DSM UNDER ATTACK: ARE UTILITIES OVERREACTING TO THE THREAT OF RETAIL WHEELING?

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INTRODUCTION

Spurred by recent regulatory actions in California (CPUC 1994) and Michigan (MPSC 1994), many electric utilities are now attempting to cut DSM programs as part of efforts to slim-down for the new "competitive era." The first part of this paper chronicles recent changes in DSM plans among utilities with the largest DSM programs (in dollar and kWh savings terms). The second part of this paper suggests that most of these cutbacks are an overreaction to the threat of retail wheeling, an overreaction that may cost society dearly in coming years. The final part presents and elaborates upon our broad recommendation that utilities and their regulators should maintain effective DSM programs as they encourage greater competition in electricity supply.

RECENT TRENDS IN DSM ACTIVITIES AND PLANS

Surveys of utilities nationwide indicate that aggregate DSM program budgets and savings targets continued to increase in 1993 and 1994 (Hirst and Hadley 1994b). Recent issues of trade publications such as *Demand-Side Report* and *the Electricity Daily*, however, have been full of articles chronicling how various utilities are proposing to cut their DSM expenditures in 1995. In order to assess how widespread this phenomenon is, we collected data on 1994 and 1995 DSM expenditures and savings targets for utilities with some of the largest DSM programs. These utilities were selected because they were the top utilities nationwide in terms of total DSM expenditures, DSM expenditures as a percent of gross revenues, and/or incremental kWh savings from DSM.[1] The selected utilities and their planned changes in DSM budgets and savings targets are summarized in Table 1.

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[1] The utilities selected were in the top five nationwide based on 1992 data reported to the U.S. Energy Information Administration and summarized by Hirst (1994). Several utilities were in the top five on more than one of these lists, hence the total number of utilities is less than 15. Also, we did not collect data on two small utilities with high spending as a percent of gross revenues but which spent less than $10 million on DSM in 1992.

Table 1. Changes in DSM Expenditures and Savings Targets from 1994 to 1995 for 12 Utilities with Large DSM Efforts.

Utility	Change from 1994 to 1995	
	DSM Budget	Incremental kWh Savings**
NEES	+10%	+23%
Florida P&L	+8%	NA
SMUD	+4%	-16%
Seattle City Light	0%	0%
WI Elec. Power	0%	0%
NYSEG	-11%*	-17%*
PG&E	-12%*	0%*
WI Pub. Svc.	-21%	-7%
Niagara Mohawk	-29%*	-28%*
Puget P&L	-37%	-23%
Con Ed	-42%*	-40%*
So. Cal. Ed.	-61%*	-17%*

* Figures are proposed but not yet approved.
** Annual electricity savings from 1995 DSM programs compared to the same figure for 1994 programs.

Sources: Data provided by individual utilities, regulatory filings, and articles in *Demand-Side Report.*

Several trends emerge from these data:

1. Most utilities with large DSM programs in past years are scaling back their spending in 1995. However, a few utilities are holding spending steady or increasing DSM budgets slightly. New England Electric (NEES) is the only utility projecting a significant increase in incremental electricity savings in 1995.

2. Utilities with above-average electricity rates are proposing the largest budget cuts. Of the four utilities with the largest percentage reductions, three have average rates in excess of $0.10/kWh. Puget Power & Light, with a 37 percent DSM reduction, has an average electricity rate of only $0.0506/kWh (as of 1992), which is not high relative to average rates nationwide but is high relative to electricity rates in its region.

3. In most but not all cases, cuts in energy-savings targets are less, on a percentage basis, than spending cuts. In other words, utilities are attempting to increase the "bang per buck" of their DSM programs. This is a continuation of a trend observed in 1993 and 1994 (Hirst and Hadley 1994b).

Additional research uncovered that while some utilities are proposing steep DSM cuts,

regulators are not always approving these cuts. In several cases regulators are scaling back or entirely eliminating the cuts. For example, Long Island Lighting in N.Y. proposed a 66 percent cut, but only a 41 percent cut was approved. Consumers Power in Michigan requested that DSM be eliminated entirely, however the commission is requiring the utility to continue DSM in 1995 at the same spending level as in 1994 (Witte 1995).

Some utilities are increasing DSM budgets between 1994 and 1995. In addition to those utilities listed in Table 1, certain utilities are increasing their DSM budgets, including some utilities with smaller DSM programs which are still in the expansion phase. For example, Central Power & Light in Texas recently proposed a 55 percent increase in DSM spending in 1995, raising their DSM budget from $5.8 million to $9 million (DSR 1995c). A two percent budget increase was recently approved at Tampa Electric Company in Florida, where peak demand is growing rapidly (Bryant 1995).

