

Garnering the Industrial Sector: A Comparison of Cutting Edge Industrial DSM Programs

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The industrial sector has posed a daunting DSM challenge to utilities throughout North America, even to those with very successful, creative residential and commercial DSM programs. Most utilities have had great difficulty in going beyond conventional programs, such as lighting and premium efficiency motor programs, to target process-related efficiency improvements, where big savings are expected.

A number of utilities have recently taken significant steps to improve their understanding of industrial customer needs and their DSM potential, with illuminating results. Others have pioneered creative approaches to meet customer needs in specific industry segments, through a continuing process of evaluation and retooling of program design elements.

This paper reviews our experience with cutting edge industrial DSM programs over the last year, focusing on their major obstacles and approaches to overcome them. The programs represent utilities of varying size and location. We address issues of industrial DSM planning, program design and delivery, evaluation, and the interface of DSM technologies and customer requirements for environmental compliance.

Improved understanding of the industrial customer decision-making process has emerged as a common thread to the recent advances in industrial DSM and marketing. We cannot overemphasize the importance of market segmentation, assessment of customer distribution, identification of key decision-makers, and research into specific needs, technology-related and otherwise. The identification of specific technology-related constraints, economic hurdles, environmental needs, and other factors have proved instrumental to the success of planning efforts and implementation. We discuss our findings in these areas also, and their implications for future industrial DSM.

Introduction

Promoting DSM in the industrial sector has posed a daunting challenge to utilities throughout North America. Typically, a majority of utility marketing effort is focused to the residential and commercial sectors. These sectors have traditional customer needs (e.g., basic electricity service), allowing electric utilities to market them with a high comfort level. The industrial sector, although understood to be the most energy intensive, is highly complex and has very knowledgeable customers. The need for technical understanding in a process-dependent sector can be quite challenging and even intimidating to a utility's Field and Marketing organizations. The complexity and variability of the industrial sector often minimizes the degree of effort spent on supporting the customer and exploring new energy-efficient opportunities. Subsequently, most utilities have had great difficulty going beyond conventional DSM programs such as lighting and high efficiency motors

programs to target process-related efficiency improvements, where significant savings are anticipated.

A number of utilities have recently taken significant steps to improve their understanding of industrial customers' needs and DSM potential, with appreciable results. Others have pioneered creative approaches to meeting customer needs in specific industry segments, through a continuing process of evaluating and retooling program design elements.

In order to provide a perspective on these successful program strategies, Barakat & Chamberlain conducted a "Best Practices" survey of the utility industry. This Best Practices effort consisted of a survey of cutting edge utility industrial programs and information brought forth through discussions with utility program managers,

technical experts, and industry consultants. The enclosed profile of industrial programs represents those programs deemed both successful and innovative from an initial screening list of approximately 100 industrial programs.

The enclosed highlights of this Best Practices effort are structured in the following fashion:

- Top criteria of the three key players—the utility, the industrial customer, and trade ally-in industrial program design and implementation. Meeting these criteria allow each player’s needs to be fulfilled; thereby, ensuring that the foundation for a successful business partnership be established.
- Findings of the Best Practices Survey. Results provide a review of a total of six program types in the context of the various components of program design: program delivery, marketing strategy, technical assistance, financial incentives, and program administration. The specific program types include:
 - Prescriptive rebates for specific technologies
 - Targeted industries—custom rebates
 - Technical assistance
 - Comprehensive Services-technical assistance and financial incentives
 - Alternative project financing
 - Industrial rate options

Within these six program types, we identify the utilities and their respective cutting edge industrial programs, including a brief description of the program.

- Conclusions stemming from the Best Practices survey, including recommendations on essential steps to understanding customer needs.

Criteria for Evaluating Best Practices

Barakat & Chamberlin conducted surveys of successful industrial programs offered by North American utilities. The surveys covered the following types of programs: prescriptive, customized, industry-specific targeting, technical assistance, financing, and rate options. Whatever the program type, in order to achieve success, the program must meet the needs of all the parties that are involved. The principal players in industrial DSM programs are the utility, the customer, and trade allies

(equipment manufacturers, distributors, professional trade associations). The key criteria used in the qualitative screen for evaluating “Best Practices” in utility-sponsored industrial DSM programs are highlighted below.

