REGULATING ELECTRIC DISTRIBUTION UTILITIES AS IF ENERGY EFFICIENCY MATTERED

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I. INTRODUCTION

A. Context and Purpose

The electric utility industry is in the midst of a period of profound changes in the structure and function of utility companies, including the introduction of market competition in the electricity generation function. In this process, there is no single simple model to follow. Rather, individual states are serving as laboratories within which new rules are being written and new approaches tested.

At the same time, however, many of the important public issues related to electricity service remain constant and enduring. For example, there is still an overriding societal objective to provide safe, reliable electric service at the lowest cost. (Indeed, the authority for regulatory agencies in most states is based on those principles.) In addition, there is still a very strong public sentiment for minimizing adverse environmental effects from electricity generation and distribution, and for providing energy efficiency services to customers. Public opinion surveys repeatedly demonstrate strong support for public policies to support energy efficiency.[1]

Furthermore, there are still abundant and attractive technical opportunities for improving the efficiency of electricity distribution and use that are not presently being captured. A recent study prepared for the U.S. Department of Energy (DOE) found that for 23 common residential and commercial building end uses, currently available high efficiency products could provide cost-effective savings ranging from 10 percent to 59 percent, in comparison to average efficiency equipment typically being installed (IWGELT 1997).

Finally, it is still national policy in the United States to encourage energy efficiency by electric utilities, per the Energy Policy Act of 1992. In particular, Subtitle B ["Utilities"], Section 111 ["Encouragement of Investments in Conservation and Energy Efficiency by Electric Utilities"] specifically addresses this issue. In the words of the Conference Committee for that legislation, "It is the intent of this subtitle to promote energy efficiency, in particular by encouraging utilities, which have a unique relationship with their customers, to expand demand-side management (DSM) programs." (Congressional Record H12155, October 5, 1992).

Although the preferred terminology may change, utility companies continue to be unique entities in this society and economy. Indeed, in the emerging electric industry paradigm, there

[1] To cite just a couple of examples: (1) random statewide surveys in Michigan found that 93 percent of residential customers and 85 percent of business customers answered "yes" to a question about whether their utility company should provide energy conservation programs to help customers save energy (MPSC 1996); and (2) a December 1996 nationwide survey by a highly experienced national polling firm found 69 percent of the public in favor of a federal requirement for utilities to provide energy efficiency programs, versus only 29 percent opposed (Sustainable Energy Coalition 1996).

is one institution that sits at the crossroads of new industry structure and enduring societal interests: the regulated "distribution utility" (DISCO).[2] The challenge for policymakers and regulators is to develop regulatory approaches that successfully integrate the evolution in industry structure toward more market-oriented mechanisms and the enduring societal interests mentioned above.

It may be useful for some audiences to emphasize that the issues addressed in this report do not require a philosophical choice between taking a "hands off" approach to utilities versus imposing a "regulatory burden." The fact is that any form of regulatory structure set up for distribution utilities will send economic signals (i.e., incentives and disincentives) to act (or not act) in certain ways. In the current industry turmoil, regulators are being forced to take action to define the emerging regulatory policies and procedures, and those actions will inevitably shape and influence utility behavior — for better or worse.

The purpose of this report is to identify and discuss ways in which the utility/regulatory relationship could be structured so as to be responsive to the aforementioned societal interests, by encouraging distribution utilities to incorporate and/or facilitate energy efficiency rather than disregard or impede progress in that area. This would include both energy efficiency in the distribution of electricity as well as efficiency in the use of electricity by customers. There are numerous practical mechanisms available for providing that encouragement for energy efficiency, and compelling societal reasons for using them.

B. Structure of this Report

Chapter II presents background information that should be helpful in understanding the issues addressed in this report. This includes a brief history of utility and regulatory involvement in energy efficiency and a discussion of the effects that the recent trend toward electric utility restructuring is having on that involvement.

Chapter III provides a quick status report on specific states' restructuring activity to date. This includes a brief review of the regulatory strategies regarding energy efficiency that are being experimented with in those states.

Chapter IV addresses from a more theoretical perspective the task of developing workable regulatory approaches to encourage distribution utilities to promote energy efficiency.

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[2] In this report, DISCO is being broadly defined to encompass whatever utility entity is responsible for electricity distribution following electric restructuring. The exact structure of that entity varies considerably from state to state and may not always match the pure form of a "distribution only" company that has completely divested itself of generation and transmission functions. In the broadest sense, many of the issues addressed in this report would also apply to publicly owned utilities and their oversight/regulatory bodies as well, as they seek to adjust to a restructured electric industry.

A discussion of the significant barriers and disincentives to energy efficiency faced by these newly created DISCOs is presented, and then a number of areas where distribution utilities could potentially contribute to increased energy efficiency are reviewed. In conclusion, several types of regulatory strategies that could be used to overcome the barriers and disincentives and help distribution utilities to realize their potential to encourage energy efficiency are discussed.

Chapter V presents the recommendations of this study by first providing a set of basic principles to guide regulators and policymakers in their consideration of these issues, and then laying out a "package" of regulatory strategies that together might constitute an optimal approach to encouraging distribution utilities to incorporate/promote energy efficiency. Finally, Chapter VI presents some brief concluding remarks and re-emphasizes the importance of, and the rationale for, regulators to strive to reflect those "enduring societal interests" in their approach to designing the regulatory structure for distribution utilities under restructuring.

II. BACKGROUND

A. History of Regulatory Involvement in Energy Efficiency

Electric utilities have operated in the United States under some form of government regulation for most of the Twentieth Century. For much of that time, of course, energy efficiency was not an issue. It was not until the first "energy crisis" in the early 1970s that energy conservation even surfaced as a public concern. In response to the energy price hikes and societal distress stemming from the first oil embargo, regulators in a number of states authorized the first utility-operated energy conservation programs in the mid- to late 1970s. These were primarily directed at residential customers and mostly featured programs addressing space heating and water heating end uses.

With the second "energy crisis" in the late-1970s, public concern regarding energy conservation grew even stronger. Once again, utility companies were seen as a logical vehicle for taking action. Congress passed the National Energy Conservation Policy Act (NECPA) in 1978 that mandated that utilities provide "home energy audits" (i.e., the "Residential Conservation Service" or "RCS" program). Despite a fair amount of utility opposition, this program achieved some notable successes. Nationally, roughly six percent of all eligible homes in the country received an energy audit during the half-dozen years of major program effort, with some of the more successful states reaching nearly 30 percent participation (Kushler, Witte, and Ehlke 1992). A national evaluation of that program determined that participants saved an average of approximately 3 to 5 percent on their household energy bills (Hirst 1984).

Congress also mandated a similar program for commercial and apartment buildings (the Commercial and Apartment Conservation Service [CACS] program). By the early 1980s, however, the policy emphasis in Washington, D.C. had changed to one of scaling back federal energy efficiency efforts, with the ultimate result that the RCS and CACS programs were terminated.

Nevertheless, by that time the groundwork had been laid for states to exercise regulatory policy to use utility companies as a vehicle for achieving public energy efficiency objectives. There were a number of logical and practical reasons for doing so. To the extent that the sale of their product contributed to concerns about resource depletion and environmental pollution, it made sense to address remedies through utility companies. Where better to assess the costs of programs to ameliorate those problems than at the point where the damaging product is bought and sold? On the practical side, utility companies also possessed two very valuable assets: knowledge about energy and how it is used, and established connections and credibility with customers. Together these features made utility companies a natural focal point for pursuing societal objectives regarding energy efficiency.

By the late 1980s and early 1990s, the incorporation of energy efficiency into utility operations had begun to become quite sophisticated. Integrated resource planning (IRP) was utilized as a technically detailed and empirically based process for incorporating demand-side management into the mix of utility resources, in order to meet customers' electricity needs at least total cost. Federal policy had swung back to being more supportive of energy efficiency, including encouraging state-level activities. This was particularly visible in the federal Energy Policy Act of 1992,[3] which contained a clear and strong endorsement of the use of IRP and DSM by state regulatory commissions.[4]

By the early 1990s, many states had specific requirements for IRP and DSM, and featured other interesting aspects such as the use of an open public process for resource planning, and the explicit incorporation of environmental costs and benefits into the IRP process. The results were quite extraordinary. By 1993, electric utility spending on energy efficiency had reached $1.9 billion and was projected to climb to $2.7 billion by 1997.[5] A large body of research literature documented that programs were being continuously evaluated and improved, considerable amounts of energy were being saved, and the public liked having the programs available.[6]

B. Restructuring Disrupts the Energy Efficiency Status Quo

By the mid-1990s, integrated resource planning had become widely accepted in the regulation community (albeit with differing levels of actual implementation among the states). The incorporation of wholesale competition for supply-side projects, and competitively procured energy efficiency on the demand side, looked like a prescription for achieving a least-cost, reliable, and efficient electric resource portfolio.

Then, just when it seemed that IRP and the use of DSM had begun to reach full stride, the "Blue Book" proposal from the California Public Utilities Commission (California PUC 1994) appeared on the scene and called for restructuring the electric industry to provide for retail

[3] The 1992 Energy Policy Act actually contains nearly 30 provisions designed to increase the efficiency of America's utilities, buildings, equipment and factories. See Geller and Nadel (1992) for a thorough analysis and overview.

