Quick Take

Utility Demand Side Program Efforts May Leave Millions on the Table

By David Meisegeier, Haider Khan, and Matt Robison

Key Takeaways

1. New optimization methodologies can save utilities up to 40 percent on their annual energy efficiency spending.
2. By optimizing the portfolio during the planning and design phase, utilities can find ways to significantly reduce their spending to meet energy efficiency goals or increase energy efficiency savings for their customers.
3. The framework outlined in this paper has also been applied to evaluate distributed energy resources. This application can bring even greater savings.

New Ways to Get a Lot More Out of Demand Side Programs

According to the American Council for an Energy-Efficient Economy, gas and electric utilities spent more than $7 billion on energy efficiency programs in 2014.[1] But until recently, they have often been designing and implementing their demand side management (DSM) portfolios without being certain that they are implementing the "best" mix of measures, programs, and incentives. This is primarily due to a limited ability to evaluate a broad range of alternatives and assess trade-offs among various objectives, such as maintaining cost effectiveness, meeting budget caps, satisfying energy savings goals, increasing customer engagement, reducing risk, and supporting market transformation and low-income customers. This is understandable, since the analysis of all potential

[1] ACEEE. 2016, *Tracking energy efficiency performance in the United States,* Accessed May 13, 2016, http://aceee.org/ee-metrics

options for designing one program—much less a portfolio—is challenging and has been hampered by a lack of sophisticated analytic tools.

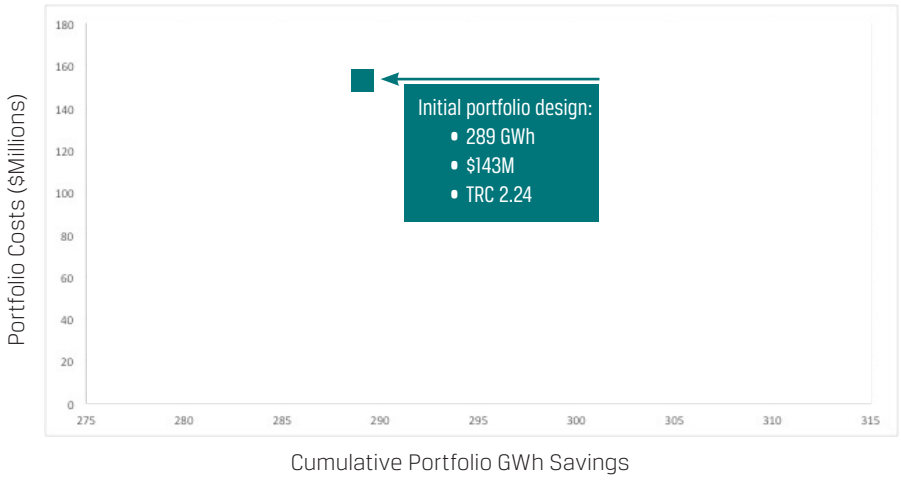
However, new tools and methodologies can permit utilities to find an optimal balance among competing objectives. As utilities contend with low avoided costs, increasing codes and standards, and greater pressure from regulators to rein in rates and deliver cost-effective programs, the simplest and smartest investment that utilities can now make is to incorporate optimization in their DSM portfolio design process.

To illustrate how, we highlight a real-world case study in which optimizing a DSM portfolio could have saved a utility $70 million over three years.

A Better Future: Why DSM Optimization is Key

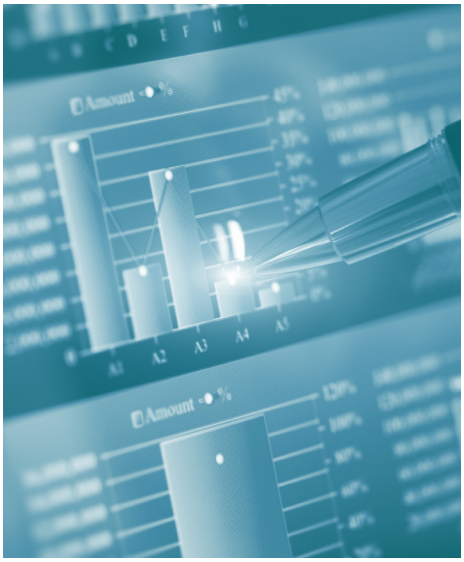
Designing energy efficiency or demand response programs and portfolios is a complex and expensive process, and optimizing at both levels—program and portfolio—is key. When creating a DSM portfolio, utilities assess the ability of a variety of measures and programs to meet portfolio targets and the budgets required for achieving them. As a combination, these programs represent a portfolio with a specific cost and energy savings, as illustrated by the gold dot in Exhibit 1. This point represents just one of many different portfolios that may meet required cost-effectiveness standards.