Utility Criteria

The utility is concerned with customer satisfaction and retention as well as program cost-effectiveness. The issues involved in meeting these goals are discussed below.

- Customer satisfaction. The utility wants its programs to increase customer satisfaction by reducing customer bills, increasing competitiveness of the customer through process improvements, aiding in environmental compliance, and providing the customer direct contact with utility representatives.
- Customer eligibility. The utility wants to offer services for large number of customers, large users, and industries that are struggling to maintain competitiveness.
- Savings potential. The utility seeks to target opportunities that can provide significant savings for individual customers and the utility as a whole.
- Comprehensive end-use coverage. Since repeat marketing costs can be high, a utility wants to achieve comprehensive retrofits whenever possible.
- Savings persistence. Utilities want to invest in long-term savings that provide value by reliably offsetting generation needs.
- Technical reliability. Since DSM is an important customer service tool, utilities seek to promote only reliable equipment that will not lead to customer complaints, as these complaints will be associated with the utility program.
- Cost-effectiveness. Utilities incur administrative costs to manage programs, pay incentive costs, and hire industry technical experts to provide design assistance. These costs need to be balanced against the avoided cost benefits, in order for a program to be cost-effective. Utilities are interested in ways to leverage their efforts, using strategies such as recruiting trade allies.
- Utility staffing requirements. Utilities are concerned with whether a program can be marketed successfully using utility staff. The program may require expertise not possessed by internal staff (outside expertise) or the addition of new staff.

- Technical expertise requirements. Utilities often use independent industry experts to provide design expertise to customers. The availability and cost of these services factor into program design.
- Fuel switching. Single-fuel utilities are concerned about preserving market share.
- Market transformation. The ultimate goal of many utility programs is a market transformation. Once the market barriers (information, stocking, availability of financing) are broken down, energy-efficiency incentives may not be needed.

Customer Criteria

The customer is concerned with reducing energy costs, but other issues, such as process improvements, reliability, or environmental compliance are often more important. The issues faced by customers are discussed below.

- Ease of participation. First and foremost, customers run a business. Participation in utility DSM programs must be convenient. Convenience includes minimal effort on the part of the customer and minimizing production disruptions for the installation of new equipment.
- Non-energy benefits. Customers are most likely to adopt measures that have non-energy benefits, such as improved product quality, greater reliability, or facilitation of long-term environmental compliance.
- Minimizing risk. Changing production procedures is a risk. Customers are looking for proven technologies and procedures that ensure smooth operation and minimize disruption to their processes.
- Cost-effectiveness. Customers are looking for options with persistent savings and short payback periods (generally less than two years).
- Capital availability. In addition to needing to plan capital outlays for the next budget cycle, many firms are cash constrained. Investing in energy efficiency may not be the most logical or pressing choice for the customer. Some customers may require outside financing to implement cost-effective equipment.

Trade Ally Criteria

Trade professionals are involved in all the steps that are required for the installation of energy-efficient equipment. Architecture and engineering firms specify equipment.

Vendors stock equipment, and contractors carry out the installations. Including the needs of trade professionals in program design is important if they are to become trade allies. Trade ally concerns with DSM programs are discussed below.

- Potential impact on business or sales. If trade professionals see energy efficiency as a way to provide increased value to customers and thereby increase sales, they are more likely to become trade allies and help promote utility programs. Utility training and financial incentives can help trade professionals deliver more value to customers.
- Stocking costs. Stocking additional product lines is an expense for trade allies. They need to be assured that the program will remain in place with adequate funding so that they can recover their investment.
- Paperwork. Many utility programs train trade allies to fill out paperwork for customers. Administrative paperwork needs to be kept simple and require a minimal amount of time to complete.
- Simplified proposal requirements. Some utilities require two proposals, one for the baseline equipment and a second for the efficient equipment. Reducing the proposal requirements either by offering prescriptive programs with line item calculations or reducing unnecessary design analysis will increase participation.
- Two-way communication. Trade allies value being made part of the utility extended team and being included in utility training sessions. It allows them the ability to provide input into utility program design and also to gain additional training and be aware of new programs before they are rolled out.

