Institutional Change or Spare Change: A Case Study of the Persistence of Utility DSM Behavior Produced by Regulatory Incentives

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This paper presents a case study examination of the effects of a substantial DSM regulatory incentive/penalty mechanism on the DSM activity of a large Midwestern utility and the degree of persistence of that DSM activity once the regulatory incentive/penalty mechanism expired. Briefly stated, the utility demonstrated a remarkable increase in DSM activity (e.g., spending, savings achieved, staffing, etc.) during the incentive time period, but virtually ceased DSM program delivery once the incentive time period had expired. The paper discusses these results, offers some possible explanations, and provides some observations regarding the use of regulatory incentives to influence utility DSM behavior.

Introduction

In the parlance of utility DSM, measure "persistence" refers to the issue of whether the effects of a particular behavioral and/or technological intervention last over time, thereby continuing to save energy at the customer site. The issue of measure persistence has become a very important topic in the evaluation of DSM programs (Vine, 1992). The thesis of this paper is that persistence may also be an important issue for the evaluation of regulatory incentives. Specifically, the persistence question in this context is: Assuming that a utility has been successfully motivated by a regulatory incentive to pursue DSM resource options it had previously ignored, will the utility continue to pursue those DSM resources if that regulatory incentive is removed?

Many authors have written about the institutional barriers that help prevent utility companies from embracing DSM as a resource option (e. g., see Nadel, Reid and Wolcott, 1992) and the consequent need for regulatory incentives (i.e., financial rewards and/or penalties to the utility contingent upon its DSM performance) in order to encourage the use of DSM. Some of the barriers to utility pursuit of DSM that have been identified include: lack of an economic incentive/presence of economic disincentives; lack of familiarity with DSM; concerns about customer response; lack of experienced staff, etc.

Consistent with many of these observations, however, is a theory which suggests that utility regulatory incentives might only need to be temporary-that once a utility gains experience and comfort with DSM, regulatory incentives will be unnecessary because the institutional changes produced will persist. Heretofore, there has been little evidence available to test that hypothesis. This paper presents a case study which directly focuses on this issue.

Background

In 1991, the Michigan Public Service Commission (MPSC) established a substantial electric DSM incentive/penalty structure for Consumers Power Company, a utility with a history of minimal involvement in DSM. The Commission's order (U-9346) established some DSM spending and cost-effectiveness targets to be pursued over an approximately two-year period, and set in place a hefty potential reward/penalty: up to a possible 1% increase in rate of return (applied to the total company rate base, not just the DSM spending) for good performance, down to a 2% decrease in rate of return as a potential penalty.

In a paper presented at the National Energy Program Evaluation Conference in August 1993 (Kushler, 1993a), this author presented the short-term results observed in terms of utility DSM-related behavior. A total of seven different indicators were examined, including: DSM expenditures, DSM employees, DSM savings impacts, DSM contribution to future resource plans, utility organizational culture, measurement and evaluation activities, and DSM program quality. Briefly stated, the results indicated

a remarkable expansion in utility DSM-related activity and commitment, thus suggesting a high degree of effectiveness of the regulatory incentive.

The purpose of this paper is to examine the persistence of those observed changes. The specific incentive and associated DSM targets adopted in 1991 expired in September 1993. No specific incentive structure or targets were created to replace them other than a provision in the original 1991 order which allowed the utility to capitalize any subsequent DSM expenditures for recovery in future rate cases. The natural question which arises is thus: To what extent does the enhanced DSM commitment and performance observed during the incentive time frame persist onward into the post-incentive time period? This paper will examine that issue by extending the analysis of the same seven indicators of utility DSM behavior discussed previously.

Methodology

Measuring Utility Response

As in the initial paper on the Consumers Power incentive plan (Kushler, 1993a), a caveat is necessary regarding the difficulty of defining a mechanism to measure the response of a utility to a regulatory incentive. Utilities are large and complex organizations, responding to a mix of incentives and disincentives which they face in their normal course of business. Studies of the type presented here are necessarily limited to case study analysis, rather than controlled experimental designs, so it is not possible to conclusively determine the causal effect of a particular regulatory action. Nevertheless, it is possible for an observational study to provide very useful information.

