# ARE INDUSTRIAL CUSTOMERS WINNERS OR LOSERS FROM DSM ?

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## Introduction

Large industrial customers often oppose demand-side management (DSM) programs on the grounds that large industrial customers have already implemented most cost-effective DSM measures and hence the prime impact of DSM programs on industrial customers is that they must subsidize DSM activities of other rate classes. This argument has been made at the national level by the Electricity Consumers Resource Council (ELCON 1990) and at the state level by consortiums of large industrial customers such as "Multiple Intervenors" in New York State.

The first part of this argument (the claim that industrial customers have implemented most DSM measures) is fairly easy to evaluate. Audits of industrial facilities still regularly turn up ways to reduce energy use by 10% or more at costs less than utility avoided costs (see for example Fuller 1992). Much of the reason for this trend is that industrial customers typically employ a payback threshold of two to three years (Alliance to Save Energy 1983). Measures with longer paybacks are seldom implemented, even though many of these measures cost less than utility avoided costs. For example, at an average industrial electricity price of $0.05/kWh (EIA 1992a), a measure with a three year payback has a levelized cost of $0.020/kWh,[1] substantially less than the avoided cost of most utilities.[2]

The second part of this argument (the claim that industrial customers are subsidizing DSM efforts by other customer classes) has been more difficult to resolve because, to our knowledge, no one has collected the necessary data. The purpose of this paper is to fill this gap and see whether industrial customers are subsidizing DSM efforts of other customer classes, or visa versa.

## Methodology

For this project we contacted 18 utilities with active DSM

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[1] Assuming a ten year measure life and a 6% real discount rate.

[2] For example, the Energy Information Administration (1992b) projects that real electricity prices will increase slightly over the next two decades, which means that the long-run marginal cost of electricity for the average utility is just slightly higher than today's retail costs.

programs throughout the U.S. We asked each utility for two years of data on DSM expenditures and savings by customer class. We requested savings figures for DSM measures installed each year, excluding savings from measures installed in prior years. We also asked for data on electricity sales and revenues by customer class. Twelve utilities were able to supply enough data to permit analysis. For each utility we then compared the industrial proportion of DSM savings to the industrial proportion of electricity sales. Similarly, we compared the industrial proportion of DSM expenditures to the industrial proportion of utility gross revenue. If industrial customers are subsidizing other customer classes, then the industrial proportion of DSM savings and expenditures will be less than the industrial proportion of sales and revenues.

## Caveats

The major limitation to this analysis is that figures are inexact. Many utilities do not track industrial and commercial DSM savings and expenditures separately, and hence for some utilities the distinction between commercial and industrial sales were estimated by utility staff. There may be a substantial error band around some of these estimates.

A second word of caution is that each utility tracks DSM savings and expenditures in different ways, and hence results between utilities often cannot be directly compared. However, any biases in utility reports would likely apply to all sectors, and hence data on the proportion of savings and expenditures that are attributable to individual sectors can be directly compared (keeping in mind the proportion of a utility's load attributable to specific sectors).

Finally, this analysis is based on data from only a limited number of utilities. As data from more utilities becomes available, and as the quality of this data improves, this analysis should be repeated. For example, the Energy Information Administration is planning to collect data on DSM savings and expenditures by customer class beginning in 1992 (EIA 1992c), which should make this type of analysis much easier to undertake in the future.

## Results

Results of our analysis are summarized in Table 1. These results show that in half the cases (where a case is one year of data for a particular utility), industrial customers have achieved a greater proportion of DSM savings than their proportion of total sales. In the other 50% of cases, industrial customers achieved a lower share of DSM savings than their proportion of total sales. For the 22 cases, the average ratio of the industrial proportion of DSM savings to the industrial proportion of kWh sales was 1.03.

Table 1. Industrial DSM Savings and Expenses in Relation to Industrial Sales and Revenues for Selected Utilities

| | Ind'l Savings as % of Total Savings | | Ratio Ind'l Savings as % of Total Savings / Ind'l Sales as % of Total Sales | | Ind'l DSM $ as % of Total DSM $ | | Ratio Ind'l DSM $ as % of Total DSM $ / Industrial Revenues as % of Total Revenues | |
|---|---|---|---|---|---|---|---|---|
| Utility | 1990 | 1991 | 1990 | 1991 | 1990 | 1991 | 1990 | 1991 |
| Bonneville Power Admin | 87% | 39% | 2.25 | 1.04 | 11% | 12% | NA | NA |
| B.C. Hydro | 30% | 23% | 0.76 | 0.64 | NA | NA | NA | NA |
| Carolina Power & Light | 56% | 51% | 1.42 | 1.32 | NA | NA | NA | 0.59 |
| Central Maine Power | 34% | 45% | 0.84 | 1.10 | 26% | 28% | 0.85 | 0.88 |
| Commonwealth Electric | 16% | NA | 1.56 | NA | 17% | NA | 1.94 | NA |
| New England Electric * | 29% | NA | 1.19 | NA | 23% | NA | 1.04 | NA |
| Niagara Mohawk | 17% | 74% | 0.25 | 1.19 | NA | 67% | 1.33 | 1.41 |
| Pacific Power & Light | 14% | 16% | 0.61 | 0.68 | 8% | 8% | 0.49 | 0.48 |
| Puget Power & Light | 18% | 16% | 0.91 | 0.81 | 12% | 9% | 0.89 | 0.65 |
| Southern Calif. Edison | 33% | 23% | 1.32 | 0.79 | 10% | 15% | 0.49 | 0.62 |
| United Illuminating | 33% | 21% | 1.63 | 1.12 | 23% | 17% | 1.36 | 1.11 |
| Wisconsin Electric | 45% | 32% | 0.77 | 0.55 | 38% | 22% | 0.85 | 0.52 |
| AVERAGE | 34% | 34% | 1.13 | 0.92 | 19% | 22% | 1.03 | 0.78 |
| MEDIAN | 32% | 28% | 1.05 | 0.93 | 20% | 16% | 0.89 | 0.61 |
| % > 1 | | | 50% | 50% | | | 44% | 25% |

* 1989 data; 1990 or 1991 data is not available.
NA = not available.