HOW AND WHY UTILITIES ARE OVERREACTING

Retail wheeling has not yet been adopted in any jurisdiction. Utilities, however, are reacting as if wheeling were a reality today among all customer segments. In other words, utilities are responding to "virtual competition," not real competition. While we agree that utilities need to prepare for a more competitive era, we believe many utilities are overreacting, at least as far as DSM is concerned. Utilities are overreacting for at least five reasons:

1. some are treating retail wheeling as if it were more imminent than it is likely to be;

2. some overestimate the impacts that retail competition, if adopted, will have;

3. some overestimate the impact of DSM programs on electricity rates and fail to admit or address the primary reasons why their rates are high;

4. some fail to recognize that certain well-publicized DSM cuts are due in part to utility-specific issues; and

5. in general, they fail to maintain a "least-cost energy services" perspective, which is in the best interest of society as a whole, or value the broad range of benefits of DSM programs.

Each of these factors is discussed in the sections below.

1. Retail Wheeling is Not Imminent

In widely publicized moves, the Michigan and California utility commissions issued proposals that may result in retail wheeling for their states. The Michigan order, issued in April 1994,

set up an experiment in retail wheeling for the state's two largest utilities. However, the experiment is highly constrained, as it is limited to 150 MW -- approximately one percent of the load of the state's two largest utilities -- and is subject to many other limitations (MPSC 1994). For example, the experiment will not begin until the two affected utilities (Consumers Power and Detroit Edison) need new generating capacity (Strand 1994), an event that will not occur until at least 2000 according to the two affected utilities' current resource plans (Detroit Edison 1994; Consumers Power 1994). Some parties involved in current case proceedings with Consumers Power are expected to advocate for an earlier implementation date for Consumers Power (Kushler 1994).

The experiment will not begin until the PSC resolves the issue of appropriate charges for customers receiving wheeling services. The administrative law judge in this case issued a recommendation in February 1995 which proposed mid-range wheeling charges that were considered to be too low by the utilities and too high by industrial customers. The commission will consider the case before reaching a decision. Further delays are likely if the two affected utilities continue their legal fight to overturn the commission's decision setting up the experiment or if any parties are dissatisfied with wheeling rates, which is likely. Of perhaps greater importance, the experiment is scheduled to last five years. Even if the experiment is successful, anything more than token retail competition is unlikely to begin until well into the next century (Kushler 1995).

In California, the process and outcome are more uncertain. Under the California Public Utility Commission's (CPUC) initial proposal, issued in April 1994, a series of rulemakings will occur throughout 1994 and 1995, in order to allow the largest customers to begin shopping for retail electric service as of January 1996 (CPUC 1994). However, the initial decision, establishing the basic framework for utility regulation in the state, has been delayed from the originally scheduled August 1994 until May 1995 at the earliest (ED 1994a). In December 1994, the CPUC announced a new round of hearings leading to a proposed policy in March 1995 and a final decision in May. The CPUC identified three restructuring proposals on which it is interested in receiving comments, one of which involves reform of wholesale markets only. Due to the complexity of the issue, the CPUC may not be able to stick to its new schedule. Furthermore, once a final decision is issued, key implementing issues will be considered, including how to price wheeling services and how to handle cost allocation for uneconomic utility assets.

Once all of these decisions are made, legal challenges may follow, which could further delay the process. Furthermore, the California legislature will probably need to modify several existing laws before industry restructuring can go forward. For example, in a May 1994 letter to the CPUC, the chairmen of two legislative committees cited 11 specific laws that may require modification (Sher and Moore 1994). This legislative process is likely to delay the beginning of retail wheeling in California even further. Thus it appears unlikely that retail wheeling can begin in California until 1997 at the earliest, and considerable additional delays are likely.

Besides Michigan and California, several other states including Arizona, Maine, Maryland, New York, Pennsylvania, Washington, and Wisconsin have opened formal proceedings or informal discussions on retail wheeling, and retail wheeling legislation has been introduced in other states such as Massachusetts, New Mexico, and Nevada. Connecticut already concluded a regulatory proceeding that addressed retail wheeling. The Connecticut Department of Public Utility Control elected not to go forward with retail competition, reasoning that "the introduction of open generation competition for retail sales is not in the best interest of the stakeholders, State Energy Policy, and the economy of the State of Connecticut" and further noting that:

> [I]f retail wheeling is to be authorized, it should only be introduced at a time of capacity need, and then after a careful structuring to minimize the adverse effects on inelastic ratepayers and the viability of host utilities. Introduction prior to the time of capacity need would create production inefficiencies, increase stranded cost, use more of our non-renewable resources than previously required to meet Connecticut's power needs, disrupt implementation of the Clean Air Act, be contrary to State Energy Policy, and adversely affect the Integrated Resource Planning process (CDPUC 1994).

The State of New York Public Service Commission (NYPSC) has opened a restructuring proceeding and has issued some initial findings and rules to guide it. The thrust of the proceeding is on more active promotion of wholesale competition. The NYPSC has directed parties to work collaboratively to "examine issues related to the establishment of a fully efficient wholesale market for electricity and any pricing reforms necessary to reflect those market efficiencies in retail customer rates." A second phase of the proceeding was established to "identify regulatory and ratemaking practices that will assist in the transition to a more competitive electric industry designed to increase efficiency in the provision of electricity while maintaining safety, environmental, affordability and service quality goals." While retail wheeling is an open issue in the second phase, the NYPSC has made it clear that principles such as treating all customer classes fairly, environmental protection, and support for energy efficiency and renewable energy sources must be maintained (NYPSC 1994a, 1994b).