The methodological approach used in this study was described in the initial paper as drawing heavily on a recent comprehensive evaluation of DSM shareholder incentive mechanisms in California (Schlegel, et al., 1993). That project utilized a total of seven direct and indirect indicators to help gauge utility response to DSM incentives. Those seven indicators were: DSM expenditures, DSM employees, DSM impacts, DSM contribution to future resource needs, utility organizational culture, measurement and evaluation activities, and DSM program quality. To provide for consistency and some opportunity to make comparisons across studies, this paper continues the focus on those seven indicators.

Sources of Data

The more qualitative aspects of this study (e.g., regarding the utility organizational culture) are based on interviews with several key Consumers Power personnel conducted during the spring of 1993 and the first quarter of 1994. The quantitative data presented in this paper was primarily obtained from Consumers Power documents filed with the MPSC, including their integrated resource plan (IRP) reports, biennial conservation plan reports, and rate case testimony and exhibits, with occasional supplementation by data obtained in the interviews with Consumers Power staff. Comments made in the Discussion and Conclusion sections of this paper represent the personal observations of the author, who was a participant in the initial rate case settlement negotiations and is the MPSC staff representative to the collaborative Evaluation Working Group responsible for overseeing the evaluation of Consumers Power's DSM programs.

Results

DSM Expenditures

Figure 1 presents the data regarding annual electric DSM spending by Consumers Power for the period of 1988 through 1994 (corresponding data is also presented for The Detroit Edison Company, the other major electric utility in Michigan). As can be seen, historical spending prior to the 1991 rate case order and incentive had been quite flat and at a very low level (approximately $3 million per year, or less than 3/10 of 1% of gross annual revenues). After the 1991 change, electric DSM spending dramatically increased. Of particular note is the fact that although the 1991 order only specified $65 million in spending over two years, Consumers Power decided (in recognition of strong customer response to the programs) to spend a total of $82 million on electric DSM in the 1992-93 time period. In all, that represented an approximate ten-fold increase in electric DSM spending following the 1991 order and settlement agreement.

For 1994, two data points are presented for Consumers Power. The higher data point corresponds to $42 million and represents the amount of new DSM spending for 1994 projected in Consumers Power's recent rate case testimony filed in May 1993. However, as of the second quarter of 1994, Consumers Power had not actually begun any new DSM programs (and reportedly would not be in a position to do so for many more months). Instead, Consumers Power was operating on essentially an internal staff maintenance budget while waiting for their rate case order (due in mid-1994). Therefore, the second data point represents an extension of the actual rate of new DSM spending observed over the first four months of 1994.

DSM Employees

In 1990, Consumers Power had just expanded the electric DSM area from essentially a two-person operation to the