[4] See Subtitle B, Section 111(d)(7) [Integrated Resource Planning] and Section 111(d)(8) [Conservation and Demand Management] of the Energy Policy Act of 1992.

[5] Data developed from Energy Information Administration reports and summarized in Eto, Goldman, and Nadel (1998).

[6] For example, the International Energy Program Evaluation Conference has been held every two years since 1985, with literally hundreds of peer-reviewed papers having been presented documenting the results of energy efficiency program evaluations.

competition. While there had been discussion in some circles of the possibility of interjecting retail competition into the electric industry, the Order from the California PUC quickly legitimized the issue and gave it widespread attention. This "restructuring" (more specifically, the prospect of retail competition) became the monkey wrench jammed into the smoothly running gears of the IRP/DSM process that had been established in many states.

Almost immediately, utilities across the country took their foot off the DSM accelerator and soon began to apply the brakes. Figure 1 illustrates quite clearly the effects on energy efficiency spending, by year, during the early to mid-1990s.

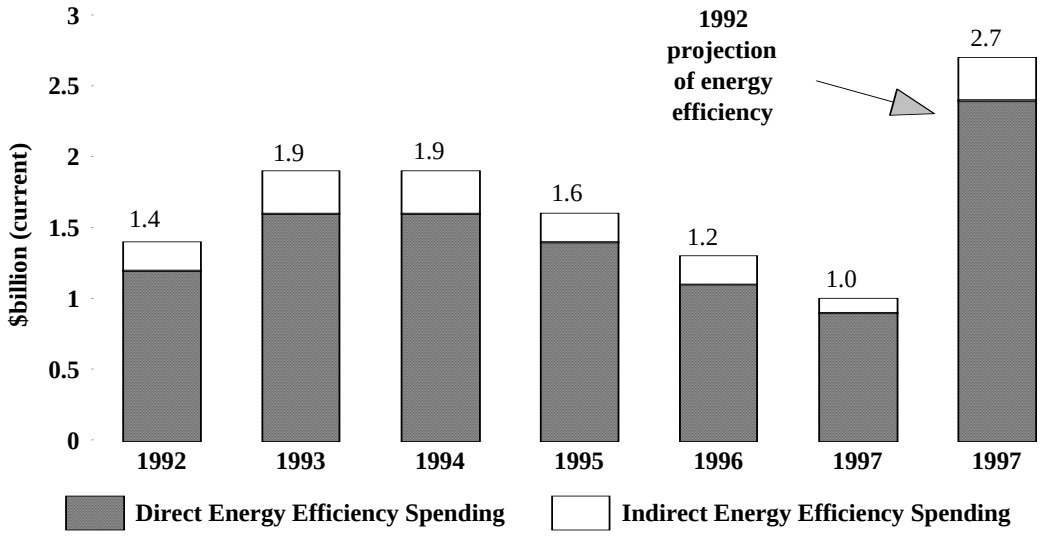

Figure 1. Utility Spending on DSM Energy Efficiency Programs by Year (1992 to 1997)

Source: Eto, Goldman, and Nadel (1998)

There are a number of reasons why restructuring and retail competition cause utilities to seek to drop their energy efficiency programs. While these factors will be discussed in more detail in Chapter IV, following are two of the most important reasons. First, the threat of competition for retail customers causes a utility to want to cut out all "unnecessary" expenses in order to achieve the lowest possible rates. (Some have termed this the "race to the bottom.") Second, restructuring generally eliminates "rate of return" regulation and IRP, replacing it with price caps or some other form of regulation that enables utilities to increase profits by selling as much electricity as possible. Regardless of the particular motivating factors, however, the evidence is clear that the bottom fell out of the utility energy efficiency market in the last half of the 1990s.

C. The Emerging Paradigm: Distribution Utilities Are Still Regulated

The evolving history of the electric utility industry brings us to what appears to be an area of general consensus in the emerging paradigm: distribution utilities are still a "natural monopoly" and therefore will remain regulated.[7] As discussed earlier, distribution utilities are at the crossroads where the new industry structure and the enduring societal interests regarding electricity intersect. The fact that states will retain regulatory authority over these utility companies provides an opportunity to implement public policy and address societal interests concerning issues such as energy efficiency.[8]

A common rationale for continuing to exercise regulatory policy in this area (i.e., encouraging distribution utilities to promote energy efficiency) is clearly and simply articulated by the following passage from a recent Order of the Maine PUC:

> "The deregulation of generation services necessarily removes any obligation for utilities to engage in least-cost planning with respect to generation resources. However, deregulation does not negate the societal benefits of promoting DSM, especially when such activities cost less than corresponding supplies or create environmental benefits by reducing pollution. Accordingly, the restructuring of the industry should not, in and of itself, result in the elimination or reduction of DSM activities. The Legislature recognized the continued benefit of DSM by including a provision in the Act that ensures a reasonable level of energy conservation activity after the advent of retail competition, and assigning the responsibility for that activity to the regulated transmission and distribution utilities." (Maine PUC 1999).

In fact, many of the states that have already proceeded to establish restructuring have incorporated various aspects of regulatory policy to encourage or require distribution utilities to play a role in pursuing energy efficiency. The following chapter presents a brief overview of state actions to date.

[7] There has been some discussion of bringing more competition to certain additional elements of electric service, such as the billing and metering functions. However, the core function of electricity distribution (the "wires" business) is generally regarded as a natural monopoly for the time being.

[8] See Cavanagh and Sonstelie (1998) for a vigorous defense of the viability of the concept of a regulated distribution utility and some creative ideas for addressing public policy interests.

III. EXPERIENCE THUS FAR UNDER RESTRUCTURING

A. Overall Summary

At this point, a total of approximately 19 states[9] have formally established a policy that "restructures" their electric utility industry. This includes 17 states that have passed and signed legislation to restructure (Arizona, California, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Montana, Nevada, New Hampshire, New Jersey, New Mexico, Oklahoma, Pennsylvania, Rhode Island, and Virginia) and another two states that have issued formal regulatory orders to implement restructuring (Michigan and New York).[10]

These states are essentially each unique in terms of the specific details of their restructuring policies and often in terms of the timetables for beginning actual retail competition. Nonetheless, one common theme visible in most of these states is the inclusion of some type of mechanism that involves distribution utility companies in facilitating and/or providing energy efficiency.[11] The following section presents an overview of the major types of energy efficiency related mechanisms incorporated into state restructuring policies so far.

B. Regulatory Approaches to Date

The approaches toward encouraging energy efficiency that have been taken by legislatures and regulatory commissions in restructured states thus far can be characterized as falling into three main categories. First, there are "direct funding" approaches of energy efficiency programs and services (e.g., with funding requirements established and costs explicitly recovered in some manner through rates). Second, there are strategies that could be categorized as being based on some type of "financial incentives" to utilities for providing energy efficiency. Third, there are approaches that are based upon some type of "planning requirements" that could encourage energy efficiency as part of a least-cost plan.

Virtually all of the approaches to energy efficiency devised to date in restructured states could be classified as falling into one (or a combination) of the above categories. The following

[9] The situation in the states is very dynamic and it is possible that this total may have changed by the time this report is printed.

[10] See Kushler (1998b) for a 50-state review of restructuring. The summary table from that report was updated on ACEEE's Web site (http://aceee.org) in April 1999.

[11] At least 16 of the 19 restructured states have included a policy of some type in support of energy efficiency. The remaining few states (Michigan, Oklahoma, and Virginia) tend to be less further along in developing the details of their restructuring policy and may still develop a policy in this area.

material provides a brief overview of the state-level activities to date under each of those categories.

1. Direct Funding

By far the most prevalent approach to encouraging energy efficiency in states that have restructured is the reliance upon some type of direct funding of energy efficiency programs and services. Of the 19 restructured states, 14 have chosen to put in place some type of direct funding mechanism.

The most popular single mechanism is the use of a public benefits charge (PBC, or wires charge), which levies a specific surcharge on distribution utility bills to support energy efficiency programs.[12] At least ten of the states have taken that approach, with funding levels ranging from about 0.1 to 3.4 mills[13] per kilowatt-hour (kWh). (Most states have been in the 1 to 3 mills/kWh range.) Another four states have identified funding levels that are to be embedded in distribution company rates, rather than collected through a specific surcharge.

A good example of a state using the PBC approach would be Connecticut. Its legislation (Public Act 98-28, signed April 29, 1998) established a 3 mills/kWh nonbypassable charge to support energy efficiency.[14] The charge is competitively neutral with respect to generation because it is assessed on all customers of the distribution utilities, regardless of the source of generation supply used by the customer. The distribution utilities will develop and implement a comprehensive DSM plan, with advice and oversight from an Energy Conservation Management Board appointed by the Department of Public Utility Control.