The most recent New York State Energy Plan, issued in October 1994, also gives priority to wholesale competition, noting that "[t]here is a broad consensus that competition in wholesale generation is a positive development for all electricity consumers and that the State should encourage genuinely competitive wholesale markets." The State Energy Plan also notes that "[i]t is unclear whether unrestricted retail wheeling is in the best overall, long-term interest of State economic, energy, environmental or social policy" (NYSEO 1994).

In Wisconsin, retail wheeling legislation has been delayed for a year as a result of recent activity by the Wisconsin Public Service Commission. On January 31, 1995, the Wisconsin PSC established an Advisory Committee charged with making recommendations on statutory changes needed to implement retail wheeling in the state's electric utility industry. The committee's work is meant to augment the 1,700 pages of testimony generated during months

of meetings on retail wheeling (LEAP 1995). Support for retail wheeling in Wisconsin comes primarily from its two largest utilities, Wisconsin Electric and Wisconsin Power & Light, rather than from industrial customers. This unusual situation results from these utilities wanting to sell their relatively low-priced electricity to neighboring Illinois, which has higher rates. Wisconsin industrial customers fear rate increases that may result in the future due to utilities expanding their markets. Some of the smaller utilities (municipals, Wisconsin Public Service Corp., and Madison Gas & Electric) also oppose retail wheeling (Jablonski 1995).

While there is considerable interest in the issue at the state level, the prospect of retail wheeling raises many difficult issues such as potential negative effects on core customers, potential stranded utility assets, allocation of costs and assets, how to preserve system reliability, potential conflicts between states, and how to protect the environment and achieve other long-term social objectives (Costello, Burns and Hegazy 1995). The outcomes of these state deliberations are highly uncertain.

Given the difficult set of issues associated with retail wheeling, some states (e.g., Connecticut) will reject retail wheeling and maintain the status quo. Other states (e.g., New York) will concentrate on promoting wholesale competition. Still other states may choose to follow Michigan's or California's lead. However, the Michigan model -- beginning with a limited experiment -- is likely to be more common than the original California proposal for full-blown retail wheeling without experimentation given the difficult issues and unproven benefits. While there is an emerging consensus that fundamental changes will occur in the utility industry, some analysts think that most if not all of the cost savings available in the electric utility industry can be achieved through a combination of greater wholesale competition and performance-based ratemaking (Cavanagh 1994; RAP 1994). The U.S. Department of Energy endorsed this position in testimony it submitted to the California restructuring proceeding (U.S. DOE 1994a).

2. Retail Wheeling is More Likely to be Limited than Widespread

When and if retail wheeling comes to pass, it is unlikely to be the type of wide-open competition espoused by organizations such as the Electricity Consumers Resource Council (ELCON), in which large customers can freely shop for electricity services from many power providers, while paying small wheeling charges and being subject to minimal exit and entry requirements (ELCON 1994). While this model of wide-open competition is attractive to many large customers, utility commissions are unlikely to approve this model because of the adverse impacts it can have on residential and small C&I rate payers.

Very large customers are often attracted to the ELCON model because it would permit them to shop freely for power at prices that would be only slightly higher than marginal power

costs in the region.[2] In most of the U.S., the marginal cost of power is significantly less than the average cost. Current electricity prices are largely based on average costs. Thus, as prices for large customers begin to approach marginal costs, the difference between marginal costs and average costs are shifted to the remaining customers on the utility system. These remaining customers are likely to be residential and small commercial and industrial (C&I) customers who do not have the time, expertise, or market clout to shop for alternative power suppliers.

In order to protect captive customers from rate increases and other risks of this sort, utility commissions are likely to constrain retail wheeling through exit fees or wheeling charges that assign to customers who leave a utility system their fair share of imbedded costs that exceed current marginal costs. Such wheeling charges may also include the cost of providing backup power to wheeling customers if these customers wish to retain their right to receive service from their local utility. Alternatively, commissions may substitute or complement backup power charges with reentry fees and/or advance notice requirements before former customers can return to the local utility system. Without such charges or restrictions, captive customers would essentially be paying for backup power for customers who leave the system.

The net result of these different charges and restrictions will be to lessen (and perhaps even eliminate) the amount of money a customer can save by switching power providers.[3] This, in turn, will lessen the number of customers who choose to leave the system, thereby reducing the financial risks to utilities caused by industry restructuring and also reducing the imperative for utilities to cut expenses quickly before they carefully consider which expenses are likely to be extraneous in a competitive environment.

