



A Review of Effective Practices for the Planning, Design, Implementation, and Evaluation of Market Transformation Efforts

11/25/2013

CALMAC Study ID PGE0330.01

Submitted to:

**Pacific Gas & Electric
San Diego Gas & Electric
Southern California Edison
Southern California Gas**

Submitted by:

NMR Group, Inc.

Contents

ACKNOWLEDGMENTS	I
EXECUTIVE SUMMARY	II
1 INTRODUCTION	1
1.1 OBJECTIVES OF THE RESEARCH.....	1
1.2 WHAT IS STRATEGIC MARKET TRANSFORMATION?	1
2 RESEARCH METHODOLOGY	3
2.1 LITERATURE REVIEW	3
2.2 IDENTIFICATION OF STRATEGIC MT PROGRAMS AND REVIEW OF PROGRAM DOCUMENTS.....	3
2.3 IN-DEPTH INTERVIEWS.....	4
3 SUMMARY OF EFFECTIVE PLANNING, DESIGN, IMPLEMENTATION, AND EVALUATION PRACTICES FOR STRATEGIC MT	6
3.1 PROGRAM PLANNING, DESIGN, AND IMPLEMENTATION PRACTICES	6
3.1.1 Step 1: Identify Target Markets.....	7
3.1.2 Step 2: Characterize the Market	9
3.1.3 Step 3: Identify the Baseline.....	9
3.1.4 Step 4: Develop a Market Model.....	11
3.1.5 Step 5: Develop Program Theory and Logic Model	13
3.1.6 Step 6: Develop a Market Transformation Story	18
3.1.7 Step 7: Establish Interim and Long-Term Indicators of Market Effects	19
3.1.8 Step 8: Plan for Exit or Transition.....	19
3.1.9 Step 9: Continue to Measure and Monitor Key Market Indicators After Transformation	20
3.1.10 Other Effective Practices.....	21
3.2 PROGRAM EVALUATION PRACTICES.....	24
3.2.1 Match the Evaluation Strategy to the Program Logic	24
3.2.2 Track Indicators Tied to Expected Outcomes	24
3.2.3 Perform Regular, Ongoing Research into the Status of the Market	25
3.2.4 Assess Market Effects Periodically	26
3.2.5 Refine the Program Theory and Logic Model.....	27

3.2.6	Assess Attribution	27
3.2.7	Calculate Net Savings at the Market Level	29
3.2.8	Assess Sustainability and Prepare for Exit or Transition	32
3.2.9	Tell the Market Transformation Story.....	32
3.2.10	Continue Tracking Market Effects after the Program Has Ended.....	33
4	REVIEW OF MT PROGRAM PRACTICES IMPLEMENTED	34
4.1	THE PROGRAM ADMINISTRATORS AND THEIR MARKET TRANSFORMATION OBJECTIVES.....	36
4.2	APPROACHES TO PROGRAM PLANNING AND SUPPORTING FORMATIVE RESEARCH	39
4.2.1	Efficiency Vermont	39
4.2.2	Massachusetts Program Administrators	41
4.2.3	NYSERDA	43
4.2.4	NEEA	44
4.2.5	Planning and Research Practice Insights from Interviews and Program Report Reviews	46
4.3	COMMON MT PROGRAM STRATEGIES.....	51
4.3.1	MT Program Strategy Insights from Program Reviews	52
4.4	PERSPECTIVES ON PROGRAM SUCCESS AND PROGRESS TOWARD MT	55
4.4.1	Efficiency Vermont	55
4.4.2	Massachusetts Program Administrators	55
4.4.3	NYSERDA	55
4.4.4	NEEA	56
4.5	EVALUATION.....	57
4.5.1	Efficiency Vermont	57
4.5.2	Massachusetts Program Administrators	59
4.5.3	NYSERDA	62
4.5.4	NEEA	64
4.5.5	Use of Market Progress Indicators	66
4.5.6	Measurement of Program Attribution and Net Savings	67
4.6	IDENTIFYING TRANSFORMED MARKETS, AND TRANSITION OR EXIT STRATEGIES.....	70
4.6.1	Summary of NEEA Transition or Exit Planning.....	70