Maine is an example of a state using the approach of funding embedded in rates. Its legislation (P.L. 1997, ch. 316, signed May 29, 1997) called for the Maine PUC to establish levels of funding for energy efficiency programs comparable to existing funding. In January 1999 the Maine PUC provisionally[15] ordered statewide funding of just over $17 million (which would be equivalent to about 1.44 mills/kWh) to be included in the base rates for distribution and collected from all distribution customers. Utilities will be responsible for administering the

[12] Many states also use a wires charge approach to support other public benefits in addition to energy efficiency, such as renewable energy, low-income programs, and public interest-oriented research and development. This report focuses only on the energy efficiency component of that support.

[13] A "mill" is one-tenth of a cent.

[14] The legislation also requires separate PBCs to support renewable energy and low-income weatherization and bill payment assistance. See Kushler (1998b) for a more complete description of this and other states' approaches to public benefit funding.

[15] The specific details of the Maine PUC proposal require subsequent legislative approval.

programs, following guidelines set by the Maine PUC. Utilities will select energy efficiency service providers through periodic competitive bidding procedures.

It is important to note that the entity responsible for the actual implementation of the energy efficiency programs is not always the distribution utility. In some cases the funds are merely collected through the DISCO and transferred to some other entity for administration (e.g., New York is using that approach, with the New York State Energy Research and Development Authority [NYSERDA] being the responsible organization). Of the fourteen states requiring energy efficiency funding, about two-thirds rely primarily on utility administration of the energy efficiency public benefits funds (although several of those have a public collaborative oversight mechanism or some type of state agency involvement as well).

The table in the appendix provides a state-by-state listing of funding categories and funding levels for those states that have restructured and implemented public benefits policies to date (as well as for a few other states which have discussed public benefits proposals but have not yet passed restructuring).

2. Financial Incentives

The use of financial incentives to encourage utilities to provide energy efficiency programs was a fairly common technique during the early 1990s. Typical strategies ranged from using a higher rate of return for energy efficiency investments to providing a bonus increase in total company rate of return or a specific monetary incentive to the utility for meeting program performance objectives.[16] Under restructuring, however, the tactic of shareholder incentives has been applied much less often, perhaps because there is a feeling that the direct funding requirements put in place in many states make such "encouragement" unnecessary. Of those cases where financial incentives are in place, many are a form of carry-over policy from the pre-restructuring days.

A few states that are retaining some type of opportunity for utilities to earn incentives from the provision of energy efficiency programs include California, Massachusetts ,New Jersey, and Rhode Island. For example, New Jersey's restructuring legislation[17] directs the Board of Public Utilities to conduct a "comprehensive resource analysis" and determine the programs to be funded and the level of cost recovery and performance incentives for utilities in connection with these activities. As another example, the Department of Telecommunications and Energy in Massachusetts has approved utility shareholder incentives for 1998 and 1999 via

[16] See Nadel, Reid, and Wolcott (1992) for a discussion of numerous examples of regulatory incentives to utilities for providing DSM programs.

[17] Assembly Bill A16, signed February 9, 1999. The reference is to Section 12, Part (a), number 3.

settlement agreement, and is presently conducting a case to establish utility incentives for year 2000 and beyond.[18]

Elsewhere, the restructuring laws in Arizona, Connecticut, and New Hampshire do not directly address utility shareholder incentives, implicitly leaving to the regulatory commissions the issue of whether and how to update the incentive provisions that have been in existence in those states. In New York the new program administrator is a government entity (NYSERDA) and will not require economic incentives. In Illinois, Maine, and Pennsylvania there is no mention of, and currently little prospect for, shareholder incentives in connection with their energy efficiency efforts under restructuring (Nichols and Sarnow 1999).

The most appropriate conclusion regarding the use of regulatory incentives at this point is probably that it is still to soon to tell how widespread that mechanism will be under restructuring. As discussed in the next section, most states have not focused much attention yet on the details of regulating the distribution utilities. Also, one additional factor that might have a substantial influence upon state decisions is the nature of any federal restructuring legislation. The Clinton Administration's proposed approach to restructuring included a federal "systems benefit trust" to provide matching funds to states for their funding of system benefits.[19] If passed in legislation, such a program would itself be an incentive that might help influence states to include energy efficiency funding and incentives in their restructuring policies.

Finally, it is useful to note that utility incentives can be used in combination with other regulatory mechanisms to encourage energy efficiency. For example, California has a direct funding requirement for energy efficiency through a Public Goods Charge (PGC) but a portion of the energy efficiency funds raised through that charge (approximately 10 percent in the most recently approved budget[20]) is available for "performance awards" to the utilities for good performance in administering the energy efficiency programs.

3. Planning Requirements

In the earlier part of this decade, integrated resource planning (or "least-cost planning") was a very commonly employed technique for requiring utilities to consider all types of resource options, including "demand-side" options such as energy efficiency. In fact, the national Energy Policy Act of 1992 explicitly required state regulatory commissions to at least consider the

[18] Massachusetts Department of Telecommunications and Energy, Case DTE 98-100.

[19] The Clinton Administration announced this proposal in its "Comprehensive Electricity Competition Plan," released March 25, 1998.

[20] Resolution E-3578, California Public Utilities Commission, March 18, 1999.

policy of requiring utilities to prepare integrated resource plans.[21] With the movement toward electric restructuring, however, many states have abandoned their IRP requirements, either explicitly or by allowing them to lapse.

In those states that have restructured, the use of planning requirements has been relatively rare thus far. There appear to be at least two explanations for this. From a philosophical standpoint, "planning" is somewhat out of favor in comparison to policies oriented toward "market mechanisms" and some states are simply not inclined to enact planning requirements. From a practical standpoint, most states have tended to focus their attention initially on the requirements for competition at the generation level and have not yet worked out all the details of how distribution utilities will be regulated. Thus it is possible that additional states will enact planning requirements for distribution utilities as they finalize the details of their restructuring policies.

At this point in time, however, there are only a few states that have incorporated least-cost planning principles into their approach to distribution utility regulation. That approach is explicitly provided for in the restructuring laws in Maine and New Hampshire. Other states, such as Massachusetts and New Jersey, still have pre-existing IRP rules in place. These jurisdictions will have to decide on whether and how their IRP rules should apply to the restructured utility industry in their states.

[21] See Subtitle B [Utilities], Sec. 111(d)(7).

IV. DEVELOPING WORKABLE APPROACHES TO ENCOURAGE DISCO ENERGY EFFICIENCY

In order to begin the task of developing workable approaches to facilitate energy efficiency by distribution utilities, it is important to understand the many barriers and disincentives to energy efficiency that DISCOs routinely face. These can be quite formidable, and if not addressed, will make it unrealistic to expect distribution utilities to pursue energy efficiency.

A. Barriers And Disincentives to Energy Efficiency

In the most basic terms, there are two fundamental barriers/disincentives for distribution utilities to pursue energy efficiency. First, absent specific regulatory intervention to the contrary, these utilities will generally profit more if their customers use more electricity. Second, there is no inherent way for a regulated DISCO to profit from energy efficiency, absent regulatory provisions. Moreover, in many cases under current restructuring approaches, even simple cost recovery of discretionary energy efficiency expenditures can be uncertain or unfeasible.

These two fundamental barriers can manifest themselves in many different ways, depending upon the specific structural form of the distribution utility under a particular state's restructuring plan and the specific regulatory framework utilized. The following material presents some of the most prominent ways in which these problems affect utility decision-making.

1. Higher Sales Equals More Profits

Under traditional "Rate of Return" (ROR) regulation of vertically integrated utilities, it has long been recognized that utilities have an inherent incentive to increase electricity sales between rate cases. This is true because once fixed costs are recovered, each kWh sold typically produces more revenue than the short-term marginal cost of supplying that kWh. Conversely, saving a kWh through efficiency reduces revenues by an amount greater than the associated cost savings.[22]

[22] See Moskovitz (1989) for an excellent treatise on this issue. That report was a cornerstone in the development of the movement toward integrated resource planning and the incorporation of DSM by electric utilities.

This fundamental barrier to energy efficiency is the reason that many states enacted mechanisms to "decouple"[23] sales from profits, or otherwise "adjust" for lost revenues. The intent was that by enacting this type of mechanism, utility management would not be dissuaded from pursuing energy efficiency opportunities.

Unfortunately, distribution utilities face the same basic disincentive if they remain under ROR regulation. In fact, the situation is even more problematic because their ratio of fixed costs to marginal (variable) costs is even higher than a vertically integrated utility (i.e., up to the point of system constraints, the marginal cost of delivering additional kWhs is trivial — meaning that extra sales can be almost pure profit).

Furthermore, the approaches most commonly being put in place under restructuring to date (i.e., "rate caps" or rate case "moratoria" as a replacement of ROR regulation) make the situation even worse. At least under ROR regulation the utility earnings level was constantly monitored and utilities could be called in to have their rates lowered if increased sales resulted in earnings levels rising too high. Under rate caps/rate case moratoria there is no such constraint acting to dampen utility enthusiasm for higher sales (nor their disdain for reducing sales through energy efficiency). They are basically free to sell (i.e., "deliver") as much as they can and keep the profits.