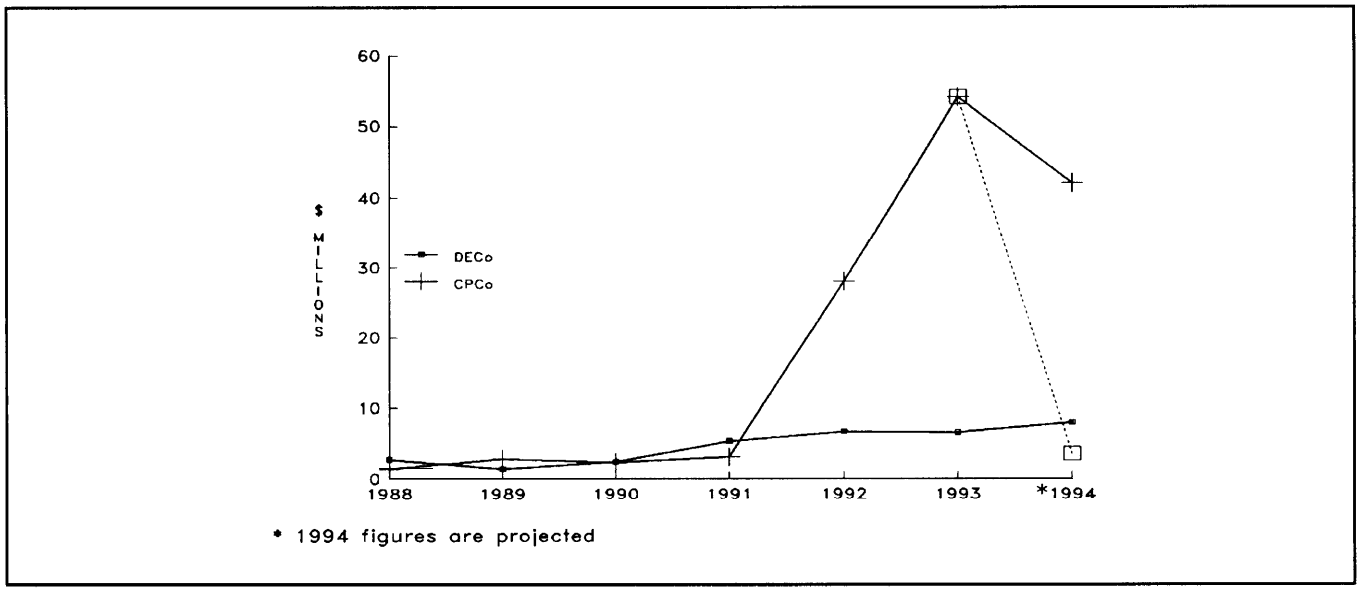

Figure 1. Electric DSM Spending

equivalent of approximately five full-time positions. This was largely in response to the new requirement by the MPSC for its large electric companies to file IRPs beginning in 1990. DSM programs at that point were still minimal.

After the 1991 rate case, Consumers Power rapidly increased staffing levels in order to administer the new DSM portfolio. However, it also increased electric DSM planning and associated staff. By the end of 1991, a total of 15 employees were dedicated to electric DSM activities. By the end of 1992, the first year of expanded DSM effort, the total number of electric DSM employees was up to 24 (including evaluation, discussed below). For 1993, 10 additional employees were added, bringing the total to 34 (see Figure 2)—a seven-fold increase in the two years after the rate case order. Adding to the significance of these numbers is the fact that these dramatic increases in staffing occurred during a period of severe staffing constraints in the company as a whole.

As of the first quarter of 1994, however, electric DSM staff had been trimmed back to 28 employees. This was in recognition of the fact that most electric DSM activities were in a planning and waiting stage, rather than actual operations. The reduction was achieved by shifting staff over to work on natural gas conservation programs, because that area of the company did have programs in operation.

DSM Impacts from Current Efforts

Prior to the 1991 rate case, the estimated impact of Consumers Power's electric DSM programs can only be described as minuscule. For example, Consumers Power's

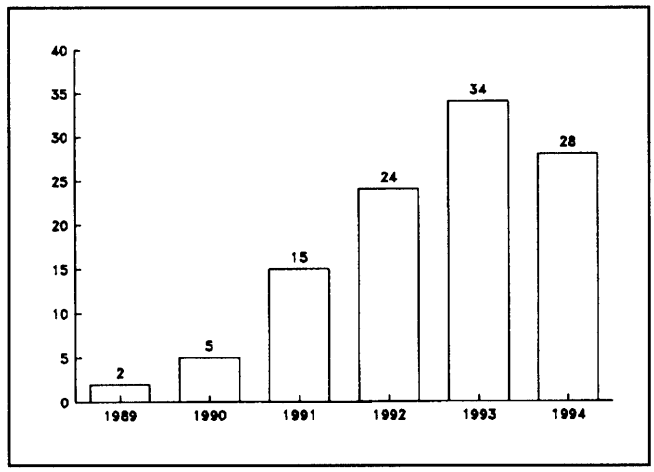

Figure 2. CPCO Electric DSM Employees

biennial energy conservation plan filed in 1989 projected annualized savings of approximately 15 GWh and 2.5 MW for each year from its 1991 and 1992 electric DSM programs. In contrast, data from Consumers Power's most recent (1993) rate case testimony indicates that the savings from its 1992-93 programs provided in response to the 1991 order will produce annualized savings of 116 GWh and 25 MW for each year, representing roughly a ten-fold increase over prior levels.

For 1994, there are once again two potential scenarios. Data from the May 1993 rate case testimony projected calendar year 1994 annualized impacts of 143 GWh and 30 MW. However, given that no 1994 electric DSM programs have yet been fielded (as of the end of May 1994), actual 1994 savings will likely be much below projected levels and could conceivably be zero.

Contribution to Future Resource Needs

In 1990, prior to the rate case order, Consumers Power filed its first IRP (Consumers Power, 1990). The MPSC staff report reviewing Consumers Power's IRP strongly criticized the company for virtually ignoring DSM as a resource option (MPSC, 1991). Consumers Power's plan incorporated almost no DSM resource impact, projecting only 67 MW (and 420 GWh) of savings by the year 2000, less than 4% of projected resource additions during that time frame.

