The role of public power utilities in promoting customer energy efficiency: Examples from the United States

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1. SYNOPSIS

This paper reviews the experiences of four U.S. Public power utilities and Federal power agencies that are actively involved in the promotion of customer energy efficiency.

2. ABSTRACT

Non-U.S. observers, curious about the success of U.S. utilities in promoting energy efficiency among customers, wonder whether the experiences of these utilities are applicable outside the U.S. Among other things, these observers are concerned about the degree to which U.S. utility promotion of customer energy efficiency appears to depend on the unique form of state-directed rate-regulation practiced in the U.S. This paper suggests that, while undoubtedly influential, rate-regulation is only one of many ways for transforming utilities from sellers of electricity as a commodity to providers of energy service. The suggestion is illustrated by descriptions of the customer energy efficiency activities of several U.S. public power utilities, which are not rate-regulated by state agencies. While we believe these activities provide important examples of how non-rate regulated, non-U.S. utilities can become more actively involved in the promotion of customer energy efficiency, we also acknowledge that transforming utilities into providers of energy services does not happen automatically. More typically, an initiating event is required, either external to the utility (such as another form of government intervention) or internally (such as a large impending resource need).

3. INTRODUCTION

The majority of electricity sold in the U.S. is provided by investor-owned utilities whose retail rates are approved by state regulatory agencies. Under this form of regulation, investor-owned utilities are granted a monopoly franchise for electricity service in return for the opportunity to earn a reasonable profit. U.S. state regulators have used this authority to require that utilities engage in integrated resource planning (or IRP). IRP requires that utilities consider a wide variety of resource options (on both sides of the customer's meter) in order to provide reliable energy services at the lowest acceptable cost. Utilities often find that helping their customers increase their energy efficiency represents the lowest cost and therefore preferred resource. However, promoting customer adoption of energy efficiency technologies and practices is a rather new activity for utilities. Coupled with uncertainty regarding the performance of energy efficiency measures, utilities are sometimes reluctant to pursue acquisition of energy efficiency as a resource. Thus, absent the unique form of regulation practiced in the U.S., some observers feel that there is little reason to expect that public power utilities (which are not rate-regulated by the state) will promote customer energy efficiency.

However, we believe that the experience of a select group of U.S. public power utilities, who have actively promoted customer energy efficiency, provides important evidence that there are equally powerful economic, institutional, and political incentives for public power utilities to adopt integrated resource planning principles, independent of direction from state rate-regulatory agencies. Moreover, the adoption of IRP principles by these utilities today may provide important insights into the fate of IRP in a more vertically disintegrated electric utility industry of tomorrow.

The U.S. public power sector consists of nearly 3.000 publicly-owned utilities: municipal, public power

district, irrigation district, state authority, Federal, and cooperative electric. In 1990, these utilities accounted for 23% (158 GW) of U.S. generating capacity, 21% (584 billion kWh) of U.S. net generation, and 23% (609 billion kWh) of total sales, leading to 45 billion ECU ($38 billion) in revenues (EIA 1991).

Structurally, many public power utilities are already vertically disintegrated to varying degrees. For example, the majority of public power utilities are essentially distribution utilities, owning few or no generating resources, relying on wholesale power markets for the majority of their supplies. The Federal utilities are often the major power marketers, typically selling hydroelectric power from Federal water projects at below market rates. There are also many publicly owned generation and transmission cooperatives, selling primarily to cooperative members, but also on the open wholesale market.

The challenges for application of IRP principles in the public power sector are strategic and practical. Strategically, the manner in which IRP and promotion of customer energy efficiency are adopted depends on the unique institutional settings of, and relationships between, public power utilities. Practically, because many public power utilities are comparatively small, joint-actions at higher levels of institutional aggregation are often less expensive and more appropriate than individual efforts. Finally, from a political perspective, it is increasingly difficult for public power utilities to ignore demand-side resource options, when the experience of neighboring investor-owned utilities demonstrates that these resources are viable and lower cost alternatives to traditional supply resources.

This paper reviews the experiences of four U.S. public power utilities and Federal power agencies that are actively involved in IRP and, as a result, the promotion of customer energy efficiency: Sacramento Municipal Utility District, California Municipal Utilities Association, Bonneville Power Administration, and Western Area Power Administration. These examples illustrate how the basic economic rationale for IRP and the utilities' role in promoting customer energy efficiency is shaped by the particular resource and institutional circumstances faced by each. We begin by reviewing the rationale for utility involvement in the promotion of customer energy efficiency and then describe how these principles are realized in each of our utility examples.