2. The "Stranded Cost"/ "Transition Cost" Recovery Problem

An additional artifact of restructuring that contributes to distribution utility aversion to energy efficiency is the very common policy of allowing the utility to recover "stranded costs" (i.e., above market costs of the original utility's generation-related assets) and/or "transition costs" (i.e., various costs associated with making the transition to restructuring, such as employee retraining and placement, billing system upgrades, etc.) through per-unit surcharges on customer bills. The problem is that, absent a rigorously enforced policy of truing-up projected and actual costs and revenue (a questionable or non-existent element in many jurisdictions), these surcharges create an even greater incentive for the distribution utility to seek to maximize sales and shun energy efficiency. Simply, more sales means more revenues collected from the surcharges. At worst, from the utility's perspective, more sales mean a

[23] In the simplest terms, "decoupling" is the concept of making a utility financially indifferent as to whether kWh sales increase or decrease. See Eto, Stoft, and Belden (1997) for a detailed description of the rationale for, and implementation of, utility decoupling mechanisms.

quicker pay-off of stranded costs/transition costs. At best (i.e., absent an enforced true-up), they can keep the extra revenue. Either way, the message is: "sell more kWh."[24]

The essence of the problem identified in this and the preceding section is succinctly expressed by the following Order of the California PUC:

> "...electric utilities are entering a period where their interest in increasing sales volumes (as opposed to decreasing them via energy efficiency) had never been greater. As a result of the rate cap and competition transition charge (CTC) provisions of AB 1890,[25] customer actions that reduce electrical usage will threaten utility profits by reducing the revenues collected to pay for transition costs (e.g., uneconomic generating assets). Conversely, customer actions that increase electric usage will accelerate or facilitate the full recovery of transition costs during the transition cost recovery period." (California PUC 1998: 23).

In order to overcome these inherent disincentives to energy efficiency, it will be necessary to devise and implement creative approaches to regulating distribution utilities.

3. *Conflict of Interest with Generation*

Although the assumption embedded in the concept of restructuring is that generation interests would be completely severed from distribution interests, the reality in many states falls far short of that mark. Only a handful of states are requiring actual divestiture of generating assets. Most are allowing some type of functional or structural separation, within the same parent economic entity or through some other type of affiliated economic structure.

While those latter approaches may suffice for addressing concerns regarding issues such as preferential treatment with respect to transmission and distribution access, they do nothing about the problem of the overall corporate interest in maximizing generation sales and, conversely, minimizing sales losses from energy efficiency. To the extent that a distribution utility is affiliated with providers of generation, the overall corporate enterprise will have an interest in higher levels of consumption of electricity (i.e., a rising sales tide lifts all generation

[24] It should be noted, however, that the solution to this problem is to insist on proper monitoring and true-up of these cost recovery mechanisms, **not** to move away from recovery of stranded costs/transition costs on a per kWh basis toward some kind of flat "per customer" type of fee. Assessing those costs on a per kWh basis helps send a price signal to become more energy efficient (in addition to being more equitable for other reasons), whereas a flat fixed fee would remove that incentive for efficiency.

[25] The legislation that restructured the electric industry in California.

boats).[26] Absent some type of regulatory intervention, most DISCOs are unlikely to willingly take actions that damage the interests of their parents or affiliates in the generation business.

4. Lack of Cost Recovery/Earnings Opportunity

In addition to the many reasons why distribution utilities would perceive the **effects** of energy efficiency to be adverse to their financial interests, there are also reasons why they would perceive their own **expenditures** on energy efficiency to be a financial risk.[27] As discussed earlier, many restructured states have gone to rate caps or rate case moratoria, meaning that there would be no mechanism in place for assuring cost recovery for any new expenditures on energy efficiency by the distribution utility. Existing rates were set based on a prior fixed estimate of costs. Incremental new costs are not covered in those rates, leaving the utility without an identifiable cost-recovery mechanism for new expenditures. Moreover, in many jurisdictions rates have been cut as a part of restructuring and then capped, creating an even greater pressure to reduce or avoid new expenditures in areas such as energy efficiency improvements.

Similarly, absent some specific regulatory mechanism being put in place, there would be no way for the utility to earn a rate of return on any new investment in energy efficiency. The embedded return in the capped rate was based on prior investments, not any forthcoming investments. The combination of these factors clearly mitigates against distribution utilities making expenditures for energy efficiency.

These issues represent some of the most serious barriers facing investment in high-efficiency distribution options. The capped rate and lack of rate of return availability will tend to encourage the purchase of lower first cost (and lesser efficiency) equipment.

Under traditional regulation, a vertically integrated utility would typically have an interest in improving the efficiency of the distribution system since those activities would not affect the number of kWh sold, but rather, reduce the cost of providing each kWh (i.e., reducing distribution losses would reduce the number of kWh they would have to generate on the front end). Within a given bundled rate, such reductions in costs would accrue benefits for the utility. However, under restructuring, the distribution utility does not necessarily see any economic benefit in reducing distribution losses. The details of the regulatory approach applied to the distribution utility will determine whether or not that utility perceives distribution system efficiency improvements to be in its financial interest.

[26] It's a bit like the American Beef Council running generic advertisements to eat more beef. The collective interest in greater sales serves the interests of the individual companies and their affiliates.

[27] The intent here is to address any type of **discretionary** spending on energy efficiency. This concern would obviously not apply to mandated expenditures paid for through a wires charge or some other type of pre-identified rate component for energy efficiency.

5. Summary

In summary, under the circumstances described in items 1 through 4 above, it is highly unlikely that distribution utilities will seek to provide or promote energy efficiency on their own initiative. On the contrary, they are likely to engage in efforts to boost electricity consumption by customers.

This is not a concern to be taken lightly. Distribution utilities will be in a position to have a major impact on how, and how much, electricity is consumed. Their opportunities to increase electricity use[28] could range from broad-based, generic "pro-electricity" media campaigns to explicit promotional efforts to increase sales. Anecdotal examples already exist of utilities offering bonuses and gifts to customers for increased electricity use, analogous to "frequent flier" and long distance usage incentives in the airline and telephone industries. Recall also that utilities are experienced hands at tactics like declining block prices and load building promotional campaigns. Without regulatory policies to dissuade or prevent these types of activities, distribution utilities could clearly contribute to inefficient growth in electricity consumption.[29]

The good news is that despite the existence of numerous barriers and disincentives, there are a number of practical areas where distribution utilities could play a significant role in achieving or facilitating energy efficiency. The next section of this report presents and discusses several such options, while the section following that reviews a number of regulatory strategies that could be employed to overcome barriers and disincentives and help distribution utilities capture that energy efficiency potential.

B. Potential Areas Where DISCOs Could Contribute to Energy Efficiency

In spite of the significant barriers and disincentives DISCOs face regarding energy efficiency, there are in fact a number of areas where distribution utilities could potentially be very effective at capturing energy efficiency improvements. These include opportunities in the electricity distribution function itself (e.g., through high-efficiency distribution equipment and targeted DSM to defer distribution investments) as well as in customer end-use efficiency.

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[28] It is important to acknowledge that increased electricity usage per se is not necessarily undesirable and that growth in electricity usage can take place in an efficient manner. However, under the effects of the barriers and disincentives just discussed, the utility would have no economic reason to distinguish between efficient or inefficient use of electricity by customers. The increased sales would be economically profitable to the utility in either case.

[29] They could also conceivably engage in passive or active opposition to public policy initiatives to increase energy efficiency (e.g., new policies to address global climate change by reducing energy consumption).

Indeed, distribution utilities have a number of assets that should augment their effectiveness in promoting energy efficiency. Two of the most prominent are: (1) their extensive technical knowledge of how electricity is distributed and used by customers; and (2) the communication capability and credibility stemming from their long-standing relationship with customers.[30] The challenge is to devise policies that encourage DISCOs to use those assets to promote energy efficiency in ways that do not result in anti-competitive effects on other potential providers of energy efficiency.

Some would argue that the anti-competitive threat is too serious and that DISCOs should be kept out of energy efficiency entirely. The counter argument presented here is that the societal interest in capturing energy efficiency is too great to allow those important DISCO assets to go unused (or worse yet, used to promote increased energy consumption rather than efficiency). The challenge of encouraging distribution utilities to use those assets in ways that do not significantly impede the activity of private sector efficiency providers (and indeed, enhance that activity) can and should be met.[31]

With that understanding in mind, the following sections present seven broad areas of activity where distribution utilities could contribute to achieving energy efficiency gains. The first two (high-efficiency distribution equipment and targeted DSM to defer or displace distribution expansion) fit neatly within the narrow definition of the role of a DISCO in providing distribution service; the next four (energy efficiency as a supply resource, efficiency as a discretionary "customer service," mandatory energy efficiency programs, and collection and pass-through of funds for efficiency) fall more appropriately under the more traditional and broader definition of public utilities regulated in the societal interest; and the final option (energy efficiency as a profit opportunity) falls into a new category of examining the potential of using market forces to motivate a utility to provide energy efficiency.