In fact, it appears that some large industrial customers are proposing retail wheeling in part to pressure utilities to grant them rate discounts (Cohen and Kihm 1994). Utilities are starting to respond to these pressures. For example, Detroit Edison recently signed a ten-year agreement with the "Big 3" auto makers under which Detroit Edison agreed to 9 - 15 percent rate reductions in exchange for a ten-year commitment by the auto makers to use Detroit Edison as the sole supplier of power for 54 manufacturing plants located in the utility's

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[2] Power suppliers would generally be willing to provide power to these large customers at the marginal cost of production plus an appropriate profit. Since exit, reentry, and wheeling charges are minimal, the prices large customers pay under this industry structure are only a little above the marginal cost of the cheapest power providers in the region.

[3] For example, an analysis by Connecticut Light and Power estimated that in order to fully recover imbedded costs from customers that leave their system, wheeling charges would be nearly $0.04 per kWh (IEB 1994). While this estimate is preliminary and would be hotly debated in a hearing room, this figure indicates the magnitude of the potential charges -- charges that are high enough to make many customers think twice before they stop taking retail service from their present utility.

service area (Garner 1994; Kushler 1994).

As was noted above, if retail wheeling is allowed, residential and small C&I customers are likely to remain on the utility system. These customers lack the resources to shop around for power. For example, while exact figures are not available, ten years after the breakup of American Telephone & Telegraph's (AT&T) telephone monopoly, approximately 60 percent of residential customers still receive long-distance telephone service from AT&T (Nadel 1994). For the electricity industry, the proportion of customers remaining on the system is likely to be even higher, because there is presently no electric transmission analog to the microwave and fiber optic networks that Sprint and MCI established in order to challenge AT&T's monopoly. Proposals have been made to bundle small customers into larger "pools" with more market clout, but this strategy is untested and may present legal difficulties, high transaction and administrative costs, and other problems that make this approach highly risky (Brockway 1995).

Since smaller customers are likely to remain on the utility system for the foreseeable future, utilities should continue to acquire cost-effective DSM resources for residential and small C&I customers regardless of what utilities do about DSM programs for large customers. This means continuing DSM programs where the cost of saved energy is less than the marginal cost of supplied energy, considering that energy supplies might come from a wholesale pool or some other nontraditional source in the near future. By cutting back on cost-effective DSM programs for smaller customers, utilities would needlessly increase the average bill of these captive customers.[4] In order to continue with residential and small C&I programs, it may be appropriate to allocate some or most of the cost of such programs to the customer class or classes that the programs serve.

3. Rate Impacts of DSM are Generally Modest and High Rates are Usually Due to Other Factors Besides DSM

Some large industrial customers have claimed that DSM programs result in substantial rate increases that put industrial firms at a competitive disadvantage (ELCON 1990). If this were true, then by cutting DSM spending, utilities could reduce rates significantly. Available evidence, however, indicates that the rate impacts of DSM programs are generally very modest.

In a recent analysis of ten reports that provide information on DSM rate impacts -- reports that examine more than 100 cases (where a case may represent a specific utility, customer class or program period), the median rate impact was found to be only 1.7 percent of underlying rates. In nearly 90 percent of the cases, the rate impact was five percent or less. Rate impacts of DSM varied from rate decreases (where DSM displaced new generation

[4] DSM programs that pass the Total Resource Cost (TRC) test reduce the electric bill of the average customer. By cutting these programs back, the average customer bill increases.

plants in the near-term) to a rate increase of nine percent (in several unique instances). For example, in a 28-year forecast, Florida Power and Light (FP&L) projected average rates to be approximately 0.3 percent lower for a resource plan that includes all DSM programs that pass the Total Resource Cost test as compared to a resource plan without DSM. Over the 28-year period, FP&L's rates for the DSM scenario are at most 2.4 percent higher in early years, but the rate differential becomes favorable around 2002, when FP&L begins to avoid building new generating capacity. A similar study done by New York State Energy Office estimated an average statewide rate impact of 4.8 percent, which is the present value of the stream of rate increases between 1991 and 2008, based on long-range DSM program plans by New York utilities as of 1994 (Pye and Nadel 1994).

A recent study by Oak Ridge National Laboratory also concluded that DSM program have a very slight impact on electricity rates. This study analyzed the impact on rates for a hypothetical utility of a DSM program that cut peak demand by one percent. Considering a wide range of assumptions and cases, the average impact on rates over a 15-year period ranged from -0.04 percent to 0.38 percent (Hirst and Hadley 1994a).

Where electric rates are high, it is usually due to other factors such as expensive power from nuclear power plants and independent power producers (IPPs), not DSM. A recent analysis of high-cost utilities and neighboring utilities with much lower costs found that the high-cost utilities owned, on average, over three times as much nuclear generation (as a percent of total generation) than their low-cost counterparts (Cohen and Kihm 1994). While the authors of this study did not conduct a similar analysis on the impact of IPPs, they (and others) have noted that "expensive IPP contracts based on administratively determined avoided costs (often based on proxy nuclear costs) rather than wholesale bidding also play a role in [raising rates] in many jurisdictions."