In late 1992, Consumers Power filed their second IRP (Consumers Power, 1992). In this document, DSM had become a prominent component of the company's resource plan, accounting for 634 MW and 2,827 GWh (roughly one-half of projected resource additions) by the year 2000 (see Figures 3 and 4).

In the spring of 1993, just prior to its latest rate case, Consumers Power filed an IRP update (Consumers Power, 1993) in which they had revised their estimates of future DSM impacts downward to reflect an apparently arbitrary

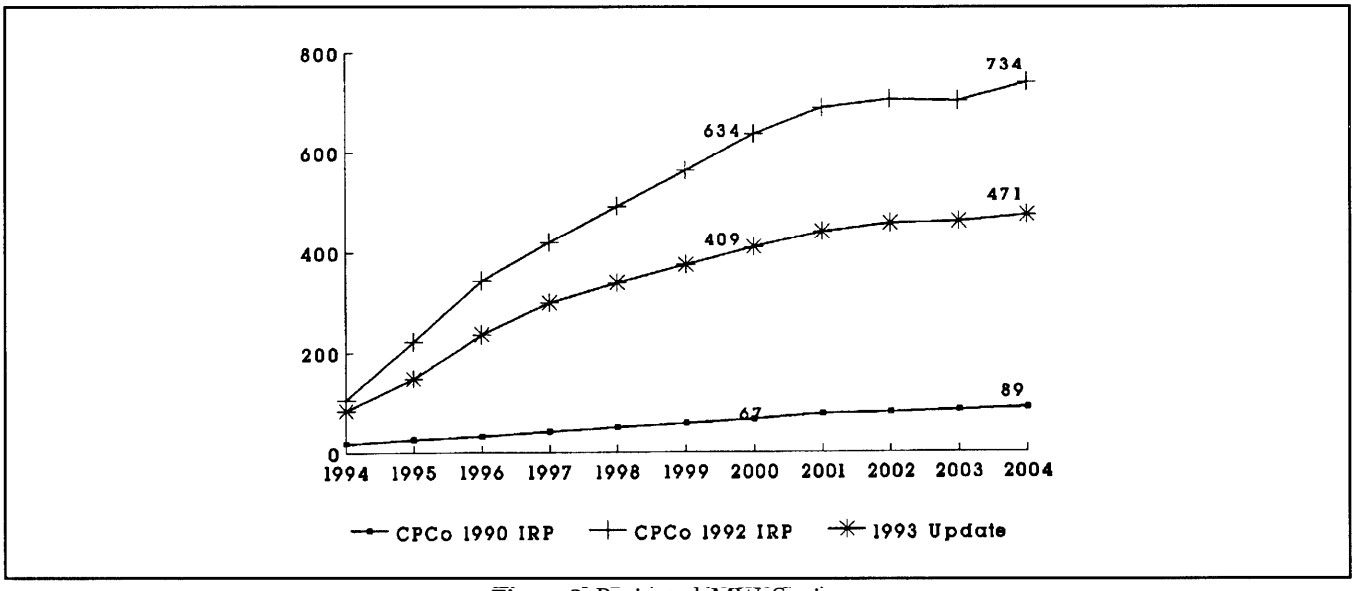

Figure 3. Projected MW Savings

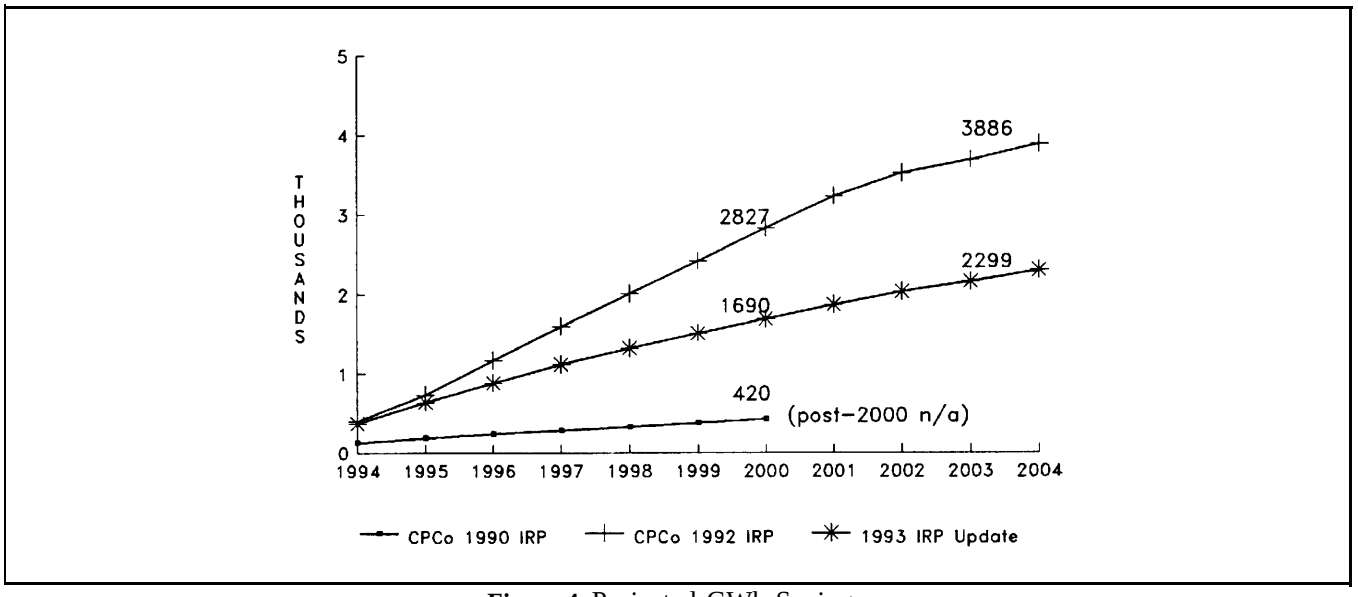

Figure 4. Projected GWh Savings

reduction in the cap on DSM spending (ranging from 28% to 41% for 1996 through 2001) and a 20% reduction in projected DSM effectiveness. No documentation was provided to explain the basis of these "adjustments," which were reportedly requested by senior management. Figures 3 and 4 present Consumers Power's three different recent IRP projections of DSM contribution to future resource needs.

Utility Organizational Culture

Up through 1990, electric DSM at Consumers Power was almost non-existent. A couple of information-oriented conservation programs were operated as an activity; however, electric DSM was regarded as a "customer service," rather than any type of resource. The prevailing attitude had been characterized as essentially, "how can we do as little as possible, and still get by."

When the 1991 rate case order was issued, a couple key staff within the company presented a rationale in support of DSM to senior management. According to personnel involved, this presentation focused on six identified benefits of DSM: (1) a profit opportunity (i.e., the 1% increase in return specified in the order); (2) improved regulatory relations; (3) opportunity for the company to be identified as environmentally sensitive; (4) economic benefits to the service territory and state; (5) customer satisfaction and service; and (6) risk avoidance compared to supply-side options. Despite these potential benefits, many observers