INDUSTRIAL DEMAND-SIDE MANAGEMENT IN TRANSITION

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SUMMARY

The utilities industry is changing, perhaps fundamentally. As utilities change, so does the nature of demand-side management (DSM). With respect to industrial DSM, an evolving paradigm is that utilities foster sustainable long-term partnerships between themselves and their industrial customers. This implies:

- Involvement of industrial customers in the development of utility DSM programs designed to serve them.
- A shift from utility rebates toward project financing plans so that individually participating customers are seen as bearing a fair share of costs.
- Utility and industry cooperation in transforming broad markets that affect multiple customers.

From an assessment of successful DSM practices among utilities, a broad set of objectives for industrial DSM is emerging:

- **Develop sustainable long-term partnerships between utilities and industrial energy users.**
- **Materially assist industrial energy users to be economically competitive and environmentally responsible.**
- **Increase industrial energy efficiency wherever the total benefits of doing so exceed DSM's total costs.**

For utilities to develop sustainable long-term partnerships with industrial energy users to help them be economically competitive and environmentally responsible, their energy-efficiency services need to focus more on core industrial processes and systems. More industrial market research is needed. Utility marketers need the outlook and resources to offer comprehensive services to their customers. Successful utility programs have all reduced the internal financial hurdles to industrial investment in efficiency. If effective, easy to use efficiency financing programs are in place, it is more likely that industrial efficiency rebates from utilities can be cut back without halting momentum toward overcoming the barriers to industrial energy-efficiency.

INTRODUCTION

Utilities commissions and other agencies in a number of states have during the past decade or more encouraged their gas and electric utilities to pursue efficiency in all its aspects, including measures increasing the efficiency of energy utilization by their customers. Utility efforts to improve the efficiency of end-use energy utilization, through measures that change the amount of energy utilized or the timing of its use, may be called conservation and load management --C&LM-- or demand-side management --DSM. Commissions have grounded their policies in the effort to increase the overall level of economic welfare in their states, consistently with other objectives, including environmental protection, and equity in rate-making. As a result of these policies, electric and gas utilities in California, Massachusetts, Minnesota, New York, Wisconsin, and several other states came to operate an extensive array of DSM programs that have begun to make significant headway in the industrial sector, which is the particular focus of this paper. (An earlier version of this paper was submitted in 1995 testimony in the Advance Plan 7 proceeding of the Wisconsin Public Service Commission.)

At the same time, the utilities industry itself has been changing. The structure of the gas industry has undergone change through a process of deregulation and service unbundling that is not yet complete. Now, the electric industry is on the cusp of as great a change. Both federal and state policies have tended to promote greater competition in the electric industry, at least at the wholesale level. As this tendency has grown --supported, for example, by the wholesale generation features of the US Energy Policy Act of 1992-- so has interest in extending competition into the retail electric sector. Consequently, most commissions by 1995 had opened dockets to consider the structure of the electric industry, to fully explore the question of how optimally to arrange the industry so that the power of competition is utilized while at the same time public values related to the electric industry are protected.

It is not our purpose in this paper to develop and assess scenarios for the future of the electric industry. Rather, we focus on *how* utilities (electric and gas) can make the efficiency services they provide to industrial customers even more effective during the transition period to wherever we are headed. Our analysis draws upon utility DSM experience in the industrial market to date, as reported in summary studies and as reflected in particular cases.

In the event that utilities are relieved of any obligation to promote DSM in the future, perhaps because they are broken up into separate companies providing fully unbundled services, the DSM capabilities that they develop in the interim will be valuable business assets that can be spun off into the energy market-place. Increasing numbers of utilities have developed or acquired energy-service subsidiaries, which can be seen as an outgrowth of their DSM experience. On the other hand, in the event that there remain distribution-level utilities, with service areas, responsible for delivering power through wires (or gas through pipes) to ultimate energy users, it seems likely and desirable that such distribution companies (electric distribution companies, or EDCs, and gas local distribution companies, or LDCs) will be expected to actively assist their customers, including their industrial customers, to: secure reliable energy services at fair prices; become more productive in their use of energy (i.e., energy-efficiency, DSM); and be environmentally responsible. The DSM capabilities that utilities maintain and improve during the transition will be equally valuable in this scenario.

