INDUSTRIAL ENERGY EFFICIENCY IN THE MICHIGAN COLLABORATIVE

H. Gil Peach, Ph.D., Scan America, Beaverton, Oregon

Abstract

This paper reports on results of a very innovative industrial project developed jointly by Detroit Edison and its five largest customers. The focus is on "lessons learned" that may provide useful insights for replicating the successful approach elsewhere, and also for avoiding the problems that "cookie cutter" rebate programs create for global industrial customers. At the same time, the full collaboration has not been renewed, an outcome which we attribute to the social forces associated with the globalization of markets.

Introduction

What we will refer to, as the "Michigan Collaborative" is the survivor of two evaluation collaboratives created by the Michigan Public Service Commission (MPSC). These were established in settlement agreements for the Consumers Power Company and for Detroit Edison. In 1994-1995, the "competitive era" and "restructuring" suddenly became seriously anticipated, albeit not yet defined. In this context, the strategy of "resource acquisition" came into question. Resources acquisition, at the beginning of 1994 was the principal economic basis for Demand Side Management (DSM). In 1995, this rationale was becoming quickly undermined, as utilities sought to define their best interests in an uncertain future.

Acquiring lower cost conserved energy instead of building new plants was still as important to society and to protecting the environment as it always was, but for utilities, it would be counter-productive if there were soon to be no longer a monopoly franchise. In this future, the utility would have incentives only to increase sales and market share. In this context, both Consumers Power and Detroit Edison withdrew most of their DSM resource acquisition programs for residential and small through large commercial customers. The Consumers Power collaborative ended in 1995 when the company unilaterally decided to end its Demand Side Management (DSM) programs and cooperation with customer groups, state agencies, and conservation advocates in assessing results of its DSM programs.[1] Detroit Edison, while ending many of its own DSM programs, to their credit, decided to at least continue in cooperation with consumer groups, state agencies, and conservation advocates in completing the tasks of the evaluation collaborative.

Workers in the area of energy conservation and of the measurement of the costs and benefits of energy conservation programs will be familiar with the stories of previous "conservation collaboratives" and "evaluation collaboratives." In these stories, technical representatives of utilities, government, industry, low-income, conservation movements, and customer groups come together to jointly plan conservation programs (in the case of the conservation collaboratives) or to jointly assess the results of programs (in the case of the evaluation collaboratives). Such collaboratives usually come to consensus on planning issues or on measurement of results despite their different perspectives and the different political, economic, and social interests of the organizations that the participants represent. This paper is supportive of conservation collaboratives, and can report that the Michigan Collaborative was successful in these regards.[2]

Like most other collaboratives, the Michigan Evaluation Collaborate worked well in accomplishing the objectives set forth by the parties and approved by the MPSC.[3] The large industrial program was the most successful among the set of set evaluated by the collaborative, and the successful cooperation of major industries with the state agencies, other customer groups, and conservation advocates represented in the collaborative was the high point of the cooperative experience.

The Industrial Program

The Large Manufacturing Customer Pilot Program (LMCP) was implemented in 1994, a result of unusually thoughtful discussions and negotiations between Detroit Edison and its five largest industrial customers. The responsibility for the program was technically with the utility but a distinguishing characteristic of the program was that it was very responsive to industrial needs and perspectives. The LMCP included unique features regarding the project types and program administration:

(1) To be appropriate for the pilot program, specific projects had to exceed an industrial corporation's currently operative corporate

[1] A "technical" pretext was used to shut down DSM and disband the Consumers Power Evaluation Collaborative (Peach, 1996).

[2] This paper is written from a public service perspective, and represents the views of the author. For further detail on the pilot program, see the evaluation report approved by the collaborative (Castellow, 1996) and a paper presented at the European Committee for an Energy Efficient Economy 1997 Summer Study (Castellow, et al, 1997). For a report from an industrial perspective, see Peach, Bonnyman, 1997.

[3] Only one evaluation remains to be completed, and that has been begun with excellence and is well underway.

payback limit (hurdle rates). Projects that would not otherwise be implemented by the corporations on their own were "bought down" to the customer hurdle rate with utility DSM fund contributions.

(2) Flexibility was added to incorporate some long range studies with no immediate payback, so long as the overall set of projects for an industry was projected to be cost effective (project carries project within each industrial corporation).

(3) While the utility retained accountability to the MPSC for the conduct of the pilot, the pilot was designed to provide actual control to industry engineers (working closely with specially assigned Detroit Edison engineers) to develop projects that made sense within an industrial perspective.

