Reap What You Sow: Why We Need to Invest in Integrated DSM Design for More Innovative, Aggressive and Successful Energy Efficiency Programs

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ABSTRACT

Energy efficiency portfolio design, while critically important, is often less transparent and not as clearly prioritized and interconnected within many demand-side management (DSM) organizations. Evaluation of program performance has evolved in many jurisdictions into an on-going, year-round effort, with specified budget allocations. This paper presents the argument why portfolio design, just like implementation and evaluation, deserves to be a more high-profile and on-going year round effort. The operational process of achieving energy efficiency goals from a utility perspective can be simplified into four major components: design, marketing, implementation, and evaluation. Program design represents the broad area of expertise that determines the portfolio of programs, measures, incentive levels, and budgets that are included in a portfolio of energy efficiency programs. This paper discusses the necessity of increasing the profile of design work as a continuous effort that is closely coordinated and integrated with implementation and evaluation. If design is not a focused and continuous process, then many times a last minute harried design process is launched, in which corners are cut, findings from market assessments and evaluation are not adequately addressed, and implementation contractors are not sufficiently engaged to help make DSM regulatory plans more innovative. Inadequate time and attention in the design and redesign phase increases the likelihood of sub-optimal programs. An integrated DSM design approach is suggested for more aggressive and innovative programs.

Introduction

Innovative and aggressive DSM programs require continuous improvement and flexibility to respond to ever evolving market conditions, technologies, customer preferences, and regulatory requirements. Innovative design requires an organizational commitment to invest the time and resources to create more than standard practice programs. Achieving energy efficiency goals, requires a concentrated effort to design, implement, and evaluate a comprehensive portfolio of energy efficiency programs. Public utility commissions across the United States routinely specify a specific percentage of overall budget for evaluation, measurement and verification (EM&V). The manner in which EM&V budgets are allocated between traditional evaluation functions, such as impact, process, and market assessment activities, is often left to the discretion of the entity administering the evaluation contract. Guidance with respect to how much of a portfolio budget should reasonably be allocated for program design planning and research efforts, and the expectation of how design should be accomplished, is typically absent. In many instances, especially in relatively young DSM portfolios (e.g. three to six years of experience), the specific role and significance of the design and planning function, after initial program launch, can be lost and minimized between the more

easily siloed and commonly outsourced functions of implementation and evaluation. As a result, design is marginalized, and without the guidance of design minded evaluators and implementers, innovation and more aggressive or optimal program design is stalled.

At Least 1% for Energy Efficiency Design

The often-used expression "you get what you pay for" is indeed relevant to DSM program design. Budget, time, and a willing commitment of the DSM program administrator to break down internal barriers that limit input to the design process are critical. To create truly customized, creative, and effective program designs, time and budget must be dedicated to maximize the potential insight to be gained by teaming more explicitly with evaluators, implementers, and other utility staff to hone in on key market barriers or pilot testing product categories, messaging, incentive levels, etc. Sufficient internal resources within the utility DSM department, and/or long-standing support contracts with third-party design advisors, must be prioritized and continually engaged. DSM portfolios commonly allocate 3% to 8% of an annual DSM portfolio budget for EM&V with an average of 4% being common. At the extreme, sometimes the DSM 'design' budget is not identified, prioritized or clearly championed by any particular group within the utility DSM department. As such, program design defaults commonly to short-term contracts for hired outside third-party design contractors to quickly prepare the regulatory plan with less than six months of notice, with little time or budget to truly assimilate the organization's past performance, evaluation findings, baseline and market assessment study findings, and no opportunity for targeted testing of incentive or program designs in the marketplace. With limited institutional knowledge and small, short-term contracts, development of more innovative and customized DSM designs are not easily obtainable. Good design requires an investment of time and resources, which at minimum may be equivalent in dollar terms to at least 1% per year or more for a large multi-million dollar portfolio budget. For example, it should be reasonable to anticipate an integrated design budget of 1% ($750,000) for a $75 million dollar per year portfolio.