Industrial Energy Efficiency -- Needs, Barriers, Opportunities

Though DSM is a utility industry-originated concept, our approach to assessing industrial DSM will actually begin less with the utilities than with the issue of *what energy-efficiency services industries are likely to find useful, and why.* We will reprise the characteristics of DSM that has been effective in addressing these industry needs. This in turn will lead us to an analysis of ways in which industrial DSM can promote economic development and be delivered at a lower cost to rate-payers during the transition period.

It is worth touching briefly on the market barriers that to a greater or lesser extent impede industries fully maximizing internal energy-efficiency that would (a) be profitable to them, and/or (b) reduce the resource costs and environmental damages from energy production. It is certainly true that many industries have made considerable strides in increasing the economic efficiency of their internal energy use of the past two decades, in many cases without any programmatic assistance by utilities. Yet it is also true that in many if not most industries significant decision-making imperfections impede the full implementation of economic efficiency measures.

Significant ongoing DSM programs may be cited to suggest the real-world persistence of market imperfections and --therefore-- of opportunities to overcome them:

> •In 1993 the Niagara Mohawk Power Company offered its largest retail electricity users the option of removing themselves from eligibility for DSM rebates and the responsibility of paying for them through rates. About 38 percent of eligible customers took this "opt-out" route. On conducting the energy audits that were required as a condition of opt-out, many efficiency measures that had not been implemented but were nonetheless were cost-effective from individual firms' perspectives were identified. Indeed the total potential savings identified in the audits exceeded ten percent of the customers' existing consumption. Consequently, the utility has gone on to partner with ESCOs and project financing specialists to assist the opt-out customers to implement efficiency projects (DePaull 1994).

•In 1994, Detroit Edison Company operated the Large Manufacturing Customer Pilot Program, through which it assessed *customer-generated* efficiency investment projects that were just outside the demonstrated internal investment criterion of the eligible firms. The utility bought down the costs of these projects just enough to facilitate their implementation, resulting in 38 separate project commitments among three auto manufacturers and two steel companies. At the same time, in the context of negotiating ten-year firm power contracts with the three auto companies, Detroit Edison agreed to increase the number of (already-present) utility-supported energy-efficiency engineers posted to the auto plants (DSR 1995).

These recent programs are instructive because they suggest that large industries have not already "done it all" in terms of DSM. Indeed, to a greater or lesser extent, we likely will find in most industrial firms that there remain key barriers, pertinent to the remaining energy-efficiency market potential, such as:

•Energy consumers emphasizing first-cost and exhibiting payback requirements for energy-efficiency measures that are in excess of those they apply to other investments (as well as in excess of those that energy producers apply in their businesses).
•Consumers exhibiting lack of information, including information about technology characteristics, the impacts of their own behavior on energy bills, the non-energy benefits of efficiency technologies, etc.
•Consumers exhibiting "bounded rationality," which has been discussed recently as follows:

> "[F]irms may have to solve extremely complex optimization problems in order to obtain desired energy services at least economic cost....A large portion of commercial sector utility consumers surveyed by a US utility were unable to specify their investment criteria for energy efficiency measures....[I]t has become increasingly clear that firms do not generally employ strictly 'rational' rules of investing such as portfolio techniques..." There is a tendency to "satisfice" not "optimize" (Krause 1994).

INDUSTRIAL CUSTOMER NEEDS

The Customer's Perspective

Effective industrial DSM must reflect customer needs, utility needs, and trade ally needs. Our assessment of program strategies and tactics to promote quantifiable and comprehensive industrial efficiency gains begins with the question of what energy-efficiency services industrial customers require. In our subsequent sections, we will also address the relation of customer needs to utility interests and trade ally roles.