within and outside the company were quite surprised that Consumers Power decided to proceed with DSM activities, rather than pursue a legal challenge to the order. Within the company, the situation has been characterized as one where, although senior management was very skeptical of DSM, they were willing to give it a shot. Primary motivators in the decision to proceed with the expanded DSM effort were reported to be the incentive/penalty structure and the desire to pursue better relations with the MPSC. In particular, Consumers Power staff expressed the clear belief that without the incentive/penalty provisions, the company would not have pursued the DSM initiative.

In the re-organizations that followed the 1991 rate case order, DSM established a much more substantial presence within the company. DSM employees began to report directly to the Vice President for Marketing, and obtained much more direct access to senior management. Furthermore, DSM began to be regarded as a resource rather than just a sideline customer service activity. When the utility assembled its quarterly resource assessment, DSM was a part of the resource assets identified in the portfolio. DSM was explicitly included as a part of the "corporate strategy," and several key managerial staff had part of their executive compensation determined by objectives tied to the DSM programs.

The situation within the company had been characterized in mid-1993 by Consumers Power personnel as a "180-degree change" in management attitude toward DSM. Interestingly, that change had been further described as having taken place in a two-step process. One level of support was evidenced by the original agreement to pursue the $65 million DSM spending and the initial staffing increases. Perhaps more importantly, the positive reaction of customers, trade allies, and even company staff themselves appeared to have led to a second, higher level of commitment-as evidenced by the decision to pursue DSM spending well beyond the original $65 million requirement and to add even more staff to the DSM area of the company.