There are some notable examples of rate inflation due to IPPs. Southern California Edison (SCE) believes existing uneconomic IPP contracts will cost it more than $1 billion over the 1997-2003 period. This results from IPP electricity costing an average of $0.085/kWh as compared to the average cost of SCE-generated electricity of $0.05/kWh. IPPs provide about 33 percent of SCE's electricity generation, yet account for approximately 44 percent of SCE's generation costs (Counihan 1994). To deal with this problem, SCE has negotiated to buy out the contracts of nearly 500 MW of IPP generating capacity, and is seeking additional buy outs (ED 1994c). Similarly, Niagara Mohawk Power Corp. claims that it will pay $3 billion more to IPPs by 2008 than it would if it could pay current market rates for the same amount of power (Pospisil 1994).

Thus, if the problem is high electric rates, slashing DSM spending is not the real solution. Instead, efforts should focus on writing down expensive nuclear power plants and buying out or renegotiating contracts with qualifying facilities (QFs) and other independent power producers -- sources of power that might have looked attractive when built or contracted for, but are now uneconomic relative to energy-efficiency resources, combined-cycle gas turbines, and other emerging power sources. Some efforts in this direction have already taken place --

many utilities have bought out expensive IPP contracts, and some utilities, such as PG&E, are reducing their charges for nuclear-generated power (PG&E's proposal is discussed in the next section). In fact, PG&E's move is expected to save customers $2.1 billion by 1999 -- far more than customers would save if PG&E shut down its DSM programs, and this comparison doesn't include customers' savings from the programs helping them increase energy efficiency and lower electricity use.

4. DSM Cutbacks are Sometimes Due to Utility-Specific Concerns, Not the Threat of Retail Competition

The possibility of retail competition and the uncertainty about the future structure of the utility industry in general has without a doubt contributed to DSM cutbacks. Many utilities, especially those with relatively high rates, are trying to cut their costs due to a legitimate concern that they are entering a more competitive era. However, cutting DSM programs is only one way to lower electricity rates, and we argue that it may not help lower rates very much and does not serve the long-term interests of society as a whole.

Some of the most publicized DSM cutbacks, however, are due in part to other factors. For example, Southern California Edison's (SCE) DSM budget reductions were due in large part to a recent ruling of the Internal Revenue Service that found that SCE must capitalize DSM expenditures instead of expensing them, resulting in an additional tax burden (IRS 1994). This ruling was appealed and was partially overturned in January, 1995 (DSR 1995b). In addition, DSM cutbacks at SCE are due in part to a recent agreement with California's Division of Ratepayer Advocates (DRA) under which SCE would accelerate cost recovery on its San Onofre nuclear power plant in exchange for substantial reductions in non-fuel costs, particularly DSM and research and development expenditures (DSR 1994a).

Pacific Gas & Electric's cutbacks in DSM and many other expenditures appear to be attributable to several factors. First, PG&E's new CEO has reportedly wanted to cut expenditures for many years -- now he has the authority to do so. Second, PG&E has been operating the Diablo Canyon nuclear power plant under a highly lucrative settlement agreement that was negotiated between PG&E and the California DRA and approved by the CPUC in 1988. Power from Diablo Canyon is expensive -- approximately $0.12 per kWh -- thereby driving up PG&E's overall rates, but also contributing a substantial portion of PG&E's total profits. In December 1994, in negotiations with DRA and other parties, PG&E agreed to cut the price of power from Diablo Canyon to $0.09 per kWh by 1999. This agreement still must be approved by the CPUC, and is being opposed by a major consumer group who believes the rate cuts do not go deep enough (ED 1994b). By cutting back on DSM and other expenditures, and voluntarily lowering the rate collected on power generated by Diablo Canyon, PG&E wants to lessen pressure to reopen the Diablo Canyon case, thereby preserving what one PG&E staffer called its "golden egg albatross."

While PG&E is cutting its DSM budget by $100 million from planned 1995 levels, the utility had originally planned a large increase in its DSM budget in 1995. The reduction from the

actual 1994 DSM budget level is more modest -- on the order of $50 million. Furthermore, PG&E expects to achieve the same level of energy savings in 1995 as in 1994. It hopes to do this by acquiring more electricity savings per utility program dollar than in the recent past (Quigley 1994).

DSM cutbacks at the Bonneville Power Administration (BPA) have also been affected by utility-specific concerns. BPA is a wholesaler of electricity generated primarily by federal dams on the Columbia River system. Competition at the wholesale level, as enacted in the Energy Policy Act of 1992, combined with increasing pressures to save the remaining salmon runs in the Columbia basin have forced BPA to cut costs, including DSM spending, to remain competitive in the wholesale power market in the Northwest.