Design Vision and Best Practices

DSM program design is required for multiple purposes, and often starts with the creation of the first DSM regulatory plan. These plans include summary descriptions of the program approaches, characterized measures, incentive levels, proposed budgets, savings targets, benefit-cost test results, and more. Key information needs that are most relevant for program designers who are tasked to prepare regulatory plans for public utility commission review and approval include items such as:

- Background on the organizational priorities, goals and objectives for the energy efficiency programs
- Determination of target audience and customer segments
- Identification of market specific barriers and opportunities as well as strategies to overcome them
- Desired allocation for savings and spending percentages by sector
- Measure-level energy and demand savings, incremental costs, and incentives
- Program delivery and marketing costs
- Program evaluation approaches and costs

- Net-to-gross ratios
- Trade ally partnership and customer marketing approaches
- Program eligibility requirements
- End-use loadshapes
- Avoided costs and discount rates
- Measure, program, and portfolio benefit-cost test results
- Applicable and anticipated codes and standards

Each of these program design related items are critical for preparing the first DSM program plan, and also are required for periodic updates to the plan. With proper planning and foresight, utilities and their design or EM&V teams can work to prepare these building blocks well in advance of when the actual regulatory plan is due. For example, ensuring a comprehensive and functional benefit-cost screening tool, populated with current end-use loadshapes, measure savings, and estimated costs per energy savings are fundamental building blocks for the program design process. However, these key inputs are often unavailable at the start of a compressed design process and frequently assembled during the rush period to finalize the portfolio design and regulatory filing in the months just before the plan is due. As such, limited time and budget, by necessity, are invested in core plan design requirements, minimizing research and incorporation of the nuanced details regarding how best to market the program or what specific incentive level range will influence first time participants. Researching program improvements and planning sufficiently in advance to receive regulatory approval for innovative changes requires strategy and coordination within the DSM organization as well as with third-party implementation or evaluation contractors.

A preferred design environment is one in which design is not viewed as a discrete task, but rather is the fundamental driver behind the range of activities carried out on behalf of the portfolio. As noted in Figure 1, program design should be the glue between all of the various implementation, evaluation, and research activities for a portfolio.

Figure 1. The integrated program design cycle

The establishment of a small core design team within an organization, drawing on cross-functional representatives from the utility strategy group, regulatory, evaluation, marketing and implementation teams is ideal. This design team is tasked to ensure design considerations and ideas are continuously solicited across the organization and through sponsored research or investment in the design process. In an organization that emphasizes integrated design, the following activities are to be expected:

- Design is a core and continually process for the DSM organization, comprised of cross-**functional team members. Groups represented may include strategy, regulatory,** implementation, and evaluation.
- Sufficient time and resources are allocated to ensure discrete deliverables (e.g. baseline studies, potential studies, impact and process evaluations, etc.), capture at minimum core design inputs, and preferably, are customized further to inform design gaps or market or programmatic issues. Regulators and utility clients, need to build longer horizons into planning activities to facilitate better value. For example, it should be reasonable to expect a robust and comprehensive baseline/potential study will take approximately one year to complete.
- Discretionary budgets for market research or evaluation are coordinated and targeted to address design gaps. For example, identifying underperforming programs, underserved market segments, or programs with high free-ridership, and testing solutions and strategies to enroll first time participants are explored.
- Ensure measure characterization reflects most current and anticipated changes in codes and standards, including revising deemed savings included in a technical reference manual (TRM).
- Tracking and monitoring market outreach strategies, such as promotional campaigns, targeted mailing, and trade ally motivation events, to document effectiveness.
- Emerging technology research
- Pilot testing of innovative approaches for marketing or delivering programs, or designing new program areas, such as formalizing ways to claim savings by supporting adoption of local, state, and federal codes and standards, or energy use behavior modifications strategies.
- Stakeholder engagement across various forms including focus groups, surveys and interviews (in person, phone, or web-based) with trade allies and customers, to get input on program changes or potential innovations, and if possible, formal support for the plan during the regulatory approval process.
- Ensuring regulatory requirements are addressed in the DSM plan, and program implementation manuals reflect new and improved approaches to design and delivery.

Leveraging EM&V and Implementation for Better Design

As program design challenges become more complex and saving targets increase, the urgency to utilize available resources throughout the DSM program lifecycle for design input is critical. The job of the core design team is to ensure that design considerations and key areas of uncertainty are identified early enough in an activity or project planning and implementation

lifecycle so that research can be framed to achieve required outcomes, as well as yield real value for the design issue of key interest.

For example, in some utility DSM organizations, the work of the EM&V team is poorly aligned with the program implementation or program design and strategy teams. This lack of collaboration between related organizational branches of a DSM organization can be due to internal politics or simply lack of awareness of the importance of coordinating more closely. Often times within EM&V, as well as within the research activities for implementation, discretion is used to prioritize research efforts. In the absence of awareness for critical program design gaps, lost opportunities persist, leading to less than ideal program design and uncoordinated research efforts. Additionally, if the ultimate design needs and perspective is not considered, energy efficiency baseline or potential studies may miss the mark of the key areas of uncertainty that the design team is struggling to identify. Additionally, without proper planning and sequencing of deliverables, portfolio designs are submitted to regulators prior to completion of in-process baseline or potential studies. Additionally, routinely, due to lack of proper planning, the authors have seen potential studies finalized prior to baseline studies being completed, representing lost opportunities for improved DSM planning deliverables. The strategy, sequencing, and awareness of the interconnected opportunities from DSM support activities need to be at the heart of the DSM design team.