4.7	POLICIES AND OTHER CONSIDERATIONS AFFECTING THE PROGRAMS.....	72
4.7.1	Efficiency Vermont	72
4.7.2	Massachusetts Program Administrators	72
4.7.3	NYSERDA	73
4.7.4	NEEA	73
4.8	LESSONS LEARNED.....	74
4.8.1	Staff for MT.....	74
4.8.2	Changing Markets	74
4.8.3	Data Collection and Market Progress Indicators.....	74
4.8.4	Necessary Conditions and Appropriate Expectations for MT.....	75
4.8.5	Collaboration and Communication.....	75
4.8.6	Home Performance Programs.....	75
4.8.7	New Construction Programs.....	76
4.8.8	Lighting Programs	76
5	SUMMARY OF APPROACHES TO MT AND DISCUSSION OF POLICY-RELATED INSIGHTS.....	78
5.1	EFFICIENCY VERMONT	78
5.2	MASSACHUSETTS PROGRAM ADMINISTRATORS	80
5.3	NYSERDA.....	82
5.4	NEEA	84
5.5	POLICY-RELATED INSIGHTS FROM THE RESEARCH.....	86
6	CONCLUSIONS.....	88
6.1	PROGRAM PLANNING, DESIGN, AND IMPLEMENTATION PRACTICES	88
6.1.1	Step 1: Identify Target Markets.....	88
6.1.2	Step 2: Characterize the Market	88
6.1.3	Step 3: Identify the Baseline.....	88
6.1.4	Step 4: Develop a Market Model.....	89
6.1.5	Step 5: Develop Program Theory and Logic Model	89
6.1.6	Step 6: Develop a Market Transformation Story	89
6.1.7	Step 7: Establish Interim and Long-Term Indicators of Market Effects	89

6.1.8	Plan for Exit or Transition: Articulate an Exit or Transition Strategy for when Transformation is Complete	89
6.1.9	Step 9: Continue to Measure and Monitor Key Market Indicators After Transformation	90
6.2	PROGRAM EVALUATION PRACTICES.....	92
6.2.1	Match the Evaluation Strategy to the Program Logic	92
6.2.2	Track Indicators Tied to Expected Outcomes	92
6.2.3	Perform Regular, Ongoing Research into the Status of the Market	92
6.2.4	Assess Market Effects Periodically	92
6.2.5	Refine the Program Theory and Logic Model.....	92
6.2.6	Assess Attribution	92
6.2.7	Calculate Net Savings at the Market Level	93
6.2.8	Assess Sustainability and Prepare for Exit or Transition	93
6.2.9	Tell the Market Transformation Story.....	93
6.2.10	Continue Tracking Market Effects after the Program has Ended.....	93
6.3	OTHER KEY FINDINGS	94
6.3.1	Claiming of Savings from Market Effects.....	94
6.3.2	MT Evaluation Protocols.....	94
6.3.3	Policy-Related Insights.....	94
7	REFERENCES.....	96
7.1	PROGRAM REPORTS	96
7.1.1	Efficiency Vermont	96
7.1.2	Massachusetts Program Administrators	97
7.1.3	NYSERDA	98
7.1.4	NEEA	100
7.2	OTHER RESEARCH.....	104
APPENDIX A	PROGRAM PROFILES AND LOGIC MODELS.....	A1
A.1	EFFICIENCY VERMONT HOME PERFORMANCE WITH ENERGY STAR AND RESIDENTIAL NEW CONSTRUCTION PROGRAMS.....	A1
A.1.1	Efficiency Vermont Home Performance with ENERGY STAR	A1
A.1.2	Efficiency Vermont Residential New Construction Program	A3
A.2	MASSACHUSETTS ENERGY STAR LIGHTING PROGRAM.....	A4