EXHIBIT 1. COST-EFFECTIVENESS GOAL UNOPTIMIZED: CASE STUDY



But current portfolio development processes often do not systematically address a key question: Could the utility identify an even better portfolio—one that costs less money, saves more energy, or better addresses one or more of the other competing objectives?

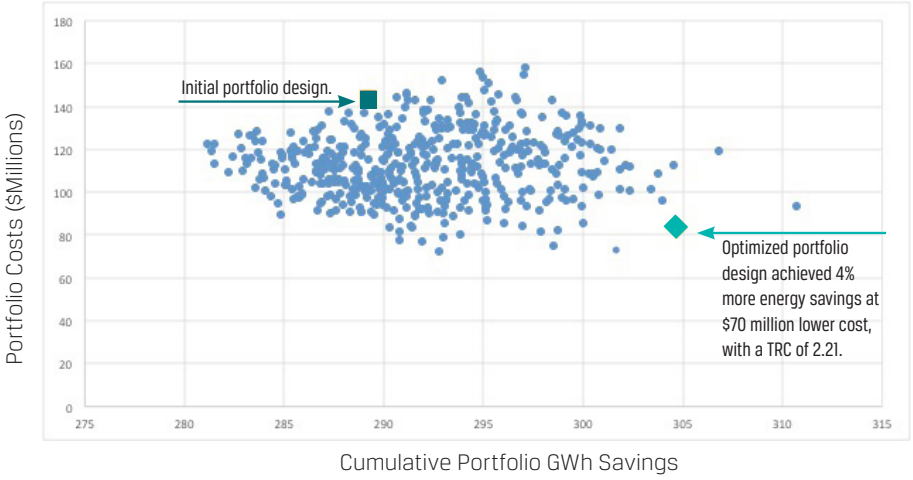
That is the question ICF set out to answer in an analysis performed after a utility had designed its DSM portfolio. Using knowledge gained through our experience delivering hundreds of energy efficiency programs across the United States, we analyzed a wide but realistic range of drivers, such as incentive levels, participation rates, and measure mix. We paid special attention to the most



effective incentive level and strategy as well as different levels of program investment in marketing. The results of that analysis are shown in the scatterplot (blue dots) in Exhibit 2. We found that if the utility had designed its portfolio around the mix of programs represented by the red dot (all of which fall within the range of reasonableness of program assumptions and constraints), it could have saved about $70 million and achieved more than 4 percent additional energy savings compared to the initial portfolio.

Notably, the scatterplot shows a wide range of possible outcomes and options that take into account different combinations of drivers. Depending on their specific needs and circumstances—and applying constraints that are relevant to them—utilities can optimize their portfolios for various objectives, which include ensuring cost effectiveness, maximizing savings and program participation, evaluating and minimizing risk associated with savings goals, and estimating sensitivity of various measures and programs on the overall portfolio.

EXHIBIT 2. COST-EFFECTIVENESS OPTIMIZATION: CASE STUDY



The ability to tailor the desired solution is especially important given the emerging capability to consider non-wire alternatives and locational benefits that distributed energy resources-focused programs and procurements can generate. Key to such analyses are two items:

1. A comprehensive database of potential program impacts and costs, along with a detailed understanding of how different program attributes and incentive strategies influence participation and
2. A comprehensive scenario analysis software, which permits integrated and rapid analysis of thousands of different potential scenarios and optimizes those scenarios subject to multiple constraints.

About ICF

ICF (NASDAQ:ICFI) is a leading provider of professional services and technology-based solutions to government and commercial clients. ICF is fluent in the language of change, whether driven by markets, technology, or policy. Since 1969, we have combined a passion for our work with deep industry expertise to tackle our clients' most important challenges. We partner with clients around the globe—advising, executing, innovating—to help them define and achieve success. Our more than 5,000 employees serve government and commercial clients from more than 65 offices worldwide. ICF's website is **icf.com**.

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