Best Practices in Industrial DSM Program Design and Implementation

The Best Practices assessment examined current DSM programs offered by utilities in North America to their industrial customers and identifies successful design and implementation practices. The assessment entailed an initial program screening that evaluated numerous industrial program offerings by North American utilities against the listed criteria of the principal players (utility, customer, and trade ally) and includes a Barakat & Chamberlain survey of 17 cutting edge industrial programs. Information was derived from discussions with utility program managers, technical experts and project engineers, and industry consultants. Program offerings included:

- Prescriptive rebates for specific technologies
- Targeted industries—custom rebates
- Technical assistance
- Comprehensive services-technical assistance and financial incentives
- Alternative project financing
- Industrial rate options

Each program type was reviewed within the context of the various components of program design, program delivery, marketing strategy, technical assistance, financial incentives, and program administration. A brief summary of the six program types is listed below.

Program Types

Prescriptive Rebates for Specific Technologies

Prescriptive rebates for specific technologies are commonly offered to customers when the associated costs and energy savings are relatively constant across various applications of the technology. Efficient lighting technologies and high-efficiency motors are often encouraged through prescriptive rebates.

Before the program is launched, utility program managers meet with trade allies to alert them of the upcoming program and to verify that qualifying equipment is available. The utility staff work with trade allies who have first-hand knowledge of customer purchasing patterns to project participation rates and customer response to qualifying equipment and rebate levels. Equipment costs and procurement time frames are discussed to coordinate the expiration date of the program. At this time, utility staff review rules for eligibility and participation, and educate trade allies on how to complete program application forms. Trade allies then become an extended sales force for the prescriptive rebate program.

Information about the program is sent to all eligible industrial customers at the plant manager and energy manager/engineer level (key decision-makers). Utility staff and trade allies are available to answer questions, but no extensive technical assistance is offered as part of this program. Financial incentives are set (prescribed) at a specific level of dollars per unit, with units represented by equipment size, speed, or quantity.

Program administration costs and program management are simplified in this type of program, since customers do not have to provide the utility with documents that prove equipment savings. In most cases, the customer must only complete an application form according to program rules, and submit supplementary proof of the equipment purchased to the utility for a rebate check to be processed. The ease with which customers may participate is a major strength of this program design concept.

Targeted Industries—Custom Rebates

Custom rebates are the most common type of utility financial incentive offered to industry for process-related energy efficiency improvements. This is because the costs and energy savings from process-related energy efficiency options are usually site-specific, requiring individual assessment per project. By targeting particular industry segments, utility marketing efforts are more effective in encouraging participation.

This approach relies on the customer to initiate the project, submitting the necessary documentation on the cost and savings involved to the utility for review and approval. Trade allies play an extensive role in this program depending on their knowledge of the program. Unless the utility offers technical assistance as part of an umbrella service offering, trade allies provide most of the technical assistance to a customer as part of their standard business practice. One drawback is that a particular vendor may not fully understand how the entire process works and may not be able to focus on energy savings opportunities.

Custom rebates can be structured in different ways, such as a fixed price paid per kW/kWh saved, a fixed percentage of the cost of the measures, or an amount calculated to provide the customer with an acceptable payback or rate of return. The key is to keep calculations simple, allowing customers to find it worthwhile to submit an application. Training trade allies on completing the application form is also recommended.

Program administration costs and management for custom rebate programs are slightly higher than for prescriptive rebate programs. Each application must be reviewed extensively by the account representative to ensure that the calculations are correct and that the technology application is appropriate. Processing the application requires additional staff time, and thus program costs are higher.

