the forms, paperwork, and procedures of a program. What are some of the lessons learned about program administration for residential programs? (*We want an example of the problem and how it was solved, a reference to a report would be great but that might be difficult*)

    a. How about business programs?

8. What have been some of the lessons learned about working with trade allies and design and construction professionals?

9. As a result of process evaluations, what changes have you seen made to customer response requirements that have led to lower barriers to enrollment and participation for residential programs?

    a. How about for business programs?

10. What have we learned, if anything, about how satisfaction with the program administrator on the part of market actors or customers is affected by energy efficiency programs?

Finally my last two questions:

11. Is there anything else that you can think of that process evaluation has found out about any other aspects of program that were found to improve program success?

12. Can you send me or tell me about one or more process evaluations that standout or were particularly valuable to you in understanding what is needed to improve program implementation?

Thank you for your participation. Good-bye.

Appendix C - List of Contacts

Those interviewed for this paper include:

Sharyn Barata – Vice President of West Coast Operations: Opinion Dynamics Corporation

Ingo Bensch – Senior Project Manager, Evaluation and Market Research: Energy Center of Wisconsin

Oscar Bloch – Gas & Energy Division: Wisconsin Public Service Corporation (Administrator: Bob Norcross)

Rob Bordner – President: Energy Market Innovations, Inc.

Ben Bronfman, Ph.D. – Principal: The Cadmus Group, Inc.

Marian Brown – Manager of Measurement and Evaluation, Energy Efficiency Division: Southern California Edison

David Carroll – President, APPRISE

Susan Coakley – Executive Director: Northeast Energy Efficiency Partnership

David Cohan – Project Manager, Market Research and Evaluation: Northwest Energy Efficiency Alliance

Phil Degens, Ph.D. – Evaluation Manager: Energy Trust of Oregon, Inc.

Linda Dethman – President: Dethman & Associates

Scott Dimetrosky – Principal: The Cadmus Group, Inc.

Luisa Freeman – Managing Director, Business Strategy & Planning: Black and Veatch

Rafael Friedman – Senior Project Manager, Policy and Evaluation group, Customer Energy Management: Pacific Gas and Electric Company

Kathleen Gaffney – Director, West Coast Consulting: KEMA

Fred Gordon – Director of Planning and Evaluation: Energy Trust of Oregon, Inc.

Steve Grover, Ph.D. – Senior Economist, Energy Modeling & Economics: ECONorthwest

Blair Hamilton – Policy Director: Vermont Energy Investment Corporation (VEIC)

Rich Hazzard – Project Manager: Puget Sound Energy

Lisa Heshong – Principal: The Heschong Mahone Group, Inc. (HMG)

Lynn Hoefgen, Ph.D. – President: Nexus Market Research, Inc.

Ken Keating, Ph.D. – Independent Consultant

Elizabeth Hicks – Senior Principal: KEMA

Kathy Kuntz – Director, Energy Programs: Western Electricity Coordinating Council (WECC)

Pierre Landry – Manager of Program Evaluation Research: Southern California Edison

Alan Lee – Principal, Energy Services: The Cadmus Group, Inc.

Marjorie McRae, Ph.D. – Principal, Research Into Action, Inc.

Judy Mathewson – Manager, Energy Efficiency Strategy: WE Energies

Lori Megdal, Ph.D. – Owner: Megdal and Associates

Carol Mulholland – Principal: The Cadmus Group, Inc.

Jane S. Peters, Ph.D. – President, Research Into Action, Inc.

Ralph Prahl – Consultant: independent

Tami Rasmussen – Senior Economic Consultant: KEMA

John Reed, Ph.D. – President, Invologie

Mike Rufo – Senior Director, Consulting and Analysis: Itron

Shahana Samiullah – Manager, Portfolio Analysis: Southern California Edison

Dick Spellman – President: GDS Associates, Inc.

Iris Sulyma – Manager, Power Smart Residential & Commercial Evaluation: BC Hydro

Bobbi Tannenbaum – Senior Principal Consultant: KEMA

Patricia Thompson – Senior Consultant: Summit Blue

Elizabeth Titus – Research and Evaluation Manager: Northeast Energy Efficiency Partnerships

Mike Weedall – Vice President, Energy Efficiency: Bonneville Power Administration

Phil Willems, Ph.D. – President: PWP, Inc.

Bob Wirtshafter, Ph.D. – President: Wirtshafter Associates, Inc.