Industrial Evaluation & Results

Under the Settlement Agreement, while the utility had complete responsibility for DSM programs, the MPSC assigned the responsibility for measurement and evaluation to the collaborative. Detroit Edison and the five largest industrial customers were members of the collaborative, but so were the MPSC, the Office of the Michigan Attorney General, the Michigan Conservation Clubs, and several customer groups. The collaborative selected Scan America®/H. Gil Peach & Associates as technical advisors to manage and oversee evaluation activities, and Foresight Engineering, Inc. to conduct the industrial evaluation.

Worldwide industrial corporations have their own energy departments with excellent management capability in measurement of results of efficiency improvements. Since the necessary knowledge and skills were already available within the industries, the collaborative evaluation made use of this in-house capability. The industrial energy departments, (with the support of specially assigned Detroit Edison engineers first performed evaluation according to the internal procedures of each industrial corporation. The collaborative evaluation took the form of an engineering review of each project, and of each energy department's assessments of project results. Steps in the review included in-depth interviews with industry energy department managers and utility engineers; and review of proposals, engineering assumptions, and calculations, in-plant measurements, and documentation of results.[4]

Energy Savings. The program's 35 projects can be grouped into five categories: Compressed Air (five projects), HVAC (six projects), Lighting (10 projects), Motors (six projects), and Process (eight projects).

The actual energy reduction was 37,000 MWh.

Emission Impacts. As it happened, projects selected were baseload projects. As such, they effect reductions in emissions during all hours of operation. Using average yearly emission factors based on the steam output of a typical, large pulverized coal plant in the US, and a steam conversion efficiency of 85% to convert the steam delivered to equivalent raw fuel supplied, and assuming a heat rate of 10.530 kJ/KWh, plus a 5% transmission loss, the yearly reductions due to the program are as follows: CO2 (32.547.000 kg); CO (7.940 kg); SOX (180.000 kg); NOX (90.000 kg); VOC (600 kg); Particulate matter (15.000 kg).

Costs. The total (utility) DSM project contribution was $1,226,000 or 23% of total project cost. The average industrial customer cost contribution for the installed projects was 77% of the total project cost. The DSM costs were allocated by a method that assigned half of the DSM contribution to demand and half to energy. Using that method of cost allocation, the Total Resource Cost (TRC) averaged $121 per KW and $0.0179 per kWh. The Utility Cost of Conserved Energy (UCCE) was $.0023 per kWh at the generator. Because the pilot was set up to cost on an overall basis (project carries project), these results include the projects designed to yield immediate savings and a few study projects designed to develop more knowledge of the possibilities for energy efficiency in particular plant processes.

Psycho-Social Observations

In the view of all parties in the collaborative, the industrial program was a bold success. From a societal perspective, however there is also a difficult element in collaboration that reflects in local human relations the effects of the globalization of markets.

The Bright Side. Detroit Edison executives and staff had to demonstrate considerable maturity to succeed in tailoring a program to the utility's largest customers. Until the Detroit Edison/large industrial customer initiative broke the pattern, utility programs were all of one "cookie cutter" variety. Usually they were designed to offer rebates for specific items of efficient equipment.[5] Such programs could not deal with industrial processes, with the industrial concept of overall production efficiency, or for savings opportunities that did not exactly fit an abstract DSM planning design. While most utilities have adopted the "listen to the customer," "customer driven," "teaming across functional boundaries to improve customer quality," "customer-focused" cliches, actual performance has seldom lived up to these ideals. If utilities really did "re-engineer their core processes to empower employees to serve the customer

[4] There was no load monitoring, other than measurements conducted by plant personnel.

[5] The rebate approach can work well in residential and small commercial applications. The difference with large industrials is that they have their own in-house energy efficiency managers as well as ongoing efficiency programs. In addition, the most inexpensive and high potential for energy savings is in the area of industrial processes.

through new paradigms," we would see more programs like this. In this case, Detroit Edison actually did something new. That involved risk and trust, and it worked.

The era of resource acquisition programs demonstrated that energy conservation could be much cheaper than building new baseload plants. The basic economics of conservation plus renewed regulatory oversight that stimulated a very strong DSM emphasis in Michigan can be judged successful when it produces a Total Resource Cost of $121 per kW and $0.0179 per kWh. This kind of result is very good result not only from DSM resource acquisition perspective but also from a competitive perspective in relation to small-scale gas generation.