One recent survey of industrial DSM "best practices" identified these key issues faced by customers (Kyricopoulos 1994, p. 10-124):

- Ease of participation (minimal business disruptions);
- Non-energy benefits (e.g. product quality, environmental compliance);
- Risk minimization (proven measures, no disruptions to operations);
- Cost-effectiveness (e.g., investment paybacks under two years);
- Capital availability (internal budget cycle/outside financing needs).

Overlapping with the above list is a set of traits common to successful industrial DSM programs, as identified by Jordan and Nadel (Jordan 1993, pp. 49-53):

- Addressing customer concerns (energy *and* related non-energy needs);
- Effective marketing (e.g., personal contact with customer's appropriate managers);
- Program flexibility (adapt services/offerings to customer needs);
- Financial incentives (rebates, loans);
- Technical analysis and evaluation (industry-specific expertise, market research on customers, feedback from program evaluations).

These two lists define a bundle of industrial customer needs that relate to DSM. Successful industrial DSM programs must confront these needs effectively. In the balance of this section, we provide a discussion of that bundle.

Services Customers Require

Energy-efficiency programs can be delivered by various types of energy service providers (ESPs) -- utilities, utility affiliated energy service companies, or independent energy service companies. Any ESP must recognize the 'bottom-line' focus of industrial customers. Customers must assess how specific actions will affect daily operations, production, productivity and the corresponding financials. An ESP's demonstration that cost-effective energy and demand savings can be achieved must be related to both the energy service needs and the production and financial focus of participants. To make this case the ESP must market its services to relevant (and only relevant) internal decision-makers. This typically includes the individuals who are responsible for energy bill management and power quality management. But it may include several others as well, in areas ranging from building maintenance to environmental compliance. Regarding the latter, it has been suggested that there "has never been a greater need to integrate environment, energy, and electricity use." (MacLoed 1993, p. 173). A framework for one-on-one ESP/customer discussions of services that address the ***overlapping*** needs of the customer will encourage participation. Offering customers services that are customized to their facility and are flexible to their needs is critical for capturing industrial DSM opportunities. For example, the loss of production and revenues may deter the customer from participating despite the potential long-term savings. Programs can address this issue by working to understand customer production cycles and identify time periods (e.g., summer shut-down periods, maintenance periods) when measure installation would have minimal effects on facility operation.

In addition, marketing to appropriate decision-makers within industrial enterprises facilitates the ESP's understanding a customer's budget cycle and its financial limitations from the outset. An ESP may need to phase DSM implementation over several budget cycles; breaking the project into distinct phases can make the project financially feasible for the customer and ensure the implementation of the measures.

The requirement for flexibility relates to many aspects of DSM. The efficiency options that are assessed and promoted need to match configurations of equipment and processes that vary from site to site, often even within a single industry type. There are more than technical differences among customers; one customer may have capital for projects that meet nominal internal financial hurdles, another may not. One customer may wish to rely on ESP-identified or supplied personnel for initial engineering assessments or subsequent equipment installations; another may prefer experts and contractors of its own choosing. If customers do need outside expertise they require that it be high-quality and industry-specific. Finally, the administrative burden of program participation should be minimal. Lengthy application forms, approval processes and burdensome paperwork can intrude on customers' activities and discourage participation.

Customers obviously require reliable performance from the equipment, systems, or procedures they put in place as part of any internal project. When that project in whole or in part involves energy-efficiency, these requirements require candid answers to such questions as:

- What percentage of the projected savings will actually be achieved?
- How sure is it that the measures will perform as intended? Will productivity increase?
- Can actual participant costs exceed the projected costs?

Quality assurance (QA) services are related to the requirements for reliability just described. Providing an explicit and comprehensive QA process demonstrates an ESP's technical competency, minimizes adverse impacts on the company's daily operations and reduces equipment performance risk. Effective industrial energy-efficiency programs may include a combination of QA services:

- Pre-approval processes: to ensure the applicability and proper sizing of the equipment;
- Post-installation inspections;

- Training and certification of installation staff; and
- Equipment warranties.