The only cautionary note expressed at that time was the observation that there remained one more level of commitment yet to be achieved. That level would reflect a comfortable reliance on DSM as a supply resource, and it was speculated that such a level was only likely to be achieved after several years of implementation and successful evaluation of full-scale DSM programs.

By the spring of 1994, however, another change in organizational climate seemed to have occurred. Although the basic structural changes from the incentive years (e.g., the new DSM department and lines of reporting) remained intact, interviews with the same key utility staff revealed a noticeably diminished enthusiasm in the company's outlook regarding DSM. By way of explanation, worries were repeatedly expressed over competitive threats, and the potential for DSM programs to raise rates appeared to have re-emerged as a preeminent concern. Also, some adverse reaction from customers to the over-subscription and closing down of the earlier DSM programs had taken some of the luster off of the image of DSM as a customer relations success. In summary, for a variety of reasons, the utility organizational culture regarding DSM seemed to have regressed significantly from the peak days of the DSM incentive time period.

Measurement and Evaluation Activities

Prior to the 1991 order, the electric DSM evaluation function at Consumers Power had the equivalent of about one-half of a full-time person. The electric DSM evaluation budget was perhaps $200,000 per year, at best. (In retrospect, this was probably not inappropriate, given that they had so little DSM program effort.)

The 1991 settlement agreement established a two-year electric DSM evaluation budget of $4 million. Per the

settlement agreement, those funds were not controlled by the utility but by a five-party collaborative oversight group (see Kushler, 1993[b] for a description of the collaborative evaluation). However, Consumers Power greatly expanded its own internal evaluation capabilities as well. By the end of 1992, there were four persons assigned to DSM evaluation, with one more position added in 1993. Staff within the company regarded the evaluation of DSM programs as an absolutely crucial step towards securing the perception of DSM as a reliable utility resource.

At this point in 1994, the organizational commitment to evaluation of the electric DSM programs appears to have continued. There does seem to be a genuine interest in determining the effect of the U-9346 DSM programs. The staff level of the Consumers Power evaluation unit has held steady at the number reached in 1993.

DSM Program Quality

The issue of program quality does not easily lend itself to simple before and after comparisons. However, Consumers Power staff acknowledge that several factors regarding program design and implementation have changed dramatically since the 1991 order. The prior programs operated by Consumers Power tended to be primarily information oriented (e.g., providing energy audits), with relatively little attention paid to motivating customers to secure energy savings. Similarly, there was little emphasis on cost containment. The focus was principally on spending the agreed-upon DSM budget.

The structure of the incentive in the 1991 settlement agreement led to substantial changes that should improve program quality. First, since the utility incentives were tied to actual measure installation, the company was forced to design programs which paid great attention to motivating customer action. This resulted in the incorporation of attractive customer incentives (i. e., rebates) and, in some cases, direct installation of measures by the utility. Second, the utility incentive structure also incorporated program cost as a key element. This resulted in Consumers Power, for the first time, having a real motivation to eliminate any unnecessary program costs. Lastly, the daunting challenge prescribed by the 1991 order and settlement agreement resulted in Consumers Power bringing in several "outside experts" to help design their DSM programs. Again, for the first time, Consumers Power had a substantial incentive to take advantage of DSM experience gained elsewhere.

Although the final impact evaluation results of the U-9346 DSM programs are still not available, it is clear from the process evaluation results that Consumers Power's DSM programs were very well received and resulted in the installation of a tremendous amount of DSM measures. This is certainly a vast improvement over the very limited DSM program offerings of the pre-1991 time period.

On the other hand, it is also clear from the evaluation work to-date that there were many aspects of the Consumers Power DSM programs that needed improvement. Furthermore, at least some of these problems may have been aggravated by the nature of the incentive itself (e.g., since the incentive was based on ex ante savings estimates without any net savings adjustment, some programs were not as diligent as they could have been about minimizing free-ridership). The evaluation work by the Evaluation Working Group has identified a number of opportunities for improvement in the next generation of Consumers Power DSM programs. As of this point, that next generation of DSM programs has not been fielded. Presumably, they will benefit considerably from the experience gained.

Discussion

Consumers Power clearly demonstrated dramatic increases in electric DSM activity during the time period covered by the incentive/penalty mechanism in the 1991 rate case order. As discussed above, the extent of change was visible in all seven indicators examined in this paper. That aspect of the results is similar to the results observed in the study of California utility DSM incentives (Schlegel, et al., 1993), and is consistent with the generally positive results reported in what is probably the most comprehensive review to-date of the effect of regulatory DSM incentives (Nadel and Jordan, 1992). As Nadel and Jordan conclude: "Our research indicates that incentives tend to work" (page 250).