4. THE RATIONALE FOR UTILITY PROMOTION OF CUSTOMER ENERGY EFFICIENCY

Critics of utility customer energy efficiency programs often acknowledge that significant imperfections in energy markets have led to the availability of cost-effective energy efficiency opportunities, but then conclude incorrectly that utilities have no role in acquiring them as resource alternatives to new sources of generation. They point to the government as the primary agent responsible for correcting imperfections in the market. In this regard, they are surely correct; governments do have a primary responsibility for ensuring the proper functioning of energy and other markets. In the U.S., a good example of government efforts to correct for energy market imperfections is the establishment of minimum performance standards for new buildings and appliances. Nevertheless, it is incorrect to also conclude that utilities have no role to play in promoting economically efficient uses of energy. (See Krause and Eto (1988) for a longer discussion of these issues.)

First, utilities are logical agents for promoting improvements to customer energy efficiency because utilities are in the best position to evaluate the relative merits of supply and demand-side resources. That is, since utility customers are the direct beneficiaries of demand-side resources, when they avoid the need for new power plants, self-interest suggests that they should also be the promoters of these activities. To put it another way, utility customers, not government taxpayers, pay for new powerplants.

Second, given the immature state of the existing infrastructure for energy efficiency, utilities often understand the energy service needs of their customers better than any other party in the energy market. Through access to customers' billing records and an established network for customer contact, the utility is often in the best position to know what energy services the customer requires and has an existing network that can be adapted to deliver them. In this regard, some believe that the utility's role in promoting customer energy efficiency is a transitory one whose importance will diminish over time as the energy

efficiency infrastructure matures.

Third, utility programs rely on voluntary participation and thus represent a non-coercive means of introducing a societal least-cost perspective into customer energy efficiency decisions. Government standards are a command and control approach for increasing customer energy efficiency. Utility programs, by contrast, rely on market mechanisms, such as the provision of information, capital, and services to deliver energy efficiency.

Fourth, and perhaps most important, promoting customer energy efficiency is inherently an opportunity for local economic development. Rather than, for example, exporting money from the service territory for the purchase of power from distant sources, the promotion of customer energy efficiency has two localized benefits. Thus, to the extent that energy efficiency costs less than new supplies of energy, the total expenditure on energy services is reduced and thereby retained locally for other uses. Moreover, the remaining expenditures on energy efficiency can directly contribute to local economies, specifically when increased purchases of energy efficiency goods and services are made from local providers. These latter, localized business opportunities are often over-looked as the stimulus to local economies they, in fact, represent.

These findings have led many U.S. utilities to acquire energy efficiency resources: (1) whenever they cost less than the supply-side resources they allow the utility to avoid, and (2) whenever the utility, rather than some other economic agent, is uniquely positioned to mobilize the resource. This rationale, moreover, does not depend on whether the utility is publicly or investor-owned. What is different for publicly-owned versus investor-owned utilities is the process by which utilities not currently practicing IRP and, where appropriate, the promotion of customer energy efficiency come to embrace these principles. With rate-regulated, investor-owned utilities, state utility commissions have been instrumental in stimulating this process. With publicly-owned utilities, the processes are inherently more diverse. The richness of this diversity can only be appreciated by an examination of specific cases, to which we now turn.

5. SACRAMENTO MUNICIPAL UTILITY DISTRICT

The experience of the Sacramento Municipal Utility District (SMUD) illustrates how the basic pre-conditions for integrated resource planning can lead to reliance on customer energy efficiency programs as important new resources for meeting customer energy service demands. In this case, early retirement of the utility's largest single generating resource, a nuclear power plant with a history of poor operation, in response to public initiative created an immediate need for an assessment of future resource options.

SMUD is the fifth largest public utility in the U.S. with annual revenues of 720 million ECU. SMUD serves nearly 500.000 customers (of whom 90% are residential), selling 8,2 billion kWh's annually, in the central part of California. SMUD's summer peak demand exceeds 2 GW and loads have been growing at 2-3%/year. SMUD owned several generating facilities: a 900 MW nuclear power plant (Rancho Seco), 640 MW of hydroelectric power, 100 MW of geothermal projects, about 50 MW of combustion turbines and a 2 MW solar photovoltaic facility. SMUD also has a number of power purchase agreements with neighboring utilities and power marketing authorities.

The utility is governed by a five-person Board of Directors, each of whom is popularly elected for four-year terms, which is jointly responsible for overall policy direction. The Board appoints a General Manager who is responsible for day-to-day operations of the utility. SMUD has full power to establish rates charged for all utility services, which are reviewed annually; retail rate and revenue levels are not subject to review or regulation by any other Federal or California State governmental agencies.