Appendix D – Definitions of Terms

This Appendix includes some definitions of terms that may be unfamiliar to those outside of the energy efficiency world. There are many other terms of importance and for those, the reader may want to review the California Evaluation Framework (TecMarket Works Framework Team 2004)

Energy Efficiency Terms and Concepts

End-Users and Customers

The term *end-user* is used in the world of energy efficiency because it clearly denotes the fact that the use of energy occurs on the building side – the other side of an electric or gas meter from the utility system. The end-user makes the decisions about how to use the energy that has been delivered to the meter. However, the end-user may not be the person who decides whether to install an ENERGY STAR® refrigerator or whether to build an energy-efficient building.

The person who pays an energy bill is the *customer* of the energy company, but they may not be the end-user.

Similarly, there may be another person or set of persons who make decisions about a building but are neither the customer nor the end-user – these would be builders, architects, and developers who design and construct buildings for sale, but do not pay the energy bill or operate the building, but do make decisions about what equipment is installed and what features will be included in the structure.

The tension between these three categories of people creates confusion as to who is the decision-maker and leads to a problem called *split-incentive*.

Market Barriers

There are many market barriers to energy efficiency. The Scoping Study (Eto et al. 1996) noted eleven market barriers to energy efficiency, one of which is *split incentives* (discussed below and at other points in this paper, regarding the difficulty in addressing this barrier). Others barriers are: *high first cost*; *information, search, and hassle costs*; *organization practices or customers*; *bounded rationality* (rules of thumb); *performance uncertainties*; *product or service unavailability*; *hidden costs*; *inseparability of product features*; and *interaction of barriers*.

Another way of looking at market barriers is discussed in Hall et al. (2005b). They suggest that there are five categories of market barriers that limit consumers' and businesses' willingness and ability to invest in energy efficiency products and services, or to implement energy efficiency behaviors. The notion is that programs should address these barriers directly. Hall et al. (2005b) note that there are sub-barriers to each category, for a total of 37 market barriers.

Program Effectiveness and Program Cost-Effectiveness

Regulators and legislatures typically expect programs to provide greater benefits than the costs of implementing them. When that happens, a program is considered *cost-effective*. There are five key tests for cost-effectiveness which examine the costs and savings from different perspectives. For a good introduction to cost-effectiveness see NAPEE (2008).

Program effectiveness, on the other hand, refers to whether the program is effectively accomplishing its goals and objectives. Cost-effectiveness may be of interest in the assessment of program effectiveness, but it is ancillary to program effectiveness. Process and market evaluations examine program effectiveness and seek to identify improvements to program effectiveness that will also improve cost-effectiveness, but the specific measurement of cost-effectiveness is not addressed in process and market evaluations.

Split-Incentives

When the end-user is not the same as the customer, and the customer is different from the person who designed and built the building or facility, then there is a *split-incentive* relative to energy efficiency decision-making. The crux of the problem is that the additional cost to invest in energy efficiency can be recovered in the reduced cost to operate a building or a piece of equipment. However, this only occurs if the person who pays the energy bill is also the person who invests in the energy-efficient equipment. This is one of the most intractable of barriers to energy efficiency.

Summative and Formative Evaluation

Summative evaluation is evaluation completed to summarize the results of a program effort. Summative evaluations can summarize program impacts, program market effects, or program processes. Typically summative evaluations occur at the close of a program period.

Formative evaluation is evaluation completed in order to influence the formation of the program. Formative evaluations can address program processes, program market effects, and program impacts. Typically formative evaluations occur at multiple times in the program cycle, beginning in the first three to six months of a program and then as needed.

Traditional Energy Segments

Energy suppliers have tended to think of four different categories of customers – *residential, commercial*, *industrial*, and *agricultural*. The customers within each of the four segments share relatively similar needs for energy distribution services: similar metering needs, similar usage patterns, and similar cost-of-service delivery.

The commercial segment can be quite large and, in those cases, will be sub-divided into *small* and *large*, based on energy requirements, and sometimes into *institutional,* which refers to publicly-owned facilities.

This document focuses primarily on residential, commercial generally, and industrial. We do not comment on agricultural programs directly.

Definitions of Acronyms

ACEEE – American Council for an Energy-Efficient Economy

ANSI – American National Standards Institute

BOMA – Building Owners and Managers Association

CEC – California Energy Commission

CEE – Consortium for Energy Efficiency

CFL – Compact Florescent Lamp

CPUC – California Public Utilities Commission

DOE – U.S. Department of Energy

EPA – U.S. Environmental Protection Agency

IEPEC – International Energy Program Evaluation Conference

ISO – International Organization for Standardization

M&V – Measurement and Verification

MSE – Management System for Energy

NEEA – Northwest Energy Efficiency Alliance