Whatever type of ESP (utility, ESCO) attempts to deliver energy-efficiency services to industry, its ability to address these energy-related customer requirements will be related to its success.

UTILITY INDUSTRIAL DSM EXPERIENCE

The Case for Utility DSM Programs

In a time of re-examination of the fundamental premises of utility DSM, we must identify what inherent assets, if any, gas and electric utilities can contribute to industry in its search for competitiveness, and to society in its search for sustainable economic development. Moreover, we must identify those assets which adhere to the distribution utility as such, since it may be the only energy "utility" remaining when some states finish their restructuring processes. We see three broad types of asset:

1. **Ongoing business relationship with industrial customers.** The enlightened self-interest of a utility -- investor-owned or publicly owned -- is to foster the short-term and long-term economic viability of its industrial customers. On-going relationships with customers provide both a basis for effective efficiency-oriented interventions, and a motive for ensuring their field success. It may take regulatory or policy prodding for every utility to see this, but there is a basis for enduring partnerships around energy services and related services that promote productivity and environmental responsibility, namely, common interests.

2. **Access to customers' usage data.** The utility that delivers the power or gas to the user has information about customer energy usage characteristics that is indispensable to the identification of on-site efficiency projects and the assessment of their likely prospects for success. Billing records are sometimes disposed of too soon -- a practice that is readily remediable in the electronic era -- but they are there. Wisconsin Electric and several other North American utilities have supplemented billing data with end-use metering projects to gain greater depth of understanding in this regard. Utilities are positioned to build up the basic data, directly and through statewide initiatives such as the California Institute for Energy Efficiency and the Wisconsin Center for Demand-Side Research.

3. **Incentive for comprehensive and sustained DSM.** To the extent the utility recognizes its long-term interest in the maximum viability of native enterprises, and in the regional economic development that follows when their total energy bills are minimized, there is a built-in incentive for that set of efficiency measures -- and related improvements -- that most assists the customer over time. A utility may require prodding by policy-makers to fully recognize its long-term interest in this regard; and competition for fuel shares between gas and electric distribution companies may affect this incentive in complex ways; but there is an objective basis for it.

Conversely, "cream-skimming" stop-gap measures are not incentivized. In addition, utility-operated DSM (as opposed to bid-out DSM) provides a "feedback loop" that reinforces the utility's own long-term commitment to DSM. That is, in the internal debate over DSM that occurs periodically in most utilities, the ability to directly operate DSM programs and reap their rewards in terms of customer satisfaction, load retention, synergies with marketing efforts, and regulatory relations, should strengthen the hand of those who wish to dedicate utility resources to customer-side energy-efficiency on a long-term, sustained basis.

The Evolution of Industrial DSM Programs

The primary objective of what might be called first-generation utility industrial programs was resource procurement --causing the industrial customers to save energy (electric energy and demand, gas commodity costs) through programs less costly than the supply-side costs avoided, perhaps with some accounting for additional benefits, such as the environmental factors utilized in various ways in several provinces and states. Successful utilities also often had the objective of increasing the loyalty of participating customers through energy-efficiency, or even of retaining the load of economically threatened customers. Nevertheless, achieving participation and consequent energy savings cost-effectively was the primary objective, and the greater the portion of the industrial savings potential thus tapped, the more successful the program. This objective is, of course, still central. But the objectives have broadened in a number of related ways. First, energy efficiency is increasingly put in the context of a broader societal objectives: promoting mutually reinforcing economic development and environmental improvement, sometimes called "sustainable development." Two sub-points:

- Industrial firms making the internal improvements necessary to stay competitive place energy-efficiency in the context of multiple objectives --overall internal process optimization, productivity, and profitability.
- Industrial firms complying with both current and anticipated environmental regulations regarding air pollution, water quality, hazardous wastes, and other impacts, give energy-efficiency a role in meeting multiple objectives.