1. High-Efficiency Distribution Equipment

Utility distribution systems lose energy as a result of inherent inefficiencies in the equipment (e.g., distribution and power system transformers and transmission lines). Improved materials and designs can minimize these losses. This section focuses particularly on opportunities for reducing distribution transformer losses, but the basic concerns addressed

[30] While there has been some attrition in experienced DSM staff at utilities due to restructuring, utilities are still typically the most common source cited by customers when asked where they would go for information about energy efficiency opportunities.

[31] This is not in any way meant to minimize the issue of potential anti-competitive behavior by utilities. It is very important that regulators devise and enforce rules and policies to avoid such abuses by distribution utilities.

would apply to any type of distribution equipment where varying levels of efficiency are available.

All electric power passes through one or more distribution transformers on its way to service building office equipment, lighting, and other loads. These devices step down high-voltage electrical transmissions to useful voltages. Transformers experience two types of losses: no-load and load losses. Because transformers are constantly energized, no-load losses occur all the time; additional losses occur as a function of the load, with greater losses at greater loads.

Electric utilities maintain 40 million distribution transformers, which account for about 60 billion kWh in energy losses annually (Barnes et al. 1996). Better materials and designs are available to reduce these losses. Utilities can get the most efficient transformer for their dollar by specifying that manufacturers produce transformers with the lowest Total Owning Cost (TOC).

Historically, electric utilities in a regulated market have been able to take a fairly long-range view in evaluating distribution transformer purchases by using a lowest TOC methodology. This trend has led to some improvement in the production and installation of relatively efficient distribution transformers over the years (Barnes et. al. 1996).

Unfortunately, in the cost-cutting "race to the bottom" reaction being adopted by many utilities facing restructuring, higher-cost, high-efficiency distribution equipment may be passed over in favor of lesser-efficiency, lower first-cost equipment.[32] This presents a substantial problem because distribution transformers are very long-lived (e.g., 30 years). Failing to purchase efficient transformers will lead to distribution system energy losses for many years to come. This is a significant net loss from a societal perspective because high-efficiency transformers can save electricity at a cost of less than $0.02/kWh.[33]

There are three basic ways that regulators could help ensure that DISCOs select high-efficiency distribution equipment. The first is by providing appropriate mechanisms for cost recovery (and preferably also an earnings opportunity) for investments made in high-efficiency

[32] A recent survey indicates that utilities that in the past had used a TOC methodology for distribution equipment are moving away from that method toward lowest first-cost purchasing practices (Thorne and Kobu 1999).

[33] See ICF, Inc. (1995).

equipment.[34] This would remove some of the important barriers to investment that might be present in a rate cap or rate case moratoria situation, for example.

A second approach would be to mandate that the utility meet some standard of efficiency in its distribution equipment purchases. The industry standard for efficient transformers, the National Electrical Manufacturers Association (NEMA) Standard TP-1, outlines two approaches that can be used by utilities to purchase efficient products: specifying lowest TOC products or using a default look-up table. The numbers in the default table are based on approximately a 3-year payback — very conservative for a product that lasts 30 years, so specifying lowest TOC is preferred.

DOE is in the early stages of a rulemaking to set minimum efficiency standards for distribution transformers and TP-1 is likely to be considered as the basis. The Federal Energy Management Program (FEMP) has also issued guidelines to federal facilities that transformer purchases should be TP-1 at a minimum. As an example of state regulation, in 1997 Massachusetts established as part of its restructuring legislation a state standard based on NEMA TP-1. Minnesota is also reportedly writing TP-1 into new building codes this year.

Third, an approach short of a full mandate would be to set benchmark efficiency targets and provide some type of economic incentives to the utility (e.g., rate of return adjustments or specific monetary awards) based on meeting those targets. (Section C of this chapter will discuss some of the incentive mechanisms that might be applied to this type of approach.)

Utilities that invest in high-efficiency distribution transformers and other components of the transmission and distribution (T&D) system will have systems that are less costly to operate and more reliable, in addition to providing the societal benefits associated with avoiding waste and reducing the amount of electricity generation required to meet customer needs.

2. Using Targeted DSM Rather Than Distribution Expansion

Another option for lowering total distribution system costs (in addition to high-efficiency distribution equipment discussed previously) is the use of carefully targeted customer end-use efficiency improvements to defer or eliminate the need for costly distribution system expansion. The capital costs to expand and upgrade a distribution system to meet growing customer demand can be very large and there may be times when strategic investment in customer energy efficiency and load management to reduce system loads may be cheaper than investing in the distribution expansion.

[34] Ironically, traditional ROR regulation provided both of those desirable features (a mechanism for cost recovery and an earnings opportunity for capital investment in the equipment). That helps explain why, prior to restructuring, some good progress had been made in moving toward high-efficiency distribution transformers.

One of the earliest and best known examples of addressing this issue was the Pacific Gas and Electric (PG&E) "Delta District" project in the early 1990's, which developed an extensive study of DSM potential to avoid transmission and distribution costs (EPRI 1992). That project indicated that DSM could potentially achieve significant cost savings in T&D expenditures and it helped legitimize the use of DSM for such purposes.

An example of picking up on that issue under restructuring is provided by the Massachusetts Department of Public Utilities in its Order announcing its Electric Restructuring Plan, which stated:

> "The Department continues to view targeted DSM as a possible alternative to distribution-system upgrades. We put distribution companies on notice that we expect their initial PBR [Performance Based Ratemaking] proposals to include a plan, along with supporting documentation, for investing in targeted DSM or distributed generation when these strategies are the least-cost alternatives to distribution-system upgrades." (MDPU 1996).

However, while such consideration of targeted DSM potential should be a required aspect of distribution utility management under restructuring (i.e., if the utility can reduce distribution expenditures cost-effectively through targeted customer end-use energy efficiency it should do so), there are serious limitations to the ability of this mechanism alone to achieve substantial amounts of energy efficiency. Principally, the problem is that much of the "benefits" of the energy efficiency are not captured by the distribution company itself (e.g., all the generation-related avoided costs and all "societal" benefits such as reduced environmental emissions), so a decision-making process based strictly on cost-effectiveness to the DISCO is likely to seriously under-value the full benefits of energy efficiency.

The practical reality is that if generation-related costs are not included in the total avoided cost calculation, it will typically be difficult to justify energy efficiency programs solely on the basis of avoided distribution costs. Fortunately, however, there are at least two creative ways around this problem. First, a policy could be adopted to have the DISCO resource planning process value the full avoided costs of DSM regardless of who supplies the energy ("generation") component (such as under the Ontario Energy Board approach discussed in the next section).[35]

A second creative approach, coming at the problem from a different angle, would be to require the distribution utility to "credit" customers for the value of the avoided distribution

[35] This type of "full avoided costs" approach would also be congruent with the decisions made in several states during the early 1990s to use state policy to incorporate the value of environmental benefits into the IRP process.

costs resulting from their end-use energy efficiency improvements.[36] In that manner, the energy efficiency decision-maker (i.e., the customer in this model) would see the full generation and T&D-related benefits accruing from a decision to implement energy efficiency.[37] If desired, an additional credit to account for environmental benefits could also be included. Such an approach would overcome the market barrier of split incentives and would be consistent with market theory requirements that decision-makers realize the full costs and benefits of their actions.

3. Energy Efficiency as a Resource Option for any Remaining Supply Function

As mentioned previously, the theoretical ideal of a complete severing of the distribution utility from the generation supply function has seldom been fully realized in those states that have restructured to date. Indeed, the role of the remaining "utility" in many states includes aspects of generation supply ranging from being the supplier of last resort to low-income and other special groups to being a default provider for the vast majority of customers in the service territory.

To the extent that distribution utilities retain some supply function, the old concept of DSM as a lower-cost supply "resource" can still be brought into play. This could be accomplished, for example, by requiring the utility to use an IRP type of approach,[38] and incorporate energy efficiency where appropriate, in fulfilling its supply obligations. There is certainly ample evidence that energy efficiency programs can save energy at a lower total system cost that producing electricity from supply-side resources.[39]

If a DISCO is responsible for securing and maintaining a resource supply portfolio, energy efficiency could be made a part of that portfolio. In addition to the use of IRP for that purpose, another new concept being discussed in some circles is the use of an "energy efficiency portfolio standard." Under that approach, the utility would be required to demonstrate that

[36] This financial incentive could take several different forms, ranging from a discount in the customer's distribution rate to a discrete monetary credit.

[37] While not strictly energy efficiency, and thus not directly addressed in this report, a similar type of "credit" approach could be applied to distributed generation technologies, where appropriate.

[38] This would likely require some modifications to traditional IRP used for vertically integrated utilities. For example, it might well feature a shorter time horizon for planning purposes.

[39] See for example Eto et al. (1995), which analyzed the 40 largest commercial-sector DSM programs in the country and found that the programs saved energy at an average cost of just $0.032/kWh, with some of the best at a cost of less than $0.02/kWh.

energy efficiency savings constituted some minimum percentage of its overall supply portfolio.[40] This would be another way in which DISCOs could significantly contribute to achieving energy efficiency.