Integrated DSM design planning, in which design is closely coordinated with EM&V (or any other channel of the DSM delivery cycle) is essential. An integrated DSM design will effectively leverage EM&V resources (as well as implementation resources) to provide more real-time feedback on program operations, as well as apply the market research capabilities of the EM&V team to identify, test, or confirm program design elements, such as measure mix, incentive levels, trade ally communication strategies, and barrier analysis. Discretionary EM&V budgets, and talented market research staff, can and should be used to assist the design teams objectives. Design uncertainties and research needs often can be incorporated into the broader EM&V function without sacrificing core EM&V impact responsibilities. This requires planning and coordination between EM&V and the cross-functional design team, which, if successful, will truly result in EM&V findings that directly inform design changes that all parties agree make sense.

Portfolio Design Steps

Five major steps, presented sequentially, yet continuous in practice, are suggested as a way to improve the program design process. The suggested program design approach is grounded in applying rigorous analyses to verify efficiency measure savings and cost estimates, followed by infusing program plans with insight from market and stakeholder research, as well as iterative discussion with key stakeholders to finalize program eligibility, delivery and marketing approach, realistic participation goals, and metrics to measure progress. Figure 2 presents a graphical view of major tasks associated with portfolio design planning and consists of five key stages to ensure successful program design. The methodology emphasizes integration of critical components throughout the stages of the program life cycle.

- **Step 1: Planning and Design Meetings:** Energy efficiency program design requires focused research and forecasting of anticipated programs, measures, measure details, delivery costs, and cost-effectiveness analysis. This is best accomplished through review of relevant reports, white papers, and discussions with existing implementation

contractors, potential future implementation contractors, evaluators, and others. The overall purpose of the design meetings are to present ideas and approaches, receive input from multiple perspectives, and identify program design gaps, which can be addressed through targeted market research and stakeholder/customer interviews

- **Step 2: Design-Data Verification:** For programs with deemed (prescriptive) savings, a comprehensive list of residential and commercial and industrial (C&I) measures must be developed and maintained. It is from this measure library list from which measures are selected to meet savings targets, and other portfolio objectives, such as comprehensiveness, participation levels by customer class, and minimum savings thresholds for certain programs per policy discretion or regulatory requirements (e.g. percent of budget allocated to low income programs). The measure library must be current with any applicable technical reference manual, and measure savings, lifetimes, and incremental costs adjusted for changes in codes and standards over the horizon of the planning period.
- **Step 3: Design-Market Characterization Research:** Insight gained from past experience with efficiency program delivery, market research, baseline studies, potential studies, and other market research needs to be processed by the design team, and new opportunities for market research to address gaps or barriers identified. Attention must be focused specifically on the opportunities and constraints of the specific utility's service territory, being mindful of the program designs and delivery techniques that have been successful in other programs across North America and other similar markets. This phase of the design process is on-going and continuous, given market conditions change, technologies evolve, and program participation may vary. Planning ahead to allow findings from pilot programs to be incorporated into design updates and conducting targeted stakeholder research with customers, trade allys, retailers on design considerations is ideal.
- **Step 4: Portfolio Modeling:** Informed by an up-to-date and accurate measure library (Step 2), awareness of best practices in program design, updated program delivery costs and incentive levels, and utility territory specific opportunities/constraints (Step 3), the design team can conduct iterative portfolio modeling of possible programs, participation levels, and anticipated program delivery costs. Iterative modeling sessions, with repeated input from utility staff across the various internal groups, such as strategy, regulatory, implementation, and evaluation, along with key participation from existing and potentially future implementation contractors, will result in a grounded and actionable portfolio design regulatory plan.
- **Step 5: Portfolio Design Regulatory Plan and Continuous Planning:** The final step is preparing the narrative explanation of the process, methods, and proposed approach for the coming period, as well as noting new areas for continuous research and investigation to improve future planning efforts. Once the portfolio plan is approved by a regulatory commission, the design team transitions to revisiting the inputs, assumptions, and areas of uncertainty that still remain in the plan, and/or new areas for research. Design progress is achieved through coordination between implementers and evaluators, looking for ways to maximize insight for continual plan design enhancements, while ensuring core implementation and evaluation objectives are accomplished.