The Rancho Seco nuclear generating station, placed in service in 1974, was SMUD's single largest generating resource and was intended to provide SMUD with a long-lived and low cost source of electricity. However, Rancho Seco was plagued by operating problems and never operated at its design capacity factor. It was also located relatively close to urban population centers. As a result of increased concern over the

reliability and safety of the plant, a growing and increasingly vocal segment of the local population began to oppose the utility's operation of the plant. In June 1989, the local electorate voted for a referendum that prohibited SMUD from further operation of the plant. The premature abandonment of the plant has led the utility to write off about 500-650 million ECU (which included unfunded decommissioning liability), which will be recovered in future rates to customers over a 17 year period.

The electorate's loss of confidence in the utility had a profound effect on SMUD's Board of Directors. A new General Manager was hired with a mandate to change direction. The resource shortfall caused by the loss of Rancho Seco led SMUD to develop an emergency three-pronged strategy: (1) sign agreements for firm power with other neighboring utilities (e.g., PG&E and Southern California Edison) through the 1990s to replace lost power from Rancho Seco, (2) acquire new (and lower cost) power resources from independent power producers through competitive bidding to replace expiring power purchase agreements, and (3) offset new load growth with aggressive customer energy efficiency programs that focus on maximizing energy efficiency in existing buildings and new construction.

At the same time, in order to rebuild the community's confidence in the utility and develop a long-term strategy to replace the power previously supplied by Rancho Seco, the utility initiated a vigorous and thorough IRP process. The plan found the following: (1) SMUD was overly dependent on relatively expensive power purchases, (2) new (and potentially lower-cost) power supply resources could be acquired through a competitive solicitation process, and (3) customer energy efficiency programs were the lowest cost resource for SMUD (estimated cost of about 0,03 ECU/kWh). Moreover, the utility could meet its entire growth in peak demand by expanding load management and energy efficiency programs and also reduce energy requirements from 2,7% per year to 1-1,5%/year. It is important to note that this large energy efficiency potential resulted in part from historically low electricity prices.

As a result, demand-side management (DSM) efforts were significantly expanded and re-organized into three main areas: load management, conservation power plant, and new construction. The utility continued its aggressive load management programs, which began in the early 1980's, aimed at reducing summer peak load through direct load control of residential air conditioners and water heaters, and voluntary interruptible and curtailment programs for commercial/industrial customers. In addition, SMUD initiated the 'construction' of a 600 MW 'conservation power plant,' which focusses on improving the energy efficiency of new and existing buildings through an array of programs: audits, rebates for high-efficiency products, refrigerator trade-in program, shade tree planing, and low-income assistance. The goal of the energy efficient new construction program is to have builders construct buildings that reduce energy usage by 20-50% below the mandated state efficiency standards (SMUD 1992). By 1992, DSM spending had increased to over 50 million ECU, up from 15 million ECU in 1991, which meant that SMUD was committing about 9% of operating revenues to DSM (The Results Center 1992).

To summarize, SMUD's integrated resource planning and acquisition process resulted from the immediate need to both re-build customer confidence in the utility and replace the loss of a major generating resource. In this last regard, the loss of nearly 50% of the utility's generating capacity essentially transformed SMUD into a distribution utility that sought to meet a large resource need through application of IRP principles. SMUD's aggressive pursuit of IRP and its reliance on customer energy efficiency programs have dramatically improved customer satisfaction with the utility, in part because there was significant public participation and input into the process.

We believe that the SMUD experience is not unusual and that similar resource planning outcomes (a balanced resource portfolio, with heavy emphasis on improving customer energy efficiency) will be found whenever supply-constrained or distribution-only electric utilities rely on IRP principles to meet the future energy service needs of their customers. What is important are the factors leading to the initial adoption of these principles (and the broad set of resource options they consider) as the appropriate basis for planning. On this score, the role of public participation in a variety of forms (public demonstrations, election of utility board members, etc.) to articulate this preference cannot be ignored.

SMUD, however, is a large municipal utility with access to significant resources and expertise. For an

example of how smaller municipal utilities can overcome their limitations in this regard, we turn now to the experience of the California Municipal Utilities Association.

6. CALIFORNIA MUNICIPAL UTILITIES ASSOCIATION

The California Municipal Utilities Association (CMUA) is a voluntary, statewide organization comprised of nearly all of California's municipal utilities (30 out of approximately 32 California municipal utilities are members of CMUA). The members include some of the largest municipal utilities in the U.S., such as the Los Angeles Department of Water and Power with annual sales of over 21 billion kWh to over 1,3 million customers and extensive generation holdings, to more modest sized utilities serving ten's of thousands of customers who purchase most of their requirements. Each municipal utility is typically governed by a city council that oversees all aspects of city operations, in addition to approval of utility budgets and expenditures. In this setting, expanded utility efforts to promote customer energy efficiency must compete both for the attention of publicly elected officials and, in California, for increasingly scarce public resources.