Finally, another interesting twist in applying IRP principles is to have the distribution utility consider the full avoided cost of a supply resource, even if the energy component of the service is provided competitively. This approach is being tried in Canada, where the gas utilities in Ontario consider the full avoided cost benefits of DSM regardless of whether the gas commodity itself is procured competitively or not (Ontario Energy Board 1993). That is certainly an intriguing approach and one which would preserve the original intent of assuring least-cost electricity supply envisioned in the U.S. National Energy Policy Act of 1992.

4. Energy Efficiency as a Discretionary "Customer Service"

Another area in which distribution utilities could be involved in promoting energy efficiency is through the function of "customer service." Utilities have long had various programs and services that they provide for the general benefit of their customers. Most typically this would involve certain types of "information" programs, such as energy audits, technical consultation, and general information provision.

These are good examples of the types of activities a distribution utility could engage in which could stimulate, rather than competitively impede, the delivery of energy efficiency services by other market actors (i.e., the function of the utility would be to increase general awareness of, and interest in, energy efficiency opportunities, with the actual efficiency services and products provided by private market entities).[41] Unfortunately, under the circumstances described in Section A of this chapter, there are many impediments to distribution utilities continuing these services under restructuring. However, as will be discussed in the Section C, some relatively simple regulatory steps would go a long way toward facilitating this type of activity.

5. Energy Efficiency as a Mandated Service

[40] For example, legislation that recently passed the state Senate in Texas (SB7, passed March 17, 1999) would require regulated utilities to acquire energy efficiency equivalent to 25 percent of each year's growth in electricity demand.

[41] This is an area where carefully developed rules to avoid anti-competitive behavior must be in place (e.g., to avoid cross-subsidization or preferential treatment of utility affiliates). Probably the simplest and most certain solution is a structural approach, such as that proposed by Cavanagh and Sonstelie (1998): a complete severing of the distribution utility from any competitive business in energy efficiency or power supply.

Most electric utilities have at least some experience delivering energy efficiency programs and services and many have done so fairly effectively. To the extent that energy efficiency is an important societal objective, distribution utilities could simply be mandated to continue providing energy efficiency. This, in fact, is the approach adopted in a number of restructured states. Nearly two-thirds of the states with required energy efficiency funding discussed in Chapter III will have direct utility involvement in administering/delivering energy efficiency programs.[42]

In addition to their proven experience, there are some additional good and logical reasons for using distribution utilities as a delivery vehicle for energy efficiency. These include the ability to take advantage of the two major assets (technical knowledge of energy usage and communications/credibility with customers) discussed earlier in this chapter, and the economic efficiency/moral appropriateness argument presented in Chapter I: that the costs of mitigating the damages of electricity use should be placed close to the point where the product is used.[43]

Of course, the serious barriers/disincentives discussed previously must be kept in mind. It would be necessary for creative regulatory tools to be employed to overcome those problems and help ensure that the distribution utility would in fact be an effective vehicle for delivering energy efficiency programs and services.

6. Energy Efficiency Fund Collection and Pass-Through

In some circumstances, the distribution utilities may be regarded as inappropriate for actually administering and/or delivering energy efficiency services. Perhaps the barriers/disincentives are considered too severe to overcome, or the utilities lack experience, did not demonstrate adequate success in prior efforts, or simply aren't interested. Whatever the reasoning for excluding them from directly providing energy efficiency, however, distribution utilities can still be a very appropriate vehicle for collecting the funds for energy efficiency (i.e., through their existing billing mechanism) and passing through those funds to whatever entity will be responsible for administering the energy efficiency programs.

[42] It should be noted, however, that the content of these utility activities is often much different than their historical DSM programs. In particular, the approach of "Market Transformation" is a key element of new energy efficiency efforts in many states (e.g., California, Connecticut, Massachusetts, New Jersey, New York, etc.). See Eto, Goldman, and Nadel (1998) for a good discussion of some of these emerging energy efficiency efforts.

[43] Obviously there are certain costs of preventing environmental pollution that are appropriately placed on the generator of electricity (i.e., meeting air emissions standards). However, there are still damages from emissions within the legal allowances and it is an appropriate strategy to have costs of helping to mitigate those emissions placed at the point where the decision to use electricity is made.

Again, there are sound economic and morally defensible reasons for using distribution utilities to perform that function (as described in Section I).[44] Importantly, the Federal Energy Regulatory Commission[45] has strongly backed the right of states to assess nonbypassable charges to support stranded benefits such as DSM. This fund collection and pass-through approach is already being used in some states (e.g., New York, Illinois) and is the intended eventual result in several others (e.g., California, Wisconsin).

7. DISCO Provision Of Energy Efficiency as a "For-Profit" Activity

A final area of potential DISCO contribution to energy efficiency could be through the provision of energy efficiency services as a profit-making enterprise rather than a regulated activity. Indeed, in the past few years, a number of utility companies have formed affiliated enterprises to provide energy services to customers through such mechanisms as forming their own energy service companies (Vine, Nakagami, and Murakoshi 1998).

As a practical matter, however, regulators have important concerns over the anti-competitive effects that could result from the advantages possessed by a monopoly utility company providing such services for profit in their own service territory. Thus it is not surprising that such utility enterprises have tended to pursue energy efficiency activities outside of the utility service territory (Vine, Nakagami, and Murakoshi 1998). In cases where utility affiliates are allowed to practice in the utility territory, they are typically subject to various affiliate rules and codes of conduct to avoid cross subsidy and other anti-competitive activity. (See California PUC [1998] for an example of affiliate rules.)

Another important constraint on viewing this mechanism as an energy efficiency "solution" is the reality that private market energy service companies have tended to focus on relatively narrow market niches (e.g., large commercial and institutional customers). For effects beyond those niches (and often even within those niches), some type of external program or incentive is frequently necessary. For a variety of important reasons (often called "market barriers"), private market behavior alone will fall far short of optimal energy efficiency realization.[46]

[44] Also see Eto, Goldman, and Nadel (1998) for an excellent discussion of the rational for and design of "public benefits charges" to support energy efficiency.

[45] Order 888, April 24, 1996.

[46] See, for example, Hewett (1998) or Cavanagh and Sonstelie (1998) for excellent analyses and discussion of the subject of market barriers to energy efficiency.

Currently unfolding experience within the industry will shed more light over time on the potential effectiveness of this approach. In the meantime, regulators would do well to emphasize some of the other energy efficiency mechanisms discussed in this report.[47]

C. Potential Types Of Regulatory Strategies

There is a wide array of potential regulatory strategies available to encourage distribution companies to promote energy efficiency, ranging from simple "jawboning" and moral suasion all the way to strict and prescriptive mandates for certain specific programs to be delivered. The likelihood of success of any given strategy depends upon a number of factors, including the unique circumstances of an individual utility in a particular state. Regulatory strategies should, of course, be tailored to meet those circumstances.

In an effort to keep this discussion manageable, however, this report will address regulatory strategies using four main categories: (1) the base form of regulation chosen (e.g., ROR vs. rate caps vs. revenue caps); (2) cost recovery for energy efficiency-related expenditures; (3) targeted incentives/penalties; and (4) mandates (e.g., for program delivery or fund collection and pass-through). Virtually all forms of regulatory intervention could be placed into one or more of those categories.

The following material presents an overview of strategies within each category, including an assessment of the appropriateness of the strategy for addressing the barriers and disincentives discussed in Section A of this chapter.

In reviewing this material, it is important to keep in mind that regulatory strategy should be applied to encouraging high-efficiency distribution equipment as well as energy efficiency in customer use of electricity. It is useful to recall that the federal Energy Policy Act of 1992 provides a strong policy statement in support of distribution system efficiency. Section 111 of that Act required states to consider the disincentives caused by existing ratemaking policies and practices and to consider incentives that would encourage better maintenance and investment in more efficient power generation, transmission, and distribution.[48]

1. Base Form of Regulation

The base form of regulation chosen for a distribution utility will have a profound effect on how that utility views the issue of energy efficiency. The two key questions are: (1) how

[47] For a much more optimistic viewpoint on utility energy service company activity, see Martinez and Hayet (1999).

[48] See also ICF, Inc. (1995) for a good discussion of barriers to, and potential regulatory strategies in support of, high-efficiency distribution equipment.

does increasing or decreasing kWh sales affect the net revenues and profitability of the company? and (2) is the utility required to operate under some type of least-cost planning framework where investments in energy efficiency are to be considered as a resource option (either for generation or distribution purposes, or both)? The answer to each of those questions will be in large part determined by the choice of the base form of regulation for the utility.

With respect to the first (and most important) question, Section A of this chapter discussed in some detail the serious disincentive to energy efficiency that exists in traditional ROR regulation and how that disincentive is made even worse under a typical rate cap or rate case moratorium approach. The economic signal to the utility is essentially: "to make more money, sell more kWh, not less." The answer to this problem is to decouple or "delink" sales and profits.

There are at least three basic ways to accomplish that objective. The first is through a formal decoupling mechanism (which could be applied to an otherwise ROR-based system). Briefly and simply summarized,[49] the process works as follows: (1) demand growth is projected and rates are set based on expected costs and sales; and (2) later, any difference in actual sales and revenues (+ or -) is calculated and the difference is refunded/charged to customers. The intent is to make the utility indifferent to whether sales increase or decline and thereby remove the disincentive to energy efficiency.