The distinguishing feature of the current study, however, is its examination of the persistence of the effects of a temporary DSM incentive. On that score, the results from this study are far less encouraging. A worst case interpretation of the observed events would be that in spite of authorization to continue spending on DSM, once the specific incentive/penalty mechanism expired in September 1993, Consumers Power completely shut down any further DSM program delivery. A best case interpretation would be that Consumers Power retained its recently developed interest in DSM but was concerned about regulatory risk and decided to prudently wait for the next specific order before proceeding.

The truth is probably somewhere in between. Consumers Power has thus far retained most of its expanded DSM staff, and is continuing to work on DSM plans. On the other hand, even the most optimistic of those plans represent a reduction from the peak of the incentive time period production, and the corporate enthusiasm for DSM is noticeably lessened.

The most salient observation would seem to be the one offered earlier in this paper as a caveat for measuring utility response, i.e., utilities are large and complex organizations, responding to a mix of incentives and disincentives which they face in their normal course of business. In this case, a number of factors are impacting Consumers Power's behavior. For example, there are now two different members of the state regulatory commission than when Consumers Power's 1991 order was issued. Consumers Power may perceive the new members' interest in DSM as different than their predecessors. Also, there are frequent calls (especially from large industrial customers) to minimize rates immediately. It is vociferously suggested by certain groups that ceasing spending on DSM would further that objective. Another conflicting factor is that Consumers Power's parent corporation has an interest in selling power to the utility from a cogeneration facility. A large and successful DSM program might interfere with that objective. And, of course, Consumers Power still has the inherent incentive to sell more electricity that is embedded in the current regulatory system (Moskovitz, 1989). In short, a number of conflicting incentives of one type or another already exist. In the absence of an explicit DSM incentive structure, it would appear that the effects of competing incentives have taken hold and diminished the corporate interest in DSM.

Finally, it should be noted that there is one aspect of the circumstances surrounding this case that has not varied much during this time period. That is that the available IRP data consistently shows DSM to be a cost-effective resource for Consumers Power (MPSC, 1991; Consumers Power, 1992; Consumers Power 1993). That was true in the "no DSM" days before the 1991 incentive took effect, remained so during the incentive time period, and continues today. The wide fluctuations in DSM activity at Consumers Power over the past four years do not appear to be associated with any particular changes in the quantitative "resource value" of DSM for the utility. Instead, those fluctuations seem clearly to be driven by other factors.

Conclusion

This author's original paper examining the effects of the regulatory DSM incentive on Consumers Power documented a remarkable increase in DSM effort and activity (Kushler, 1993a). The issue examined in this second paper was whether the effects of that incentive, having presumably overcome many of the hypothetical barriers to utility DSM (e.g., lack of corporate familiarity with DSM, lack of experienced staff, concerns about lack of customer response, etc.) would persist. Would the utility continue its aggressive DSM efforts after the specific DSM incentive was removed?

The answer to that question is, thus far at least: apparently not. This result reinforces the conclusions of the previously mentioned study of the California utility DSM incentives. Although that effort did not have an opportunity to directly observe a situation where a utility incentive expired, the authors of that study extensively analyzed utility perceptions and motivations regarding DSM. That study concluded: "Shareholder incentives are designed to offset the disincentives previously described to a utility's interest in DSM. They counteract the disincentive to not invest in DSM because there is no return allowed and to invest in supply-side investments because there is . . . [Incentives should be a permanent feature of a least-cost program. Merely getting management's attention for a while will not be enough. Incentives, to be effective, must be present whenever management makes a resource decision" (pages 5-18). [1]

Interestingly, the arguments of some of the better known opponents of DSM shareholder incentives (Newman, Kihm and Schoengold, 1992) are really not that inconsistent with the results observed in this case. Even they acknowledge that a utility will act in its own perceived self interest.2 Their preferred course of action is a strong regulatory mandate rather than explicit shareholder incentives. But even in that situation, the effectiveness of a strong regulatory hand in shaping utility behavior is dependent upon the implicit (or sometimes explicit) threat of adverse financial consequences to the utility. Thus, either way, through the use of specific shareholder rewards or implicit penalties, there is an essential reliance on the fact that a utility's behavior will be greatly influenced by the perceived economic consequences of that behavior.