This indicates that industrial customers, on average, are achieving slightly more than their "fair share" of DSM savings (a ratio of 1.0 means industrial customers are exactly achieving their fair share).

On the other hand, in only 6 out of 17 cases were the proportion of DSM expenditures for the industrial class greater their proportion of revenues. In 65% of the cases industrial customers were not receiving their "fair share" of DSM budgets. For the 17 cases, the average ratio of the industrial proportion of DSM expenditures to the industrial proportion of utility revenues was 0.91, indicating that on average industrial customers are receiving slightly less than their fair share of DSM expenditures.

The discrepancy between the two measures is explained by the fact that industrial DSM programs are generally less expensive per kWh saved than commercial or industrial programs (Nadel 1990). For this reason industrial DSM programs can save more than programs for other customer classes, yet cost less money.

Of perhaps greater significance than our overall results is that for some utilities industrial customers received significantly more services than their "fair share" and for other utilities the reverse was true. The reason for this variation is perhaps explained by a recent study on results of industrial DSM programs. For this study (Jordan and Nadel 1992), a database of the results of 70 industrial DSM programs was assembled and analyzed. For each program the participation rate (proportion of eligible customers who participated) and electricity savings as a percent of utility industrial electricity sales were calculated. Many of the programs in the database had participation rates of less than 10% and savings as a percent of industrial sales of less than 1%. However several programs had higher participation rates and savings. Many of these successful programs are offered by utilities that have achieved high industrial DSM savings as indicated by the analysis in Table 1.

In the Jordan and Nadel study, four factors were identified as contributing to successful industrial DSM programs:

1. Understanding the customers perspective. Industrial customers are different from other customer classes and to be successful, industrial DSM programs must be designed with industrial needs in mind. To provide just one example, in the industrial sector the majority of potential energy savings lie in industrial process improvements, not in the lighting measures that are the "bread and butter" of commercial DSM programs. Identifying these measures requires detailed knowledge of specific industrial processes. Walk-through energy audits by junior-level utility staff cannot identify these measures, and may leave the industrial customer questioning whether the program is really worth the bother. To address this problem, some of the more

successful programs feature technical assistance by experts in a particular industry.

2. Marketing that is personal and user-friendly. Industrial programs cannot be run out of an office. Bill stuffers and other direct mail alone will rarely succeed in marketing a program to the appropriate people in a large industrial facility. The utility needs to make regular personal contact with appropriate decision-makers at each facility. Through this contact trust and rapport can be developed that will eventually lead to participation. Similarly, since "time is money" for an industrial customer, programs must be user friendly. This requires a well administered program that minimizes paperwork, bureaucracy and customer time requirements.

3. Program flexibility. Generally the more flexibility offered the industrial customer, the more likely customers are to participate. Flexibility involves two concepts. To be most effective, a utility's industrial DSM effort must address both concepts in a complementary fashion. First, programs should allow customers to propose their own efficiency measures. Many customers know of measures unique to their situation. Utility programs should encourage and be able to handle these custom measures because these measures often produce very large energy savings. Second, programs should not be limited to custom measures because custom measure application requirements will be perceived as burdensome by many customers. Simple prescriptive lists of common measures, with specified incentives and other services, make it easy for customers to participate. These measures can achieve high participation rates. Furthermore, implementation of simple, prescriptive measures build trust between the utility and the customer, making it more likely that custom measures will be proposed in the future.

4. Financial incentives. All of the programs with high participation rates and savings offered financial incentives to customers. In many cases the incentives are large, meaning they cover a large proportion of measure cost for those measures customers are unlikely to do on their own. For example, the Bonneville Power Administration had low participation in its Energy $avings Plan program until incentives were raised by a factor of three and program marketing improved. As a result of these changes, the annual participation rate increased approximately four-fold.

## Conclusion

On average, for the utilities examined in this study,

industrial customers are receiving their "fair share" of DSM savings. Industrial DSM programs tend to be cheaper per kWh saved than programs for other sectors, and thus industrial customers, on average, are receiving somewhat less than their fair share of DSM expenditures.

However, for some utilities, industrial customers receive more than their fair share of savings and expenditures and for others they receive less. Those utilities with particularly successful industrial DSM efforts generally feature strong programs that understand the customers perspective, provide financial incentives, and are user-friendly, flexible and marketed on a personal basis. In cases where industrial customers are under-represented among DSM program participants, utilities would be well advised to follow the lessons taught by successful industrial DSM programs. In cases where industrial customers are well served by DSM programs, they would be well advised to stop griping lest consumer advocates discover that industrial customers are being subsidized by other rate classes.

Given the caveats described above, the results of this analysis should be considered preliminary. When improved quality data from more utilities becomes available (such as through EIA's 1992 survey), the analysis should be repeated. Many utilities do not separately track DSM data for industrial and commercial customers, which makes analyses of this type difficult. Given the fact that industrial customers are concerned about their place in DSM efforts, and given the many differences between commercial and industrial customers (in how they think and operate), all utilities should track commercial DSM data separately from industrial DSM data. Separate data will permit analyses such as this one and will also provide an improved foundation from which to plan and evaluate industrial DSM programs.

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