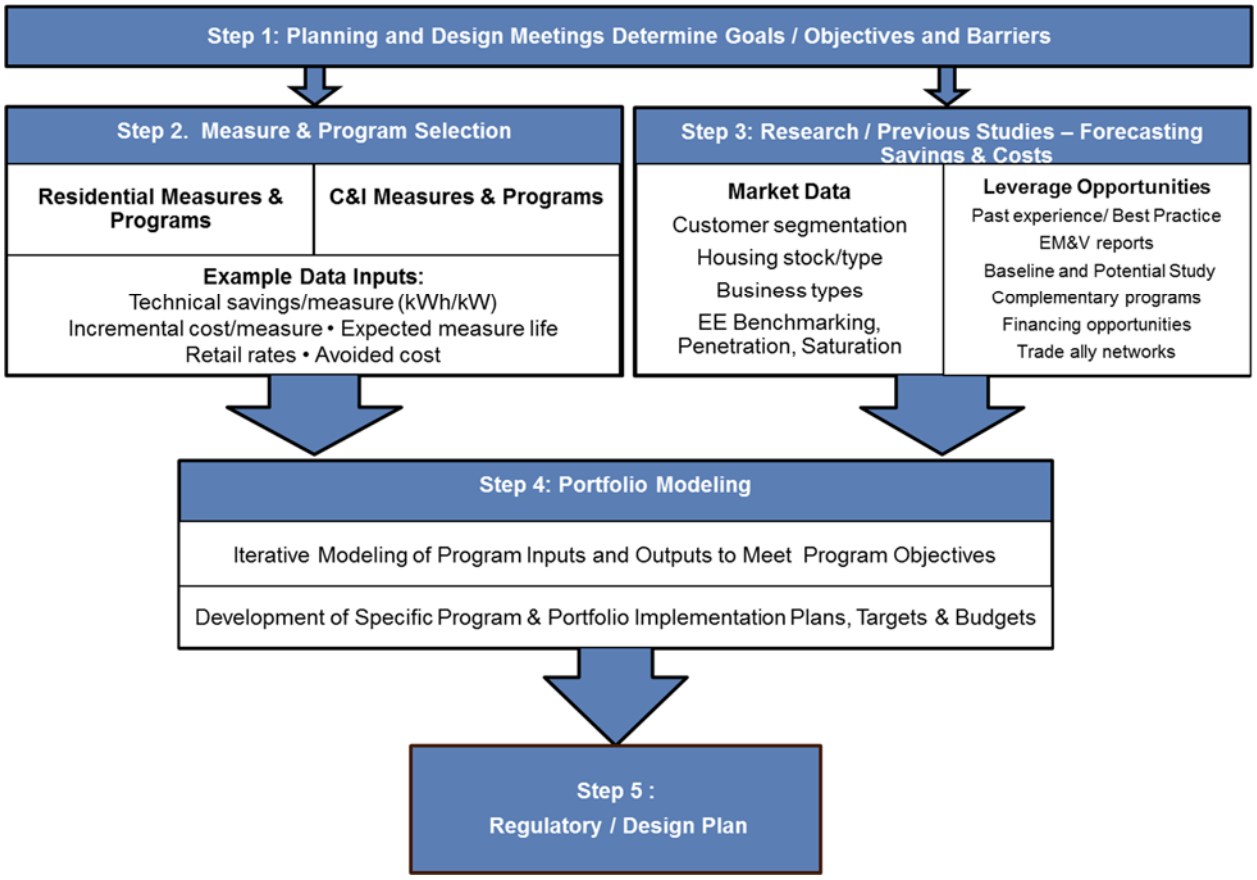

Figure 2. Portfolio Planning Process

Conclusion: Integrated DSM Design is a Continuous Process

The benefits of integrated DSM design are numerous. With an integrated DSM design approach, EM&V plans and process research can be specifically designed to focus on those areas of highest uncertainty and complexity. Evaluators want to provide value from their research efforts, beyond pure impact verification. The core activities of EM&V, such as installation verification or customer satisfaction and general process research, can be easily expanded to address the areas of design uncertainties. The critical step to take advantage of these leveraging opportunities is empowerment of all parties to think of their collective roles as part of the overall on-going design process. To foster this development, breaking down the barriers between design, implementation and evaluation is a necessary first step. Changing the role and function of design within an organization is best accomplished if the team responsible for preparing the final regulatory plan design and on-going design changes is integrated in a continuous manner with the operations of the DSM organizations strategy, regulatory, implementation and evaluation groups. A suggested integrated DSM design philosophy, with a standing 'design team' comprised of representatives from EM&V, implementation, and the regulatory group, is a suggested best practice for ensuring available resources within a DSM portfolio overall are maximized for creating more innovative, valuable, and customized program designs.

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