Related broadenings of objectives have to do with the time dimension and with the politics of utility-industry interactions around efficiency. First-generation DSM focused on "once-through" programs, cost-effective savings would be procured and the program would then be over. As a short-run programmatic response to regulations or legislation in many jurisdictions, programs were designed centrally by utilities and their program contractors with fairly limited input from the customers targeted by the programs. Programs were rebate-driven and indeed, as we shall see, financial incentives contributed strongly to success in participation, implementation, and so to savings.

In many U.S. jurisdictions, industrial customers complained about what we have called first-generation DSM, as did Electricity Consumers Resource Council (ELCON), a national association of large electricity users. The complaints were often about industrial ratepayer responsibility for the costs of residential or commercial DSM, but sometimes also about the equity of participating customers within the industrial classes receiving payments collected through rates to others (see, for example, Pritchett 1993). Partly in response to such concerns there is increased interest in processes that collaboratively involve industrial interests from the beginning, and that develop resource sharing designs that can be perceived as reasonable and fair over time, and thus are politically sustainable. (Of course, while collaboration between utilities and industrial energy users is a cornerstone of political sustainability, wider collaboration amongst all key stakeholders is essential to developing new approaches that identify common ground at the policy and regulatory level and good program design at the implementation level.)

The evolving new paradigm, in contrast, is that utility DSM should foster "sustainable long-term partnerships" between the utilities and their industrial customers. This implies:

- Involvement of industrial customers in the development of utility DSM programs designed to serve them.
- A shift from utility rebates toward project financing plans so that individually participating customers are seen as bearing a fair share of costs.
- Utility and industry cooperation in transforming broad markets that affect multiple customers.

Based upon the most successful DSM practices among utilities, we can note that a broad set of objectives for industrial DSM is emerging:

- **Develop sustainable long-term partnerships between utilities and industrial energy users.**
- **Materially assist industrial energy users to be economically competitive and environmentally responsible.**
- **Increase industrial energy efficiency wherever the total benefits of doing so exceed DSM's total costs.**

Characteristics of Successful Utility Industrial DSM Programs

This subsection discusses characteristics of utility programs adjudged successful on the basis of participation and savings results or on the basis of informed observers' judgments. It is critical to identify "success characteristics" based on past experience, to guide future progress. In the past, successful utility programs provided key services meeting industrial customers' needs as were categorized above. However, some of these services may have to evolve --financing techniques, in particular-- to support the emerging broader objectives of industrial DSM identified above. In our view the following seven points are important to success in industrial DSM:

1. **The customer's perspective is understood.** Understanding and supporting the industrial customer's perspective was the first success factor listed in the survey of industrial DSM by Jordan and Nadel in an assessment of first-generation industrial DSM, defining success in terms of greater than average participation and savings (Jordan 1993). From the perspective of the customer, controlling energy bills is one piece, sometimes large but often small, of the set of challenges to operating a profitable enterprise. The utility must have means of understanding the challenges to customer profitability, showing that it understands them, and demonstrating that it can add value to the customer's business. Successful programs do this. A variety of means for doing this are addressed in the subsequent success factors.

2. **Market research is used and applied.** For years many electric utilities had a far greater understanding of residential and even commercial markets where the same end-uses recur from customer to customer than they have had of the industrial sector. Single large customers accounting for large portions of industrial load might be partial exceptions to that. Even here the knowledge of very large customer energy characteristics and needs might reside only in account representatives serving that customer. Utilities that have successfully pursued industrial DSM have taken a different tack. Their customer service and DSM personnel have learned the broader market trends in the markets for their main types of industry. They have learned the innovative technologies that advanced firms utilize in energy-related (and other) processes.

For example, it is our observation that the larger Wisconsin utilities have done this individually, and as well have been assisted in their efforts by the market and technology research conducted through the Wisconsin Center for Demand-Side Research regarding high-efficiency motors. Furthermore, Wisconsin utilities are planning to undertake additional market research activities such as customer decision-making studies. Such studies provide information for understanding the energy needs of the customers.