A similar and somewhat simpler approach is to apply a revenue cap. Unlike a rate cap (which encourages increasing sales), a revenue cap results in the utility not realizing any profit growth from increased sales that drive revenue above the cap. Excess revenues would have to be refunded to customers. A revenue cap can be applied in absolute terms (total dollars) or in terms of "revenue per customer" to allow for adjustments to reflect changes in customer population.[50] (Other factors could also be used to adjust the revenue cap, such as indices of economic growth and/or weather.)[51]

Perhaps the most interesting and innovative new application of the revenue cap approach is in a recent order from Oregon,[52] which approves an "Alternative Form of Regulation" (AFOR) approach for Pacificorp (d.b.a. Pacific Power and Light). That order features the use of multi-year revenue caps (i.e., a pre-approved succession of revenue caps over time) to ensure that the

[49] See Eto, Stoft, and Belden (1997) for a detailed description of regulatory decoupling.

[50] Over the past decade, utilities in California, Maine, New York, Oregon, and Washington State have been regulated using some type of revenue cap approach.

[51] The Regulatory Assistance Project (RAP 1994) provides an excellent description of the mechanics of a revenue cap ("bill cap") mechanism.

[52] Order 98-191, May 5, 1998.

distribution utility is financially indifferent to kWh sales levels, as well as a nonbypassable system benefits charge to support both energy efficiency and a renewable resources incentive.

A third and potentially more cumbersome approach is to allow specific recovery of "lost revenues" that result from a utility providing energy efficiency services.[53] This approach has been used in the past in connection with DSM programs but suffers from two major drawbacks: (1) it requires the measurement of the actual effects on sales of the energy efficiency programs (an often contentious issue); and (2) it does nothing to remove the otherwise overriding incentive for the utility to increase sales and shun energy efficiency in all areas other than those specifically covered by the lost revenue mechanism.

The solution to the second major question (regarding least-cost planning) is to incorporate some type of requirement for least-cost planning into the base regulation of the distribution utility. Just because a DISCO has shed most or all of its generation responsibility does not alter the historical societal interest in having "reliable electric service at the lowest practical cost." Distribution utilities can be required to plan for and implement: high-efficiency distribution equipment; targeted DSM (in place of distribution investment); and even distributed generation (where appropriate), when those options result in achieving that objective of reliable service at lowest total cost.[54]

Moreover, to the extent that a distribution utility retains some responsibility for providing generation services (or to the extent that regulators wish to take a societal perspective on total costs[55]), avoided generation costs could also be included in the least-cost planning calculations.

2. Cost Recovery for Energy Efficiency Expenditures

This seemingly simple issue actually addresses an important threshold barrier to many DISCOs making investments in energy efficiency. Under rate cap or rate moratoria regulation (and even conceivably under revenue cap regulation), the utility will be averse to spending any

[53] At least 9 states (Arizona, Hawaii, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, North Carolina, and Ohio) have, or recently have had, lost revenue adjustment mechanisms (LRAM) of some type for energy efficiency programs (Nichols and Sarnow 1999).

[54] In the words of Cavanagh and Sonstelie (1998), the goal of the system would be to "minimize life-cycle distribution costs by finding the optimal mix of system expansion, demand reduction incentives, and new load-center supply resources."

[55] Recall the Ontario approach to regulating natural gas companies discussed earlier.

new money on energy efficiency. Because the old rates were set to cover historical costs, any new expenditures are not covered in those rates and hence reduce the profits of the utility.[56]

Solving this problem is likely to be a necessary (although not sufficient) step to get DISCOs to voluntarily spend any money on energy efficiency. Fortunately, on the regulatory side, it is technically rather simple to set up special accounts for energy efficiency purposes and authorize recovery of those costs. The larger problem will occur where legislated rate caps have been established. That situation might require a legislative remedy (although even legislated rate caps often include some exceptions under which energy efficiency might be creatively placed) or the creation of some type of deferred recovery account.[57]

The important point is that this barrier be addressed somehow. In this restructured world, if a utility can't expect to recover their costs they'll be loath to spend the money.

[56] Even if a budget for efficiency expenditures was embedded in historic rates, there is still an incentive to save money by not continuing those expenditures in the future.

[57] In some cases, legislatures have provided guidance that energy efficiency should continue at least at historic levels (e.g., see the Maine example discussed in Chapter III).

3. Targeted Incentives and/or Penalties

Another common regulatory strategy during the IRP/DSM era was the use of specific financial incentives and/or penalties to encourage utility involvement in energy efficiency.[58] There is absolutely no reason why similar approaches could not be applied to regulated distribution utilities. After all, they are still being regulated in the public interest, and financial incentives are a common regulatory tool.[59]

For example, if the DISCO is still being regulated under a traditional ROR approach, an incentive/penalty could be applied to adjust allowed rate of return up (or down) based on the utility meeting certain energy efficiency objectives. This can be a very effective way to attract management attention and help counter some of the financial disincentives for energy efficiency.

Another popular new approach is to move from traditional ROR regulation to some type of performance-based ratemaking (PBR).[60] Under that approach, economic incentives (often using adjustments to allowed rates of return) are attached to a number of performance indicators (e.g., outage minutes, service response time, etc.). It would be an easy modification to add some energy efficiency-based criteria to the list of factors used to gauge performance. This could range from very simple indicators (e.g., energy efficiency spending, customers served, etc.) to more sophisticated measures (e.g., weather-adjusted usage per customer).

Finally, an even simpler method that has been used in some states (e.g., California, Massachusetts, Michigan) is to negotiate annual efficiency targets with utilities and tie specified dollar amount bonuses to achievement of those targets. This has the advantage of avoiding the need to get into arguments about the proper calculation and application of rate of return. In Massachusetts, for example, Massachusetts Electric Company (MECO) in 1998 was eligible to receive a fixed incentive per kWh and kW saved, if it achieved at least 50 percent of targeted savings. The incentive was scaled according to the proportion of targeted benefit-cost ratio achieved, up to a maximum of 8 percent of net program benefits, after tax — a maximum possible incentive of $2 million for 1998 (Nichols and Sarnow 1999).

[58] See Nadel, Reid, and Wolcott (1992) for an excellent presentation and analysis of regulatory incentives for DSM.

[59] Indeed, even in 1998 there were shareholder incentives of some type available in at least 12 jurisdictions in the United States, some of which had restructured and some which were still under traditional regulation (Dunsky and Nichols 1998).

[60] RAP (1994) explains the concept in detail and provides examples of how to structure PBRs to encourage energy efficiency, resource diversity, environmental emissions reduction, and other policy objectives.

There are a variety of different ways that utility shareholder incentives can be structured. The important principle is that some type of meaningful financial incentive will be necessary to help counteract the significant direct and indirect financial disincentives for energy efficiency described under Section A of this chapter.

4. Mandates

Finally, the simplest and most direct form of regulatory strategy is the use of mandates. This could take the form of a mandate to actually administer and/or deliver energy efficiency programs or just to collect funds for energy efficiency and pass them on to another entity. As monopolies regulated in the public interest, mandates are certainly one established mechanism for exercising public policy.

The mandate approach has the advantage of not having to rely on carefully crafted motivational signals and incentives to influence utility behavior — although well-crafted incentives can still be important if one wants to encourage excellent performance rather than just compliance behavior. (This consideration of incentives for excellent performance would be particularly important if the mandate is to have the utility actually deliver energy efficiency, rather than just collect and pass through funds.)

The downside of mandates is that they can at times be more difficult to impose, politically and sometimes legally. Some oppose mandates on philosophical grounds (i.e., as part of a general preference for less regulation), while others oppose them due to economic self-interest.[61] Nevertheless, of the 19 states that have restructured to date, no fewer than 14 have adopted a policy that mandates distribution utilities to collect funds for energy efficiency, and in many cases to administer and/or deliver energy efficiency programs.

Mandates effectively override all barriers and disincentives, at least in terms of the specifically prescribed utility actions. However, to get utilities to adopt efficiency in other areas, and to mitigate their otherwise dominant interest in increasing kWh sales, it would be desirable to combine mandates with other regulatory strategies discussed in this chapter. (This might also have the corollary benefit of helping to ensure that utilities aren't motivated to pursue political means to undermine or do away with energy efficiency mandates.)[62]

[61] Two of the most vocal opponents have been large industrial customers who don't want to pay the surcharge that provides funding and electricity suppliers who want to maximize electricity usage.

[62] This may become increasingly important, given that most of the states that have put in place mandates for energy efficiency spending under restructuring to date have only assured the funding for a limited time period (typically 3 to 5 years). Usually some type of policy review is called for at the end of that period to decide upon further funding. If the fundamental disincentives distribution utilities face regarding energy efficiency are not resolved, those utilities could be formidable political opponents of further energy efficiency funding.

5. Summary

As discussed elsewhere in this report, the tendency among states that have restructured thus far has been to defer decision-making on the details of how distribution utilities will be regulated, in an effort to expedite work on retail competition for generation. Therefore, there are not yet many concrete examples of the implementation of the regulatory strategies discussed in this chapter (other than the fairly widespread use of mandated energy efficiency funding) among states that have restructured to date.