In 1992, CMUA published the Model Plan for Energy Efficiency (CMUA 1992). The document, which was developed with active participation from 20 of the Association's 30 members, the California Energy Commission (a California State energy office), and the Western Area Power Administration (a Federal power marketing authority), simultaneously addresses three often-cited barriers to integrated resource planning and customer energy efficiency by public power utilities: (1) difficulty in gaining access to technical information, (2) absence of an energy efficiency infrastructure among utilities, and (3) lack of resources to get started.

The Model Plan for Energy Efficiency combines descriptions of the steps involved in planning, selecting, implementing, and evaluating utility-sponsored energy efficiency programs with case studies of selected energy efficiency programs offered by California municipal utilities. In addition, the document organizes a wealth of background and supplementary information on all phases of utility-sponsored customer energy efficiency programs, including basic definitions of key concepts, descriptions of major energy efficiency opportunities, lists of vendors and suppliers of energy efficient technologies and services, and extensive listings of additional information sources and organizations. Because the document was prepared with extensive input from its ultimate users, it was specifically tailored to meet their particular information needs. For example, the document contains an extensive discussion of energy efficiency opportunities for agricultural applications because many California municipal utilities have significant agricultural loads and because these applications are not typically emphasized in energy efficiency discussions.

The process of producing the Model Plan led to significant interaction among its primary beneficiaries and led to increased communication on issues associated with utility promotion of customer energy efficiency. The Model Plan was developed through an extensive organization of committees consisting of the participating municipal utilities and sponsors. For the smaller utilities, many of whom has historically been less involved in promoting customer energy efficiency, the process provided a unique and collegial atmosphere for the free exchange of ideas and views with larger or more experienced utilities. Thus, while the published Model Plans systematically documents the major issues addressed by each committee, the committee discussions, themselves, led to increased, or at least a shared understanding of these issues by all participants.

Lack of resources to engage in utility promotion of energy efficiency is an often cited barrier to increased IRP efforts by smaller municipal utilities. The Model Plan is an excellent example of how pooled efforts can lead to increased benefits for all parties. While the direct costs of producing the Model Plan were modest (and, in fact, were largely provided through a grant from the Western Area Power Administration), there was significant task-sharing associated with the time committed by each participant. Nevertheless, since these costs were spread among all participants, it is clear that the joint development of the Model Plan was less costly than the costs associated with individual development of model plans for each of the participating utilities. More recently, as a result of the Model Plan and the increased interest of its smaller member utilities, CMUA has begun setting up a 'joint powers agency' to help municipal utilities finance

demand-side management and recycled water projects.

The Plan has also led to increased recognition and support by local city governments for municipal utility promotion of customer energy efficiency. The Model Plan begins with a policy statement committing support for the implementation of the Model Plan for Energy Efficiency. In conjunction with its release, the policy statement has been formally adopted by a growing number of local city councils for the participating utilities.

In evaluating the process leading to the development of the Model Plan it is also critically important to appreciate the political environment in which it was developed. California's investor-owned utilities, through policies adopted by the California Public Utilities Commission, have been very aggressive in their pursuit of customer energy efficiency as the major and least-cost energy option for meeting new resource needs. The efforts of these large utilities has not gone un-noticed by the public power utilities in California. Indeed, there has been discussion of legislative (rather than regulatory) initiatives to increase public power utilities' commitment to promoting customer energy efficiency. Thus, motivation for the Model Plan can be tied both to a genuine desire by municipal governments to see their utilities move forward in promoting energy efficiency and, perhaps more importantly, a strategic desire to pre-empt possible state legislation mandating these activities in a manner beyond their control. That is, most local governments prefer to have their utilities promote customer energy efficiency on the utility's own terms, rather than on terms dictated by someone less familiar with local circumstances.

The economies of scale possible by the joint action of individual public utilities illustrated by CMUA's experience is just one example of how barriers to IRP and promotion of customer energy efficiency faced by smaller utilities can be overcome. For another, more far-reaching example in which these economies of scale can also be achieved in DSM program design, we turn now to the experience of the Bonneville Power Administration.