3. **Programs are marketed to key decision makers.** For large and medium-sized industries, utility representatives have normally cultivated long-standing relations with key personnel concerned with electricity or gas bills and with the quality and reliability of utility service. These relationships are the point of departure for discussing, developing, and marketing DSM. Targeted marketing, based on personal contacts that are sustained over time, characterizes successful utility programs. Programs need to be marketed both to individuals in the enterprise who have technical interest and to managers who have authority to commit to the program, not merely the former. Improper or incomplete targeting can eliminate a program from consideration or result in a longer marketing and approval process. An extensive evaluation of industrial decision-making pointed out the need to locate a "project champion" (Seratt 1994, p. 8.190).

4. **Technical expertise is provided from the outset.** Industry-specific outside expertise is utilized. Without adding more DSM staff than is efficient, it is simply too much to expect that even well trained utility staff will demonstrate the engineering expertise that industrial customers will respect and require. Several studies indicate that customers are interested in receiving more assistance in the identification of energy-efficiency projects. Speaking of energy audits specifically, Bartsch and DeVaul write:

> By hiring contractors, the utility can obtain the needed expertise as well as distance itself from the assessment, making the audit more credible to the firm. (Bartsch 1994, p. 12)

This course has been followed by most utilities with effective DSM. There are examples of competing utilities collaborating to sponsor fuel-neutral audits, something which Ontario Hydro and the members of the Ontario Natural Gas Association are currently doing. There are also examples of utilities employing total assessment audits, which address the multiple objectives of energy bill control, power quality, process optimization, waste management, etc.; IES in Iowa currently does so (Iowa DNR 1994).

In addition to audits, outside expertise is used in various aspects of industrial DSM from initial market research, through engineering studies of project feasibility, through negotiations to apply what financial incentives are available to efficiency projects that have been specified. Engineering studies by consultants with industry-specific process experience are conducted to identify and cost a range of improvements consistent with customer objectives, particularly those that meet internal investment hurdles.

5. Trade ally networks are utilized in marketing. Trade allies -- that is business parties other than the utility and the customer, including equipment manufacturers and dealers, consulting engineers, installation contractors, standards organizations, and others -- are informed of relevant utility programs from the outset. They sometimes come to play very active roles in raising customer interest and awareness and marketing and recruiting for the program. In some utility programs, there are explicit financial incentives for vendors associated with successful marketing and measure implementation by customers. For example, Iowa-Illinois Electric & Gas uses dealers to promote its high-efficiency motor (HEM) program by providing an incentive to participating dealers who install HEMs. Successful programs make effective use of trade allies and related interests.

6. Customer investment criteria and budgeting processes are understood. Successful programs identify the internal processes, criteria and timetable for budgeting capital projects within the firms they are targeting. They do this on an individual basis for customers of any size. Flexible marketing and timing is then employed to make efficiency investment proposals "mesh" with the internal financial constraints and timetable.

7. **Financial incentives are offered.** Up to now the utility programs that have success promoting energy-efficiency improvements have, by and large, utilized direct financial incentives that reduce efficiency measure costs to participating customers. These have taken the form of prescriptive rebates (for specified measures, e.g. motors), incentives to vendors, and custom-rebate programs in which a utility contribution to efficiency project costs is based upon savings (usually projected savings, sometimes performance) and/or project costs. "Generally, large financial incentives offered to the participant correlate to above-average participation and savings" (Jordan 1992, p. 5-129). This makes sense given the universally observed tendency for industry's payback requirements for internal investments in energy-efficiency to be short, often in the range of a few months to two years.

DSM DIRECTIONS IN A TRANSITIONAL ERA

The seven effectiveness characteristics distilled above provide guide-posts to more effective industrial DSM in the era of customer-centered programs that emphasize multiple objectives and make maximal use of self-sustaining financing. This section discusses future directions for consideration by utilities, industries, regulators, and others. These are directions that we consider will help maintain, and build on, the gains to industry and the community that have been realized from industrial DSM to date. The experience base now is extensive; two primary directions for progress seem clear.