A.2.1	Massachusetts ENERGY STAR Lighting Program Logic Model	A5
A.3	NYSERDA NEW YORK HOME PERFORMANCE WITH ENERGY STAR AND NYSERDA NEW YORK ENERGY STAR HOMES.....	A9
A.3.1	NYSERDA New York Home Performance with ENERGY STAR Program.....	A9
A.3.2	New York ENERGY STAR Certified Homes	A11
A.4	NEEA INITIATIVES: CONSUMER ELECTRONICS TVs, ENERGY STAR CLOTHES WASHERS, AND DUCTLESS HEAT PUMPS	A12
A.4.1	NEEA Consumer Electronics TV Initiative	A13
A.4.2	NEEA ENERGY STAR Clothes Washers Initiative.....	A14
A.4.3	NEEA Ductless Heat Pump Initiative	A15
APPENDIX B	MATERIALS TO SUPPORT MT INITIATIVE DEVELOPMENT	B1
B.1	PROGRAM STRATEGIES IDENTIFIED IN REPORTS	B1
B.2	MARKET BARRIERS BY PROGRAM TYPE.....	B7

Tables

TABLE 2-1: SUMMARY OF PROGRAM DOCUMENTS REVIEWED	4
TABLE 4-1: FULL NAMES OF PROGRAMS ABBREVIATED IN TABLES	35
TABLE 4-2: IDENTIFICATION OF PROGRAM DOMAIN AND TARGET MARKETS IN PROGRAM REPORTS	47
TABLE 4-3: USE OF AND LINKAGES BETWEEN LOGICS MODELS/PROGRAM THEORY AND MARKET MODELS.....	49
TABLE 4-4: MOST COMMON PROGRAM STRATEGIES BY PROGRAM TYPE	53
TABLE 4-5: LEVERAGING OF RESOURCE ACQUISITION PROGRAMS BY MT PROGRAMS.....	54
TABLE 4-6: STANDARD AND ENHANCED SPILLOVER MEASUREMENT APPROACHES FOR NYSERDA PROGRAMS BY THEORIZED LOCATION OF SPILLOVER	63
TABLE 4-7: CHARACTERISTICS OF MARKET PROGRESS INDICATORS.....	66
TABLE 4-8: ATTRIBUTION ASSESSMENT TYPE AND METHOD	68
TABLE B-1: LIGHTING PROGRAM STRATEGIES.....	B2
TABLE B-2: PRODUCTS PROGRAM STRATEGIES.....	B3
TABLE B-3: WHOLE HOUSE PROGRAM STRATEGIES	B4
TABLE B-4: NEW CONSTRUCTION PROGRAM STRATEGIES	B5
TABLE B-5: HVAC PROGRAM STRATEGIES	B6
TABLE B-6: RESIDENTIAL LIGHTING BARRIERS	B7
TABLE B-7: PRODUCTS BARRIERS.....	B8
TABLE B-8: WHOLE HOUSE BARRIERS	B9

TABLE B-9: NEW CONSTRUCTION BARRIERSB10
TABLE B-10: HVAC BARRIERSB11

Figures

FIGURE 3-1: SUPPLY-SIDE FLOW OF THE FENESTRATION MARKET..... 12
FIGURE 3-2: EXAMPLE LOGIC MODEL..... 15
FIGURE 3-3: ROGERS’ THEORY OF DIFFUSION OF INNOVATION..... 17
FIGURE 3-4: PROGRAM-LEVEL CONCEPTUALIZATION OF NET SAVINGS 30
FIGURE 3-5: MARKET-LEVEL CONCEPTUALIZATION OF NET SAVINGS..... 32
FIGURE A-1: MA ES LIGHTING PROGRAM THEORY—CONSUMERS..... A6
FIGURE A-2: MA ES LIGHTING PROGRAM THEORY—RETAILERS..... A7
FIGURE A-3: MA ES LIGHTING PROGRAM THEORY—MANUFACTURERS A8
FIGURE A-4: NYSERDA HOME PERFORMANCE WITH ENERGY STAR A11
FIGURE A-5: NYSERDA ENERGY STAR HOMES LOGIC MODEL A12
FIGURE A-6: NEEA TV INITIATIVE LOGIC MODEL A14
FIGURE A-7: NEEA DUCTLESS HEAT PUMP INITIATIVE LOGIC MODEL..... A16