Further, the pilot produced institutional learning for all parties in the Michigan Collaborative:

(1) Rebate programs interfere with corporate decision processes. The normal decision cycle in global industrial organizations is three years, whereas utilities offer their rebate programs for short windows of time and are likely to change or close a program before a large industrial organization can respond.
(2) The locus of knowledge for the best industrial savings opportunities lies in the energy efficiency staffs of the corporations, not in the generalist engineering staff of the utility.
(3) Large industries have very short windows of opportunity to install efficiency measures, and at these times all available engineering staff has to work on a multiplicity of other types of projects to support the next cycle of production.
(4) Rebate programs can cause career problems for industrial managers. If a manager diverts funds from an approved project in order to take advantage of a short-term rebate opportunity, the manager is perceived as "out of line," and to have acted outside of the expectations of corporate protocol.
(5) Industrial efficiency staff wants the freedom to develop "locally appropriate" solutions, but rebate programs often have general rules that do not allow specific exceptions.
(6) Industrial staff wants the freedom to go for "high risk/high reward" projects.
(7) Industrial staffs want committed funding with multi-year duration. Rather than a rebate program with a yearly cycle and a competition among customers for funds, industry needs a multi-year commitment of a fixed amount of funds. Ideally, the utility provides the DSM funds to be used as an adder to buy down projects to the current corporate hurdle rate, and then the industrial energy efficiency department acts as the industry's own internal energy service company.
(8) A feature most liked by industry is the assignment of top utility engineers to work in the industry. These engineers learn the industry, propose and document possible projects, and assist the industrial energy efficiency manager in project implementation.[6]
(9) An advantage of having a utility cost contribution and utility engineers on site as if they were contract staff is that some projects were approved by industry management that would not have been approved if proposed by their own staff without the credibility of a trusted "second option" from another organization with a stake in the project. In particular, some "high risk" compressed air projects were supported and they had savings at a multiple of the savings projected. Such "wins," once demonstrated can be copied in plants worldwide.
(10) Collaborative members learned that large industrial corporations are quite capable of carrying the common energy efficiency goals of conservation advocates, regulators, and concerned government agencies when they are provided the freedom to optimize their own efficiency projects with additional DSM funding from the utility.

In summary, for the Michigan Collaborative, the industrial parties committed to collaboration. They carried out that commitment with success through the three years of the collaborative. In the process, they brought skill to the development of several non-industrial program areas as well as to the industrial focus of the collaborative. The industrial program and its evaluation were successful.

*The Dark Side.*I Industrial corporations require a measure of independence from other sectors of society. But there must be a balance in this independence because industry is socially, historically, and ecologically in the same social space with all of the other dimensions of society. Currently the balance is shifting under the impact of the globalization of markets.

Capital has become increasing (even radically) mobile. It necessarily looks outward and globally, and because it is so mobile it is imposing a harsh discipline on societies, states, communities, and families. This creates both high collective opportunity and high social loss. In looking toward the future the industrial parities currently see continued DSM collaboration as a possibly unnecessary overhead. This outlook did not grow out of the Michigan Evaluation Collaborative, but came to it from the outside, as a part of a

[6] One reason is that many industrial corporations have experienced waves of re-engineering and corporate downsizing.

more general "spirit-of-the-times" characteristic of global industrial corporations in the current period.[7]

A widely available model for understanding this perspective is given by the ISO 14001 standard for dealing with potential environmental problems. This standard could have substantial application to the energy conservation area, and although it is officially put forward by governmental agencies they actually serve as facilitators. The views reflected in the standards are those of industry.

This model provides for an industry the highest order of internal flexibility in identifying and approaching potential environmental problems, and allows secrecy. A rationale for ISO 14001 is that it may pre-empt State regulation and the public perception of need for compliance to abstract regulations.

Why does industry currently seek such freedom? It is a fact that abstract regulations can distort production and that such distortion can be costly. In addition, abstract regulation in the regulatory-compliance model can focus scarce resources on minor problems, which happen to fall within certain legal definitions, while preventing the use of novel solutions for solving major problems. Further, the regulatory-compliance model is inherently juridical, so that once a problem is defined as a compliance problem; the disproportionate share of available resources may necessarily go to lawyers rather than to technical people who could actually fix the problem. At the same time, as the Michigan Evaluation Collaborative shows, global industries actually do have a superior internal capability that could secure substantial energy savings, and fix other environmental effects of production.