1. Financing. A key question for the immediate future is whether a shift from utility financial incentives, which have primarily consisted of direct customer rebates, is consistent with sustained participation in and effectiveness of industrial DSM over time. Several North American utilities have begun to move in this direction, or propose to. In Wisconsin, for example, many utilities have recently developed financing and/or shared savings approaches that can be applied to the industrial market. Making these new financing programs as effective as possible and monitoring their performance closely must be a priority over the next five years.

Experience with utility-brokered financing for customer efficiency projects is limited. PacifiCorp has been dedicated to this approach, in which participants repay utility loans over a 5-10 year term through its FinAnswer program. After pioneering the concept for its commercial new construction market, the Company extended it to the commercial/industrial retrofit market, with limited experience to date.

Several financing programs have been publicly developed for public buildings and nonprofit institutions, such as the Iowa Energy Bank program (Iowa DNR 1994). To date, publicly developed financing programs for industry have been limited. A survey of existing financing programs and of new options by a statewide collaborative can help to develop concepts for joint utility/private/public financing programs -- an Energy Bank for industry, perhaps.

An important objective for financing programs is to provide positive cash flow financing based on the projected customer benefits from the project. There are a number of different options for developing financing programs for industry, these include:

- Development of a financing program whereby the customer can repay the utility over a long time frame.
- Development of preferred financing whereby the utility contributes toward creating a below-market-rate financing program.
- Provision of insurance that guarantees a third-party creditor against default by a participating industrial customer.
- Development of a statewide program that combines private investments with limited utility and public funds to create an economic development loan pool.
- Development of RFPs to solicit proposals for financing approaches such as the above, on a utility-specific or joint basis.

Each of these options represents alternative means to address the capital-shortage barrier that up to now has been addressed largely by direct utility rebates. These options not only have to be considered, but also used to shape financing programs that are effective and in-place before existing incentive approaches are simply dropped. If initially, existing incentives are eliminated and replaced with only financing options, participation levels may not be sufficient.

By developing appropriate financing programs, more comprehensive DSM need not translate into increased utility expenditures per unit of savings, and instead should be premised on the reverse. Furthermore, these financing options provide an opportunity for utilities to negotiate their financial contributions to the projects in customer facilities rather than assuming a fixed payment.

A productive path is to increase reliance on user-pay principles through effective financing options while gradually moving toward reserving rebates for addressing special needs or opportunities, such as key technologies where markets can be effectively transformed. An example is the existing Wisconsin state-wide motors program, which will continue to utilize rebates for a time, albeit at a reduced level. At the same time, distribution utilities must continue to put resources (not necessarily rebates) on the line to help customers use energy more wisely, consistently with the multiple objectives of industrial DSM.

> **Finding:** Successful utility programs have all reduced the internal financial hurdles to industrial investment in efficiency. Only if effective, easy to use efficiency financing programs are in place can industry efficiency rebates from utilities be cut back without halting momentum toward overcoming the barriers to industrial energy-efficiency.

2. Partnerships. An emerging model is that utilities develop sustainable long-term partnerships with industrial energy users --with programs that address customers' perspectives and needs-- and use these partnerships to materially assist industrial energy users to be economically competitive and environmentally responsible. Many of the elements of such partnerships are in place in service areas where utilities have now had extensive experience in industrial DSM. But progress needs to be made by the utilities in a number of interrelated areas. The discussion above indicated the need for approaches that build a customer perspective into programs, develop projects that meet industry's multiple objectives of improved cash flow, improved productivity, environmental compliance, avoiding disclosure of sensitive manufacturing process information, while delivering real energy savings that justify the contribution of utility dollars. A "holistic" program approach is consistent with a strong customer-service orientation at the utilities, and can be marketed through ongoing contacts with large customers. It can be part of a philosophy of a continuing, active alliance with large customers.