Technical Assistance

Technical assistance can range from simple walk-through energy audits that are relatively inexpensive to conduct per

site, to comprehensive engineering feasibility studies. Technical assistance looks not only at new equipment, but also at better matching of fuel sources to processes, and optimizing production options to ensure energy conservation.

Technical assistance can be provided by utility representatives (on a selective basis) but are typically provided by technical or industry experts familiar with the industrial processes involved. While some industrial customers have in-house technical experts, or outside experts with whom they are comfortable working, other customers can benefit from utility efforts to introduce them to technical experts to assist them. Utilities are moving to hiring selective industry experts into technical staff positions to address and support key customer segments.

Some utilities have targeted specific end uses as a focus for technical assistance programs rather than targeting specific industries; others incorporate both strategies. The approach depends upon the amount of market research that has been conducted. When innovative technologies are developed, there is not always a definitive answer as to which industries might benefit from them. Technical assistance may require an R&D component whereby the utility and customer partner with a research group such as EPRI or GRI to solve certain process-related problems and enhance competitiveness.

Comprehensive Services—Technical Assistance and Financial Incentives

Comprehensive services involve packaging technical assistance, financial assistance, and installation services within a single program framework. While few utilities offer comprehensive services to their industrial customers, those that do have experienced significant improvement in industrial sector DSM. Providing comprehensive services to individual customers in a staged fashion, by working with them on a series of projects over time, allows the customer to integrate DSM into their overall business planning process while simultaneously addressing their competitive needs.

Delivery of comprehensive services involves project teams comprised of members from the customer's process facility and financial office, the utility central office, responsible account representative and trade allies. Large projects are segmented into smaller phases to keep the costs of the projects more manageable, in terms of the customer's budgeting cycle, and to keep the interest of the participants high. Comprehensive services often begin with a preliminary audit of the facility and a recommendation for further action: prescriptive rebates for specific equipment; a more detailed analysis of processes; custom

rebates and financing. As each phase is completed, credibility builds and the customer views the utility as a business partner.

Comprehensive services require extensive program administrative and management effort both on the part of the customer and the utility. The account representative tends to coordinate services with the project management team, and thus needs to have excellent project management skills as well as technical know-how. The least complex projects should be completed first to allow the team to achieve early success; thereby, establishing a solid foundation to build upon with future projects.

Alternative Project Financing

Alternative financing within programs targeting industrial customers has been limited but there is a growing trend to explore creative financing options for industrial customers in order to enhance their overall competitiveness and overcome limited capital budgets. The majority of industrial customers have access to capital, and those who do not may represent a significant risk. The target market for this type of program are those customers who are considered to be a good credit risk. Bidding programs are one avenue utilities have used to acquire industrial sector energy savings without offering up-front financial incentives. Other options include the use of energy service charges and third-party financing through shared savings arrangements. Lengthy contracts and ongoing program evaluation documentation can make these programs expensive and time consuming for both customers and utility staff. Persistence of savings "proof" for shared savings programs can also become cumbersome and keep customers from turning to the utility for financing assistance.

Third-party contractors tend to focus on "cream-skimming" measures such as lighting retrofits; thus, careful thought must be given in the up-front planning process to structure a program such that it will target the right end-uses (process-related) and will elicit participation by qualified project teams.

Industrial Rate Options

Industrial rate options are usually employed to encourage load shifting or peak clipping, rather than energy efficiency. Typical rate options include time-of-use pricing, real-time pricing, interruptible and co-op (a group of customers cooperating as a group to curtail load) pricing. However, there is one rate option directed at energy efficiency. Several utilities have preferred rates offered to large customers for modernizing the processes within their facilities. Target markets may include those industries

with a critical need to modernize and maintain competitiveness or those with a particular end use that requires high energy use. Again, account representatives must be trained to work with the utility rate department to deliver this program to customers. An electric charge/rate is negotiated depending on the objectives of the utility and the customer. The administrative costs for such a program are low. Any technical assistance can be incurred in the rate charged to the customer.