The results of the present case appear to affirm that paradigm. It is instructive to note that even though IRP analysis showed DSM to be a cost-effective resource option, in the absence of any specific DSM incentive or penalty structure Consumers Power chose to not pursue DSM. There appears to be a disconnect between the theoretically optimal IRP preferred path and the utility's perceived self interest. Recent gains in Consumers Power's knowledge and experience with DSM do not seem to have been alone sufficient to overcome whatever factors are operating to inhibit DSM activity.

In conclusion, while Consumers Power's experience over the past couple of years may have overcome some barriers, perhaps making the company more receptive to DSM and more capable, it appears that those gains were not sufficient to produce a continuing high level of DSM effort once the specific DSM incentive expired. In short, there is little evidence of persistence. The results of this case study appear to confirm the critical importance of

on-going economic incentives and disincentives in determining utility DSM behavior.

Endnotes

1. Additional support for this perspective can also be gleaned from the previously cited study by Nadel and Jordan. They reported, from their review of 17 utilities with some type of DSM incentive, that the impact of incentives was greater on near-term activity than on long-range plans. By way of explanation, they speculated that one reason for the discrepancy might be that utilities may be waiting to see if incentives are permanent.

2. Those authors should be commended for the valuable contribution they have made to illustrating some of the differences between the perceived and the real effects of DSM on shareholder interests. That stated, however, efforts to motivate utilities must take into consideration those factors which are most salient to utility decisionmakers, even if those factors include some dubious or misguided assumptions.

References

Consumers Power Company. 1990. Integrated Resource Planning Report. Jackson, Michigan.

Consumers Power Company. 1992. 1992 Integrated Resource Planning Report. Jackson, Michigan.

Consumers Power Company. 1993. 1993 Long Range Resource Plan: 1992 Integrated Resource Plan Update. Jackson, Michigan.

Kushler, M. 1993[a]. "A Two-By-Four and a Pound of Cheese: A Case Study of the Effect of Regulatory Incentives on a Reluctant Utility." Proceedings of the National Energy Program Evaluation Conference, pp. 582-587, Chicago, Illinois.

Kushler, M. 1993[b]. "Productive Teamwork or Too Many Cooks: An Adventure in Collaborative Evaluation." Proceedings of the National Energy Program Evaluation Conference, pp. 362-367, Chicago, Illinois.

Michigan Public Service Commission (MPSC). 1991. "MPSC Staff Report on Consumers Power Company's Integrated Resource Planning Report," Lansing, Michigan.

Moskovitz, D. 1989. Profits & Progress Through Least-Cost Planning. National Association of Regulatory Utility Commissioners, Washington, D.C.

Nadel, S. and J. Jordan. 1992. "Does the Rat Smell the Cheese? A Preliminary Evaluation of Financial Incentives Provided to Utilities." In Nadel, S., M. Reid and D. Wolcott (Eds.) Regulatory Incentives for Demand Side Management, pp. 229-254. American Council for an Energy Efficient Economy (ACEEE), Washington, D.C. and the New York State Energy Research and Development Authority (NYSERDA), Albany, New York.

Nadel, S., M. Reid and D. Wolcott (Eds.). 1992. Regulatory Incentives for Demand Side Management, ACEEE, Washington, D.C. and NYSERDA, Albany, New York.

Newman, P., S. Kihm and D. Schoengold. 1992. "Spare the Stick and Spoil the Carrot: Why DSM Incentives for Utility Stockholders Aren't Necessary." In Nadel, S. M. Reid and D. Wolcott (Eds.) Regulatory Incentives for Demand Side Management, pp. 203-228. ACEEE, Washington, D.C. and NYSERDA, Albany, New York.

Schlegel, J., G. Edgar, R. Prahl, M. Kushler and D. Norum. 1993. Evaluation of DSM Shareholder Incentive Mechanisms: Final Report. Prepared for the California Public Utilities Commission by the Wisconsin Energy Conservation Corporation, Madison, Wisconsin.

Vine, E. 1992. "Persistence of Energy Savings: What Do We Know and How Can It Be Ensured?" Program Evaluation - Proceedings from the ACEEE 1992 Summer Study on Energy Efficiency in Buildings. Volume 7, pp. 7.257-7.266. ACEEE, Washington, D.C.