To forge partnerships, the utility's industrial *marketing staff* needs resources. To understand the needs of industrial customers of varying sizes and types takes resources both for the staff who maintain contacts, and for data gathering and development. In addition is it useful for the utility to develop good links with outside experts who can be drawn on to assist in its marketing and energy-efficiency efforts in its key industries. Ways of augmenting marketing staff with technical experts should be considered by the utilities. The technical potential studies conducted to date many utilities have been thin on the industrial sector. One of the best ways to learn about the industrial sector is to do a series of in-depth audits of particular enterprises that include, not just lighting and motors, but also the *core processes* of the industry. This could be a state-level effort, modelled for example on the industry audit program of Ontario's Ministry of Energy and Environment.

The development of audits and engineering studies that focus in more depth upon optimizing industrial processes can advance industrial energy-efficiency programs. A utility may provide technical services and custom programs that in principle could be applied to process optimization, but to transcend beyond programs that focus upon pieces of equipment to programs that focus on performance optimization, involves a qualitative leap on the part of the utility.

Competitive solicitations related to industrial energy efficiency have been little used by the individual utilities. The advantage of competitive solicitations is that they can be tailored to any need and any set of priorities. Depending on the purpose of an RFP, bidder evaluation criteria can include qualifications and references, price, financing, depth of and verification of savings, creativity, value-added customer services, etc. To the extent the utility is procuring demand-side resources -- energy or capacity related -- by paying on the basis of avoided cost, an RFP can be structured emphasizing price competition to procure those resources at the lowest cost to ratepayers. That is the traditional DSM bidding model. But the utilities can also use solicitations to develop the elements of effective partnerships with industry -- to identify outside expertise for audits and studies; to solicit proposals to provide financing services in industrial markets; to provide marketing studies and evaluations to develop or improve utility understanding of effective ways to influence industry's internal decision-makers and better promote energy-efficiency in the system context. RFPs can be used to identify partners in the industrial sector with whom the utility wishes to form strategic alliances to support the utility-customer partnerships. (There is, of course, tension between the partnership model --whereby the utility and ESCO cooperate in serving customers-- and the resource procurement model, whereby regulators compel utilities to procure DSM at least-cost and thus, ESCOs compete with them, and if successful may, in the view of some utilities, create confusion amongst customers.)

While there needs to be flexibility in marketing efficiency to industrial customers, one "holistic" option that may be useful for industry markets, particularly small industry is: aggressive, hand-holding, total project management ("turn-key") programs (Robinson 1991). Some ESCOs offer a turn-key approach in the commercial market. Utility experience is limited to small to medium sized firms, largely commercial. But United Illuminating Company's C/I retrofit program includes a Turn-Key Installation Service available to both small commercial and some industrial customers. In this approach, the program operator assumes responsibility for the project from start to finish, including performance guarantees, relieving host facilities of the hassles and guesswork of contractor selection and management. The program operator develops the specifications for the equipment to be installed. In the most advanced form of program, the utility provides the customer with competitive bids to perform the work specified (Baebler 1992). Bids come from contractors pre-qualified for the program by an RFQ process. The customer may, alternatively, identify a contractor it wishes to install the project. The utility presents the customer with a project financing plan consistent with the its payback requirements and projected bill savings. The program operator does not "walk away;" the efficiency project is part of a continuing process of good customer relations with the host facility, and there are follow-ups, evaluations, and ancillary services on a continuing basis, beyond those required in the specific project contract. By offering to manage efficiency projects at customer premises, utilities can encourage participation and provide a stronger stimulus to the competitive market for energy efficiency services. Even if operated by a utility, this approach develops markets for the services of other ESPs.

> **Finding:** For utilities to develop sustainable long-term partnerships with industrial energy users to help them be economically competitive and environmentally responsible, their energy-efficiency services need to focus more on core industrial processes and systems. More industrial market research is needed. Utility marketers need the outlook and resources to offer comprehensive services to their customers. Competitive solicitations may be a useful supplement in developing the elements of these services.

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