Successful Utility Industrial Programs

Barakat & Chamberlin conducted an extensive screening process to determine those utility industrial DSM program offerings that were both successful and innovative. Table 1 provide a list of nineteen programs, categorized by respective program type. A brief description of the project and its overall results are also included. The insights gained from these programs as well as some essential guidelines that these collective programs offer the utility industry are summarized in Table 1.

Conclusions

Before outlining some essential steps that utilities need to address in order to successfully support the industrial segment, it is important to understand the industry perspective. For industries, the cost of energy is typically only a relatively small percentage of product cost and therefore not a major focus of attention. Coupled with the perceptions that utilities do not have process-specific understanding, and utilities have not been proactive in communicating with them, industrial customers question what utilities can offer them. In addition, industrial customer needs and desires from DSM programs vary.

There is agreement that utilities should be open to industry-designed proposals that fit industry's priorities and needs. Flexibility is imperative. The successful industrial DSM programs outlined above are indicative of the proactive efforts of utilities. The utility response to industrial support has included hiring industry specialists who understand specific industrial processes, augmenting staff skills by partnering with technical experts, and including industry representatives and trade allies in program design. All of these steps address the building of a partnership with the industrial customer.

Some industrial customers like DSM programs and the immediate value of rebates (instant capital is made available to them). The utility should design its program to provide industrial customers sufficient up-front financial incentives to meet a typical industrial customer's two-year payback requirement. The incentives should be

individualized for each specific conservation measure and application to reduce the initial cost of the investment. It is important to understand that providing incentives to meet this two-year payback does not require a utility to provide 100% rebates for the energy efficiency equipment and measures. By working with industrial customers to determine the effects of conservation on maintenance costs, productivity, product quality, and equipment reliability, it may be possible to negotiate incentives which are effective but cover only 20-50% of project costs.

Improved understanding of the industrial customers' decision-making process has emerged from the recent advances in industrial DSM and marketing. We cannot overemphasize the importance of market segmentation, assessment of customer distribution, demographic profile, and research into specific customer needs, technology-related, competitiveness, and otherwise. The identification of specific technology-related constraints, economic hurdles, environmental needs, and other factors has proved instrumental to the success of utility planning efforts and implementation. The more thoroughly a utility understands the industrial customer's perspective, the greater the likelihood that the customer will participate.

Identification and understanding of these needs and constraints is essential. This understanding can be achieved through a combination of first-hand industrial experience (program implementation) and detailed market segmentation. These efforts culminate in a thorough understanding of the targeted customer. With this understanding, the utility can market the "value-added" features of energy efficiency measures, such as more reliable production with premium-grade motors or better process control with adjustable speed drives.

The industrial customer looks to the utility to be its energy management expert as well as assistance in technology assessment and evaluation, based on information-sharing. The utility must be postured to support these high-value customers with a full menu of services and options to consider and pursue. This comprehensive customer service approach will result in enhancing the utility's credibility with the industrial sector, thereby allowing the building of a strong business partnership between the utility and its industrial customers.

The industrial sector still remains a mystery and an intimidating, potentially impenetrable market for many utilities throughout North America. The results of this Best Practices effort emphasize the need to balance the needs and key criteria of each of the principal players within industrial DSM. Too often, utilities design and roll-out DSM programs that meet their criteria and goals with secondary priority given to the customer and trade ally key concerns. The utility that achieves the optimum