However, the desire for virtually complete autonomy is inherently problematic for other "players" in the social order. In a children's game, a child may "take their marbles and leave." But in matters that affect the viability and carrying capacity of the environment, no one can leave because we share the same social space -- there is no place else to go.[8] This presents a dilemma: On the planet, in a region, or in a State, no party can operate independently in matters that materially affect energy conservation and environmental sustainability without hurting the others. From a social perspective, such behavior presents a danger to society.

When the regulatory-compliance model is employed, collaboratives can solve many of its potential problems while maintaining the force of the compliance model as a way to motivate collaboration and interest intermediation. Thus, while industry's focus on the excesses of a compliance model is not incorrect, there are cooperative solutions of which the Michigan Collaborative is a good model. Virtual autonomy of industry from the compliance model of state regulation also is a story of the excesses of an earlier period in capitalism. These excesses were moderated only by the growth of labor unions, and by the establishment of safety, purity, product liability, and environmental protection legislation.

A further complication is that the vibrant DSM era has ended in Michigan due primarily to political changes initiated and supported by lobbies funded by large industrial corporations. Looking at their competitive situation in global markets, and with the goal of cheap power for themselves, the industrial lobby worked to characterize DSM as "an extra cost" (a discretionary cost, a part of the social overhead that could be eliminated). This was not an "anti-conservation" perspective. DSM was apparently simply in the way of the drive to open markets to obtain the best price for power. Large corporations sought to be free of as much of the public purpose and environmental protection burden of monopoly utilities as possible. Given the goal of cost-reduction in the context of global competitive markets, the industrial sector sacrificed the utility conservation programs. These were the programs that materially and successfully provided conservation to the residential, small commercial, and medium to large commercial sectors. Supposedly, in the market vision, DSM will be handled by "the market" and will be paid for directly by those who benefit most directly from energy savings.[9] Supposedly, eliminating the DSM adder in electric rates will cause companies to move to Michigan and both create new jobs and protect existing jobs.[10] The industrial lobby has succeeded in shutting down DSM for people in their homes and for small, medium, and large commercial businesses, and for Michigan's universities, schools, colleges, and charitable institutions. However, they remain internally committed to all types of efficiency, including energy efficiency.

These changes are part of a reinvigoration of capitalism, on a planetary scale. Deregulation, harmonization, rationalization, downsizing and the failure of social welfare commitments are all expressions of the same global market forces. The Michigan Collaborative and the former DSM resource programs show the kinds of success that can come through collaboration, and remain as viable alternatives when balances shift again. In the meanwhile, the impersonal forces of the globalization of markets may overwhelm the renewal of commitments to common projects.

---

[7] Moreover, in direct contrast with the "social responsibility" perspective that emerged following the urban riots of the 1960s and the rise of the environmental movement.

[8] Again, capital can withdraw. No one else can.

[9] One is reminded of the Brazilian saying, "'Each for ourselves and God for us all' said the elephant as he danced among the field mice."

[10] This assertion, unfortunately, does not pass the simplest 'straight face test' given the miniscule effect of DSM costs on rates. At their highest point in Michigan, total DSM costs amounted to only about one-percent of gross utility revenues.

References

1. Castellow, Carl. (1996), Evaluation *of Large Manufacturing Pilot Program for the Detroit Edison Company*. Foresight Group, Inc., Raleigh, North Carolina.

2. Castellow, Carl, et al (1997), Energy Efficiency in Automotive and Steel Plants, Proceedings of ECEEE 1997 Summer Study.

3. Peach, H. Gil. (1996), *The Cat with Six Toes, An Analysis of the June 19, 1995 Michigan PSC Order in the Consumers Power Case No. U-10554.* Scan America®/H. Gil Peach & Associates, Beaverton, Oregon.

4. Cascio, Joseph, editor (1996), *The ISO 14000 Handbook.* CEEM Information Service, Fairfax, Virginia & ASQC Quality Press, Milwaukee, Wisconsin.

5. Greider, William (1997) *One World, Ready or Not.* Simon & Schuster: New York, New York

H. GIL PEACH & ASSOCIATES

MANAGEMENT/PLANNING/EVALUATION

16232 NW OAK HILLS DRIVE
BEAVERTON, OREGON 97006-5242 USA

Telephone: (503) 645-0716
Fax: (800) 204-3803
hgilpeach@scanamerica.net

Suggested Citation:

Peach, H. Gil, "Industrial Energy Efficiency in the Michigan Collaborative," Pp. 43-47 in *Proceedings of the 1997 International Evaluation Conference.* Chicago, Illinois: National Energy Program Evaluation Conference (NEPEC), August 1997.