BPA will dramatically reduce its DSM program budget, which was around $150 million in recent years. While BPA wants to spend less on promoting energy efficiency, it has repeatedly committed to ensuring that all cost-effective conservation programs will continue. BPA has indicated it will continue funding high impact DSM programs supporting strong codes and standards, as well as market transformation. BPA is also requiring local utilities that purchase wholesale power from BPA to develop their own DSM programs and increase DSM spending (DSR 1995a). If local utilities do not deliver the energy savings targeted under BPA's previous resource plan, BPA has pledged to step back in and make up the shortfall. These efforts will be constrained, however, by BPA's current cash-flow situation, which is pinched by current wholesale market prices and weather conditions (Gardner 1995).

5. DSM Programs and a Least-Cost Energy Services Perspective Benefit Consumers and the Nation

As of 1993, 40 states had established integrated resource planning (IRP) (Lang and Haydel 1994). The goal of IRP is to develop a mix of supply-side and demand-side resources that result in least-cost energy services for society as a whole. Adopting IRP and other regulatory reforms such as allowing utilities to profit from cost-effective DSM programs often leads utilities to make substantial investments in energy-savings measures in customer facilities. Nationwide, utilities reduced electricity use by 1.3 percent in 1992, and some utilities cut electricity use by more than five percent on a cumulative basis, that is, from DSM programs offered prior to and including 1992 (Hirst 1994). A more recent survey indicates that DSM programs reduced national electricity use by 1.6 percent in 1993, 1.8 percent in 1994, and are expected to reduce electricity use by 3.0 percent in 1998 on a cumulative basis (Hirst and Hadley 1994b).

Utility demand-side investments, on average, have been significantly less expensive than total reliance on supply-side investments. For example, a recent evaluation of Massachusetts Electric's DSM programs found an average benefit-cost ratio from societal perspective of 2.87 (MECo 1994). More broadly, an assessment of 20 lighting DSM programs for commercial customers found that the programs save electricity at a weighted-average cost of $0.022/kWh (considering utility costs only and assuming a five percent discount rate) and

$0.039/kWh (considering both utility and customer costs) (Eto et al. 1994). For comparison, the average electricity price for commercial customers for these 20 utilities is $0.09/kWh. Furthermore, all of the individual conservation programs were cost effective from the total resource perspective, even programs facing avoided costs of $0.04-0.05/kWh (i.e., avoided costs commonly used throughout the electricity industry in the mid-1990s).

Utilities in California have been among the leaders in promoting and investing in greater energy efficiency by their customers. During 1990-93, the three major investor-owned utilities in California spent about $830 million on DSM programs that produced an estimated net benefit of $2.3 billion for the state (Goldstone 1995). This net benefit estimate takes into account both utility and customer costs for efficiency measures and programs. In 1993, the DSM programs had a benefit-cost ratio of about 2.5. This figure was lower than in previous years due to declining avoided costs and improved monitoring and evaluation.

It is possible to make a rough estimate of the overall direct economic benefit provided by DSM programs nationwide. Extrapolating from data on DSM program expenditures since 1989 (Hirst 1994; Hirst and Hadley 1994), utilities nationwide spent about $15 billion on DSM programs during 1985-94. Based on the review of lighting programs cited above, it is likely that customers invested on the order of $11 billion of their own money in efficiency measures to complement the utility incentives. If this overall $26 billion energy-efficiency investment had a benefit-cost ratio of 1.5 - 2.5, then the DSM programs provided $39 - $65 billion in gross benefits and about $13 - $39 billion in net benefits.

Given the experience gained over the past decade and the trend towards higher-yielding and more cost-effective programs, continuing vigorous utility DSM programs will provide substantial economic benefits for society in the future in spite of the lower avoided electricity supply costs prevalent today. For example, NEES forecasts DSM spending of approximately $380 million over the next five years (Hatcher 1995), and their current DSM benefit-cost ratio is 2.0 (Hicks 1995). Therefore, if customers invest another $280 million in these energy-efficiency measures, the overall $660 million investment would have a gross benefit of more than $1.3 billion and a net benefit of $660 million.

DSM programs provide other economic and environmental benefits in addition to the direct energy bill savings realized by those who purchase or install efficiency measures. Utility programs can help foster a transformation of markets in which efficiency measures and practices becoming the norm over time. For example, utility DSM programs greatly helped to make energy-efficient motors the norm in Canada and energy-efficient site-built and manufactured homes the norm in the Pacific Northwest (Flanigan and Weintraub 1994). It is unlikely that DOE would be proposing a minimum efficiency standard that essentially requires electronic ballasts were it not for utility rebates that built up the electronic ballast market over the past decade (Geller and Nadel 1994). And the Super Efficient Refrigerator Program (SERP) paved the way for the next round of efficiency standards on refrigerators that is expected to take effect in 1998 (Nadel 1995).

DSM programs, along with other strategies for increasing energy efficiency, can provide local employment benefits and lead to a net increase in jobs, partly because manufacturing, selling, and installing energy-efficiency measures tend to be more labor intensive than supplying electricity. In addition, consumers who increase their energy efficiency will on average respend energy bill savings in ways that support more jobs than do energy purchases. For example, widespread energy efficiency improvements in Ohio could result in a net increase of over 60,000 jobs by 2010, lowering the state unemployment rate that year by about one percent (Laitner et al. 1994).