Acknowledgments

This report would not have been possible without the following contributions:

- The staffs of Efficiency Vermont, the New York Energy Research and Development Authority, and the Northwest Energy Efficiency Alliance, as well as staffs of and consultants to the Massachusetts Program Administrators, generously shared insights about their experiences for this report.
- Caroline Chen, consultant to Southern California Edison; Brian Smith, Pacific Gas & Electric; Loan Nyguen, Sempra Utilities (Southern California Gas); and Rob Rubin, Sempra Utilities (San Diego Gas & Electric) provided guidance in developing this document. Ralph Prah and Ken Keating, consultants to the California Public Utilities Commission (CPUC), also provided guidance, with the support of Cathy Fogel of the CPUC.

Monica Nevius, Lynn Hoefgen, Lisa Wilson-Wright, and Cheryl Browne of NMR authored the report.

Executive Summary

This study identifies effective program planning, design, implementation, and evaluation practices as described in the market transformation (MT) literature. It also examines practices that have been used to support MT for five types of residential programs (lighting, products including appliances and consumer electronics, whole house, HVAC, and new construction) in jurisdictions outside California. The purpose of the study was to identify and summarize effective practices in support of MT from both programs and the literature for the consideration of the California investor-owned utilities (IOUs).¹

Approach

To meet the study objectives, NMR reviewed key reports and conference papers on the planning, design, implementation, and evaluation of MT programs to develop a summary of practices recommended in the literature. NMR also identified residential programs in the Pacific Northwest, New England, and New York that qualify as “strategic market transformation” programs as described by Prahl and Keating:

*Strategic market transformation is a program approach that uses ‘the tools of market transformation to make a deliberate and rigorous effort to intervene in [targeted], clearly defined markets.’ Strategic MT programs are expected to have market-transforming effects. Strategic MT acknowledges that not all markets are transformable, and allows for the tactical incorporation of other programs in the effort to change the target market.*²

For these programs, NMR obtained and reviewed program reports to glean information on the program designs, strategies, evaluation approaches, and other relevant topics. Finally, the research team interviewed staff representing eight programs across four administrators of strategic market transformation programs—Efficiency Vermont, the Massachusetts Program Administrators (Berkshire Gas, Columbia Gas, National Grid, New England Gas, NSTAR/Western Massachusetts Electric, and Cape Light Compact), the New York Energy Research and Development Authority (NYSERDA), and the Northwest Energy Efficiency Alliance (NEEA)—to further understand the actual planning, design, implementation, and evaluation practices for these programs.

Summary of Effective Practices

Through the literature review, NMR identified the following effective planning, design, implementation, and evaluation practices in support of MT program approaches.

Effective program planning, design, and implementation include the following practices:

1. Identify target markets

¹ Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas.

² Prahl, R., & K. Keating, “Planning and Evaluating Market Transformation: What the Industry has Learned, and Possible Implications for California” (Market Transformation Workshop, Consultant Whitepaper Draft, October 17, 2011).