Table 1. Best Practices Program Results

Program Type	Utility	Program Title	Description	Results
A-1	Iowa Illinois	Industrial Process Optimization	Target top 100 customers for process optimization. Bundle efficiency and process improvements.	12 customers participating in first year.
A-2	New England Electric	Energy Initiative	Prescriptive rebates for large industrial customers. Account reps successfully use a one-on-one approach with customers.	Achieved a benefit to cost ratio of 3.69. Served 767 customers.
A-3	Ontario Hydro	Compressed Air System Check-Up	Target small-medium industrials within key industrial segments. Utility-paid audits, system checks, and feasibility studies.	30% participation in two years.
A-4	Baltimore Gas & Electric	Compressed Air Program	Extensive market research conducted to develop optimum program design. Introduced special customer rep training.	12 accounts installed 21 compressors in first nine months of program.
B-1	BPA	Energy Savings Plan	Provides energy reviews of largest industrial facilities, payments for conservation acquisitions, and motor rebates. Set up as "umbrella" agreement per customer. Uses multiplying factor for rebates.	55 projects completed. Annual energy savings of 1.8 GWh each.
B-2	Ontario Hydro	Industrial Performance	Aggressive trade ally recruitment and training program to promote sales of energy-efficient equipment. Top performing trade allies recognized.	Achieved more than 50 MW of savings in first 18 months.
B-3	Pacific Gas & Electric	Customized Gas and Electric Rates	Targeted to large conservation electric and gas industrials. Targets 14 key segments. Rebate up to 50% of project cost.	46% process-related rebates were electric; 77% process-related rebates were gas.
C-1	Carolina Power & Light	Energy Efficiency Plant Program	Provides in-depth technical assistance to key industrial segments. Promotes state-of-the-art technologies in new plant operation.	350 facilities have participated in program. 60–70% have adopted recommendations.
C-2	Southern California Edison	Fuel Substitution	Developing viable alternatives that address customer process-related issues. Employs staff industry experts for key industrial segments.	Key segments (Food Processing, Metals, Furniture) ongoing support. Customer response favorable—assists in maintaining competitiveness.
C-3	Puget Power	Industrial Energy Management Services	Offers a number of services under "umbrella" support for industrials. Customer-driven approach to address process measures.	Proactive participation by industrial segment. ASD projects went up five-fold.

Table 1. (contd)

Program Type	Utility	Program Title	Description	Results
C-4	Boston Edison	Energy Efficiency Partnership	Goal to reduce one billion kWh through energy efficiency. Comprehensive approach to long-term energy efficiency. Utility hires engineering firms for comprehensive audits.	Customer response overwhelming. Large backlog of customers waiting for services.
D-1	Northeast Utilities	Energy Action and Customer Initiated Programs	Promotes comprehensive implementation of energy conservation measures to large industrials. Customer options are to go through Contractor/Arrangers or through customers themselves.	Delivered 35,000 MWh of energy savings, 15% process-related.
D-2	BPA	Energy Savings Plan	Provides energy reviews of largest industrial facilities, payments for conservation acquisitions, and motor rebates. Set up as "umbrella" agreement per customer.	55 projects completed. Annual energy savings of 1.8 GWh each.
D-3	Southern California Gas	High-Efficiency Equipment Replacement	Goal is to work with industrial customers in addressing their competitiveness, and ensuring retention.	Customer response excellent, support ongoing. Customer competitiveness improved.
E-1	PacifiCorp	Energy FinAnswer	Provides upfront capital for installation of energy saving measures. Balances utility and customer criteria. Targets customers with highest credit rating and largest conservation opportunity.	Pilot program. Customer response promising.
E-2	Public Service of Colorado	50-MW Bidding Program	Two 50-MW bidding programs offered by utility to customer promoting implementation of energy efficiency. Uses benchmark of \$240/kW.	First goal of 50 MW will be met.
E-3	Northeast Utilities	Energy Action and Customer Initiated Programs	Promotes comprehensive implementation of energy conservation measures to large industrials. Customer options are to go through Contractor/Arrangers or through customers themselves.	Delivered 35,000 MWh of energy savings, 15% process-related.
E-4	Southern California Edison	ENvest Program	Offers eligible industrials financing and project management design and installation of comprehensive energy efficiency solutions. Minimum qualifications in-place.	Pilot program. Two projects approved.
F-1	Georgia Power	The Modernization Rate Rider Program	Targeted at large industrials with minimum demand of 500 kW. Aimed at key segments (textiles and high process heat requirements). Part of overall menu of services.	Approximately 100 customers. \$20-\$30 million in technology investments.

balance of meeting all principal player needs and exhibiting open two-way communication throughout the program design, planning, and implementation process will be successful in reaching the industrial sector.

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