Regarding environmental impacts, DSM programs reduce consumption of fossil fuels, thereby cutting pollutant emissions, helping utilities meet their Clean Air Act requirements, and reducing emissions of gases that contribute to global warming (Nadel et al 1994). For example, the U.S. Climate Change Action Plan, adopted as part of U.S. obligations under the Framework Convention on Climate Change, assumes that utility DSM programs will reduce national electricity use by about 85 billion kWh/yr by 2000 and that electricity demand only increases by 0.5 percent per year on average during 1990-2000 (U.S. DOE 1994b). Without these electricity savings, U.S. carbon emissions in 2000 would increase by about 20 million metric tons, which is equivalent to about 30 percent of the total reduction in carbon emissions targeted under the Climate Plan. DSM programs also can provide other environmental benefits, such as facilitating recovery and recycling of CFCs from refrigeration systems, disposing hazardous materials properly (e.g., mercury or PCBs from lighting products), lowering water use, and improving indoor air quality (Mills and Rosenfeld 1994).

It is unclear how IRP and DSM would fare under a retail wheeling regime. Many retail wheeling proponents advocate an end of IRP processes and utility-sponsored DSM programs, arguing that the market should determine the optimal mix of resources. However, due to many market imperfections and barriers (e.g., lack of information, access to credit, inability to consider lifecycle costs, split responsibilities between those making investment decisions and those paying energy bills, and distortions in energy prices), reliance on electricity commodity markets alone is likely to result in underinvestment in efficiency measures relative to societally optimal levels (Levine et al. 1994). In addition, under such a system there is little assurance that the mix of new generating plants that are built will be in society's best interest. For example, the environmental externalities of different resource options are likely to receive scant attention (after environmental requirements are met). Utilities will be unlikely to develop renewable power sources that are still somewhat expensive today from a first-cost perspective, but are likely to decline in cost as technologies evolve and market size grows. As a result, the bulk of new power generation may be natural-gas fired, providing little diversity if natural-gas prices rise or supplies are disrupted, as has happened several times in the past two decades.

Increased wholesale competition would also affect DSM. It is generally believed that increased wholesale competition will lead to lower electricity costs with little direct impact on DSM programs, as long as the relationship between utilities and their customers remains intact. However, increased wholesale competition, if it leads to lower marginal costs, could

affect the cost effectiveness of DSM programs and thus the level of DSM activity by utilities and their customers (Goldstone 1995).

Of course many energy efficiency measures are purchased and installed without support from utilities. But by cutting back on DSM programs, utilities risk hurting the market for DSM measures and services. Equipment vendors, such as manufacturers of compact fluorescent lamps, electronic ballasts, and efficient appliances, motors, and HVAC systems, have geared up production of their high-efficiency products to meet demand created in part by utility DSM programs. If programs suddenly end, some of this production capacity could be left unutilized, causing significant dislocations in the energy efficiency industry. In other words, part of the potential stranded investment due to real or threatened retail competition is the investment made by manufacturers such as Osram, Motorola, and Whirlpool in factories to produce energy-efficient technologies.

Local contractors have also geared up to handle the demand for DSM services generated by utility programs. If DSM programs are drastically cut or terminated, many of these firms will contract or, in some cases, go out of business. And if utility-induced DSM services are needed in the future -- either to provide customer service or to provide a less expensive resource than new power plants -- these energy service companies may be unwilling to reestablish the necessary infrastructure. For example, when several New England utilities overspent their DSM budgets in early 1991 and canceled their programs for the rest of the year, several local vendors went out of business, and the local market was flooded with close-out sales, which made it difficult for some remaining companies to stay in business (Davis 1994).

WHAT SHOULD BE DONE

To date, cutbacks in DSM programs, while well publicized, have been relatively modest. Some utilities are attempting to provide the same level of energy and power savings but with less DSM spending. Movement away from energy-efficiency programs, however, is in danger of becoming a tidal wave if utilities focus solely on minimizing costs and rates in the short run. Instead, utilities should carefully consider questions such as: How likely is the authorization of retail wheeling? In what time frame? For which customer classes? Under what types of conditions and restrictions? Utilities and regulators should compare the benefits of DSM cutbacks -- small decreases in rates in preparation for an uncertain competitive threat -- with the many costs of such cutbacks. Among these costs are loss of economic benefits for consumers, loss of a valued customer service, loss of environmental benefits, potential loss of some of the DSM infrastructure that has been built up, and loss of shareholder incentives for cost-effective end-use efficiency improvements in the 29 states that now provide some form of incentive (NARUC 1993).