2. Characterize the market
3. Identify the baseline and ensure ample savings are possible
4. Develop a market model
5. Develop program theory and logic model and match program theory to market characterization
6. Develop a market transformation story
7. Establish interim and long-term indicators of market effects
8. Articulate an exit or transition strategy for when transformation is complete
9. Continue to measure and monitor key market indicators after transition
10. Work with markets by doing the following:
 - Recognize and use market forces
 - Find market allies who are willing to work with the program
 - Promote competition
 - Share risks with other market actors
 - Use upstream market actors to influence downstream adoption of energy-efficient products and services
11. Identify and promote non-energy benefits to the product or service
12. Leverage resource acquisition tools or programs
13. Take the innovation adoption curve into account:
 - Focus on early adopters in opening markets for innovative products, including energy-efficient products
 - Avoid the “chasm” between adoptions by innovators and the general public
14. Form a market-based advisory group to help shape and review the program

Effective program evaluation includes the following practices:

1. Match the evaluation strategy to the program logic
2. Track indicators tied to expected outcomes
3. Perform regular, ongoing research into the status of the market
4. Assess market effects periodically
5. Refine the program theory and logic model
6. Assess attribution
7. Calculate net savings at the market level
8. Assess sustainability and prepare for exit or transition
9. Tell the market transformation story
10. Continue tracking market effects after the program has ended

Implementation of Practices

The interviews and review of program reports suggest that the program administrators with programs examined for this study undertake most of the planning, design, implementation, and evaluation practices listed above. There are a few exceptions, mostly practices that we were not able to examine for the study or practices carried out by NEEA alone.

We found that one practice—developing a graphic market model (3.1.4)—is not routinely carried out by any of the program administrators. In addition, only NEEA carries out four of the practices associated with planning for market exit or transition and tracking market effects after the program has ended.

In regard to claiming savings from market effects, the Massachusetts Program Administrators and NYSERDA are able to claim these savings to the extent that they are embedded in net-to-gross (NTG) ratios. NEEA funders are able to claim the energy savings from the net market effects of NEEA initiatives.

We found no MT-specific evaluation protocols in use by any of the program administrators, although NYSERDA operates under evaluation guidelines that provide general guidance on spillover attribution measurement and is developing market effects measurement guidelines, while Massachusetts Program Administrators operate under standardized approaches to estimating program-level net savings. However, these guidelines and standards are not prescriptive.

While the study did not focus on policy, it yielded the following policy-related insights from the interviews:

- Claiming savings from programs' market effects may be simpler in states or regions with a clear, consistent market transformation program track and framework, especially the Pacific Northwest.
- Less prescriptive evaluation protocols may be preferable for MT, as these approaches allow methods to change as programs and markets change.
- If programs focused on transforming markets are to be treated like generation or resource acquisition savings, the relatively long wait before MT efforts bear returns must be taken into account in both planning and evaluation.
- While the calculation of NTG based on a program's effects within a single year is an example of an evaluation timeframe that is too short to take market effects from MT into account, the near-annual measurement of NTG for residential lighting in Massachusetts has accounted for the acceleration of the adoption curve, thereby demonstrating the market effects of the Massachusetts program and partially overcoming the limitations imposed by the regulatory requirement of examining net savings within the program year only.
- For cases in which program administrators report to regulators, an informal, collaborative approach to evaluation planning may benefit MT efforts. Several interviewees offered some important related insights, including the following:
 - MT evaluation can be improved by involving program staff members in evaluation planning and obtaining their input in developing measurement instruments such as survey questions and data collection forms.
 - It is wise to plan for evaluation while planning the program in order to make sure to collect the data that will be needed for evaluation from program inception.

- Program administrators should work together to try to negotiate getting sales and other data as part of contracts with program partners.
- Placing responsibility for market research with an organization other than the program administrator may impede carrying out timely market characterization studies that provide rich information about the dynamics of a particular market.
- It is difficult to operate programs with MT goals while simultaneously attempting to meet ambitious resource acquisition goals, although resource acquisition programs can be leveraged as part of a greater MT effort.

Supporting Appendices

The study includes appendices with detailed information about barriers commonly identified for the program types, strategies of each individual program and the market actors targeted, the types of market progress indicators tracked, and program descriptions and logic models.