However, there is a fair amount of awareness of the need to address these issues at some point. A good example of this situation is the recent legislation passed in New Jersey,[63] which contains a section focusing on future regulation of distribution companies. The set of standards that the Board of Public Utilities must use in reviewing a utility's proposed alternate form of regulation includes the following:

> "[The plan] will not discourage energy efficiency or distributed generation as alternatives to distribution plant investment and will explore ways to remove the linkage between retail throughput and the recovery of fixed and stranded costs." (Assembly Bill A16, Section 55, paragraph 11).

That type of framework at least gives a recognition to the presence of the barriers and disincentives discussed previously and provides a platform from which positive regulatory strategies can be built.

[63] Assembly Bill A16, signed February 9, 1999.

V. RECOMMENDATIONS

It is somewhat difficult to develop an optimal regulatory approach in the abstract, because each state, and indeed each utility, is unique. Therefore, the following comments should be regarded as a general framework under which specific state and utility "tailoring" should occur. Nevertheless, a basic fundamental set of recommendations has been developed and is presented below, first as a list of key principles and then as a recommended optimal "package" of regulatory strategies.

A. Key Principles

In approaching the challenge of considering the role of distribution utilities in promoting energy efficiency, the following information summarizes some basic principles that should be useful to keep in mind.

1. Distribution utilities under restructuring face serious and significant barriers and disincentives to energy efficiency. Absent regulatory intervention, they will generally seek to promote increased sales and be economically averse to energy efficiency.

2. There is no single "magic bullet" approach that will address all problems. Different regulatory strategies will address different aspects of the barriers and disincentives faced by distribution utilities.

3. Mandates are the quickest and most certain way to assure some set level of energy efficiency effort (e.g., spending) and mandates are a legitimate policy tool for achieving specific objectives. However, mandates leave some other areas of potential distribution utility impact that still need to be addressed.

4. If you want a utility to make "discretionary" investments in energy efficiency (either in distribution equipment or customer end-use efficiency), make sure there is a realistic mechanism available for that utility to recover its costs (prudently incurred, of course). This is a threshold requirement for distribution utility investment in energy efficiency (necessary, but probably not sufficient).

5. The base form of regulation applied to a distribution utility (e.g., ROR, rate caps, revenue caps, etc.) will have a profound effect on how it views energy efficiency in general. In the worst cases (e.g., simple rate caps), the utility will be very averse to energy efficiency and motivated to increase kWh sales. In the best cases (e.g., ROR with de-coupling or a revenue cap), the utility can at least be made indifferent to increasing or decreasing kWh sales.

6. To move beyond indifference, the distribution utility will have to perceive some type of specific financial incentive for engaging in energy efficiency. A number of proven mechanisms exist for providing such an incentive.

B. An Optimal "Package"of Regulatory Strategies to Encourage Distribution Utilities to Promote Energy Efficiency

Keeping in mind the caveat offered above (that all state/utility situations are unique and require specific tailoring) the combination of the following five core elements comprise what could be regarded as an optimal package of regulatory strategies to encourage energy efficiency.

1. Design the Base Regulation Approach to Remove the Disincentive for Energy Efficiency

Begin with a base regulatory strategy designed to mitigate or remove the otherwise dominant disincentive to lowering kWh sales. This could be done either through ROR with decoupling or through a revenue cap (preferably a "revenue per customer" cap). By all means, try to avoid the use of a simple rate cap approach.

2. Incorporate a Mandatory Public Benefit Charge to Fund Energy Efficiency

A mandatory public benefit charge to support energy efficiency will ensure that at least a base level of spending on energy efficiency will occur. The decision on whether the distribution utility will administer/deliver the energy efficiency programs or simply pass through the money to another entity can be made based on the particular circumstances in any given state (e.g., past experience and success of the utilities in delivering energy efficiency, availability of other suitable institutions to administer/deliver energy efficiency programs, etc.). Note, however, that the failure to accomplish Item 1 above would make it more important to consider having administration and delivery of energy efficiency be done independently of the utility.

3. Establish A Cost Recovery Mechanism for Discretionary Energy Efficiency Expenditures

An important threshold barrier to overcome for distribution utilities under restructuring will be the ability to recover the costs of expenditures made for energy efficiency. A simple and reliable mechanism needs to be established (e.g., some kind of allowable cost account) to let the DISCO recover prudently incurred expenditures for encouraging/obtaining energy efficiency.

This can also be another useful avenue for public involvement. For example, a collaborative could be established to identify projects and activities that would be important and legitimate areas of utility expenditures (which could go a long way toward assuring prudency and dependable cost recovery for the utility).

4. Require The Utility to Use a Least-Cost Planning Process

For a publically regulated distribution utility, a least-cost planning process accomplishes two important functions. First, it provides an explicit mechanism for considering energy efficiency investments (including both high-efficiency distribution equipment and targeted DSM to reduce distribution investment costs) in the operation of the utility. Second, it should provide an open forum for public oversight of the DISCO to ensure that it is operated in the public interest. While the planning process alone is not sufficient to ensure optimal incorporation of energy efficiency, it is an important element in making the achievement of that objective possible.

5. Establish a Financial Incentive for Energy Efficiency

Most of the preceding elements of the package tend to focus on removing disincentives to energy efficiency and providing for a sound planning process. However, if the distribution utilities are expected to have any role beyond collecting and passing-through a public benefits charge (i.e., if they are expected to actually work to achieve energy efficiency), it will be necessary to create circumstances where it is in their financial interest to make energy efficiency happen. Like any other economic entity, DISCOs will be motivated by the bottom line.

Fortunately, there are well-established mechanisms for regulators to provide that motivation, such as through targeted shareholder incentives (e.g., rate of return adjustments or specified monetary awards based on achieving certain goals) or performance-based ratemaking (e.g., calibrated earnings adjustments based on performance on certain specific indices).

In summary, the barriers and disincentives to energy efficiency for distribution utilities manifest themselves in many ways. No single regulatory strategy is suitable for addressing all those problem elements. The above list of items reflects an attempt to assemble a package of regulatory strategies that has the best chance of producing the optimal incorporation of energy efficiency by distribution utilities.[64]

[64] Note: the focus of this report is necessarily on distribution utilities. There are obviously other policy mechanisms that could also promote energy efficiency through other structural entities (e.g., codes and standards, tax credits, energy efficiency portfolio requirements for generation suppliers, etc.). These issues are beyond the scope of this report and will not be addressed here, except to emphasize that distribution utilities have their own unique opportunities to contribute to energy efficiency irrespective of what is done in those other policy areas.

VI. CONCLUSION

The objectives and approaches taken in this report were shaped by three very important factors. First, electric distribution utilities are unique institutions in our society. They sit at the crossroads of the emerging private sector involvement in electricity generation and the enduring public interests regarding electricity, including: having a safe, reliable, and lowest cost electric system; providing energy efficiency; and minimizing adverse environmental impacts.

Second, electric distribution utilities are very powerful institutions in our economy. Electricity, the very lifeblood of a modern society and economic system, flows through them to virtually every home and business. The decisions made by electric distribution utilities will have a major impact on how, and how much, electricity is consumed in this nation.

Third, electric distribution utilities are still regulated in the public interest. As such, it is legitimate to consider how public policy interests can be expressed through the regulation of these unique and powerful entities in our economy and society.

A strong case can be made that there are still compelling reasons for having a public policy to promote energy efficiency. From an economic standpoint, there are still enormous opportunities for realizing cost savings from energy efficiency. A recent federal study found that the net savings from currently available and cost-effective energy efficiency improvements in buildings and equipment would be $20 to $30 billion per year. Including industrial facilities would increase that by half again as much (IWGELT 1997). (To put those numbers in perspective, they significantly exceed the $20 billion total savings to consumers from national electric restructuring itself, as projected in the Administration's March 25, 1998 restructuring proposal.)

From an environmental standpoint, the electric industry is the largest single source of air pollution in the country. Electricity generation is responsible for about two-thirds of U.S. sulphur dioxide emissions, one-third of nitrogen oxide emissions, and one-third of national emissions of carbon dioxide (Ottinger et al. 1990)

From a public preference standpoint, both national and state-level opinion surveys repeatedly have shown overwhelming public support for energy efficiency, including specifically the issue of requiring utility companies to provide energy efficiency programs (Kushler 1998a).

For those who believe that the above factors and circumstances justify a regulatory policy to encourage distribution utilities to promote energy efficiency, this report has attempted to identify and discuss important issues for consideration. Barriers and disincentives to the pursuit of energy efficiency by DISCOs have been described and regulatory policies to overcome those obstacles have been identified. Finally, some key principles were enumerated and an optimal

package of regulatory policies was proposed. The challenges to be faced in implementing these policies are substantial but there is much at stake and the potential benefits to be realized should be worth the effort.

VII. REFERENCES

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APPENDIX: SUMMARY TABLE OF PUBLIC BENEFIT PROGRAMS

APPENDIX: SUMMARY TABLE OF PUBLIC BENEFIT PROGRAMS (CONT'D)

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