Under these circumstances, we believe that most utilities should continue to operate vigorous DSM programs. However, in these uncertain times, and with capacity surpluses in parts of

the United States, some changes in DSM program design are probably warranted. While most DSM programs have been successful, there is still room for improvement in terms of maximizing the "bang for the buck." For example, utilities can reduce incentive payments in some areas, increase efficiency thresholds in order to reduce "free riders," work more closely with manufacturers and vendors to transform markets, and increase support for building codes and equipment efficiency standards. Also, utilities should continue to serve specific markets that are not likely to install energy efficiency measures without utility support (e.g., low-income households). Nadel (1995) describes in detail how utilities can accomplish these objectives.

Utility DSM programs targeted toward larger commercial and industrial customers are often the most cost-effective DSM programs. Utilities can offer DSM as part of a package of services that will encourage larger customers to stay with their current utility, when and if retail competition comes, or when industries threaten self-generation or relocation. For example, North Carolina Power (NCP) has reached an agreement with Weyerhaeuser Co. whereby NCP would provide Weyerhaeuser with technical and financial assistance for maximizing energy efficiency, along with lower rates on incremental load, in exchange for Weyerhaeuser not increasing self-generation when it expands its facilities in the near future (DSR 1995d). For smaller customers, programs can be reoriented away from expensive rebates and more towards programs that seek to transform markets for energy-efficient products and services. Such programs hold the potential for maintaining or increasing DSM benefits, while leaving long-term expenditures at moderate levels.

For all customer classes, DSM programs should target so-called "lost-opportunity resources" where failure to make energy-saving investments today will significantly increase the cost of achieving these energy savings in the future. The most obvious lost-opportunity resource is DSM programs that promote more efficient new or remodeled homes, commercial buildings, and factories. At the time these buildings or factories are being built, the cost of efficiency measures is the difference in cost between standard-efficiency and high-efficiency equipment and design practices. After the building or factory is completed, it is much more expensive to remove inefficient equipment and pay the full cost of the new, more efficient equipment. Another unique opportunity where energy efficiency can be achieved at relatively low cost is at the time when chlorofluorcarbon (CFC) refrigerant needs to be replaced in a chiller system. In this case, the opportunity is to reduce cooling loads, downsize, and replace the old chiller with a more efficient system, rather than just reconfiguring the old inefficient system to run on a new refrigerant.

State utility commissions can play a critical role in ensuring that cost-effective DSM programs are maintained or even expanded (Schweitzer and Young 1994). Many public utility commissions recognize that DSM programs provide a broad array of benefits. This recognition was a key factor in the decision not to pursue retail wheeling by Connecticut's DPUC (CDPUC 1994). This consideration also prompted utility commissions in Michigan and New York to turn down requests from utilities to reduce DSM savings goals (DSR 1994b, 1994c, 1994d).

Other PUCs should carefully scrutinize requests for cuts in DSM programs and ensure that DSM budgets are adequate for achieving reasonable DSM savings goals. In particular, regulators should devote particular attention to requests to reduce residential and small C&I program budgets dramatically, because these customer classes are unlikely to benefit from retail competition in the foreseeable future. However, these customers have much to gain from well-designed and well-managed DSM programs. DSM is still generally the least-cost resource in most states even at today's long-run avoided costs; if DSM programs are sacrificed today, more new power plants will be needed tomorrow and the emission of many pollutants will increase.

PUCs should clearly state that they expect cost-effective DSM programs to be part of the future resource mix under whatever type of industry restructuring ultimately emerges. If we move to competitive electricity generation and separate transmission and distribution (T&D) companies, DSM can still be provided by the regulated T&D utility and/or financed through a volumetric charge on use of distribution systems. The latter approach would ensure that all utility system users pay for energy-efficiency programs with societal benefits, irrespective of the generating source. Such a scheme has already been adopted in Washington state (Cavanagh 1995).

PUCs should maintain regulatory approaches that decouple profits from sales and provide utility shareholders with financial incentives for implementing cost-effective DSM programs, or such approaches should be adopted in states that have not done so already. Experience shows that DSM program investments increase and utilities spend more on energy efficiency programs when such mechanisms are adopted (Baxter 1995). Proposals for adopting volumetric charges on distribution systems and maintaining regulatory incentives for DSM programs have been put forward in restructuring discussions in California and New England (CEERT 1994, Moskovitz and Foy 1994).

PUCs should also realize that uncertainty about how retail wheeling will be addressed is having a negative impact on DSM efforts and other socially beneficial activities in some parts of the nation. Many utilities are cutting DSM budgets and other costs because they do not know what type of competitive and regulatory environment they will be facing in the future. This argues for quickly resolving the competition/restructuring debate rather than continuing in an uncertain policy framework for many years.

In conclusion, if utilities and their regulators eliminate or deeply cut DSM programs due to fear of the most extreme forms of retail wheeling, then the many benefits of utility DSM programs could be lost. This would hurt the energy-efficiency industry while subjecting society to a more costly and environmentally damaging energy future. But if utilities and regulators act judiciously and maintain effective DSM programs while encouraging greater competition in electricity supply, the nation will benefit from lower-cost, less-polluting energy services.

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