7. BONNEVILLE POWER ADMINISTRATION

The Bonneville Power Administration (BPA) is a Federal power marketing authority which owns and operates electric generation and transmission facilities in the Pacific Northwestern portion of the United States. BPA sells power on the wholesale market to 136 publicly-owned utilities, 12 privately-owned utilities, 16 industrial firms, and 10 federal agencies. BPA's original mission was to operate and market low-cost hydropower from the Columbia River system. During the 1960s and 1970s, because BPA was prohibited by law from constructing or owning new power plants, the region's growing electrical needs were met through the construction of baseload thermal plants (coal- and nuclear-fired) by public and private utilities whose output BPA purchased. However, during this period, an increasingly difficult set of problems were straining the region's utilities: (1) long delays in siting and licensing power plants, (2) contentious disagreements regarding the economics of BPA's reliance on thermal plants vs. conservation, (3) difficulty in arranging financing for the thermal plants, many of which had huge cost overruns, and (4) environmental concerns (e.g., decline of salmon).

In 1980, the U.S. Congress passed the Pacific Northwest Electric Power Planning and Conservation Act which sought a comprehensive solution to the region's problems. Under the Act, BPA was given an expanded role and new authority to acquire resources (including conservation) and a new agency, the Northwest Power Planning Council (NPPC), was created to develop a 20-year regional power plan using least-cost planning principles, allow for broad public participation in these processes, and develop a fish and wildlife protection program. The Council's members were appointed by the governor's in the four states primarily served by BPA and BPA was responsible for implementing actions that were consistent with the Council's regional plan.

Over the last decade, BPA and the Council have become nationally-recognized leaders in integrated resource planning and acquisition of conservation resources. BPA was among the first Federal utility to develop and promote the concept of centralized development, implementation, and evaluation of customer energy

efficiency programs (the Tennessee Valley Authority also pioneered this concept in the late 1970's). That is, BPA has designed and delivered region-wide energy efficiency programs directly to the customers of the public and private utilities that purchased power from BPA. BPA conducted pilot programs, set up ways to evaluate and measure savings, and established the financial incentives that were to be offered to customers. BPA felt this approach was warranted because conservation was a relatively new and untested resource and because many of the publicly-owned utilities were quite small with very limited staff resources.

While this approach has worked reasonably well for residential weatherization and new construction, BPA has realized that its programs must be tailored to fit local needs and conditions, particularly given the heterogeneity of commercial, industrial, and agricultural classes and the remaining conservation opportunities. Thus, BPA's current and next generation of conservation efforts will rely increasingly on programs designed and implemented by the local retail utilities with funding from BPA.

BPA has also been a leader in aligning conservation efforts to match load/resource balance. During the early and mid-1980s, the region had substantial energy surplus. In response, BPA focussed on developing the capability to deliver conservation programs by conducting many small-scale pilot programs and emphasized large-scale programs in new construction which would capture 'lost opportunity' resources.

Finally, BPA has led the way in viewing DSM program evaluation as the 'meter' on the conservation resource (BPA 1990). BPA has conducted impact, process and market assessment evaluation on nearly all of its major programs and claims that about 85% of savings have been subject to rigorous impact evaluation. These evaluations, as opposed to engineering estimates, have confirmed that the costs of saving almost 300 average MW has been 0,02 ECU/kWh.

As the experience of BPA shows, Federal power marketing authorities can play an important coordinating role in developing and, where appropriate, standardizing and even implementing utility-sponsored customer energy efficiency programs. BPA has, in effect, applied its traditional expertise as a resource aggregation entity (developed through its historic role in coordinating generation and transmission planning activities for the region) to the demand-side. In so doing, they have also demonstrated the leadership role a Federal agency can play in stimulating innovation in integrated resource planning and customer energy efficiency.

The experience of the Western Area Power Administration provides a final, and somewhat different example of the role and manner in which a Federal power marketing authority can stimulate IRP and the promotion of customer energy efficiency programs among its public power utility customers.

8. WESTERN AREA POWER ADMINISTRATION

The Western Area Power Administration (WAPA) markets nearly 10.400 MW of hydroelectric power, or about 75% of regional hydroelectric generation over more than 26.000 km of transmission lines from 51 power plants operated by various Federal agencies, and about 550 MW of power from a coal-fired power station. In 1991, WAPA sold nearly 34 billion kWh to more than 600 wholesale power customers (by sales: 30% municipal, 22% cooperatives, 13% state agencies, 11% public utility districts, 7% irrigation districts, 7% investor-owned utilities, 6% Federal agencies, 3% other) in order to provide electric service to millions of customers in 15 central and western U.S. states.

However, with few exceptions, power marketing is only one aspect of the Federal government's involvement with these facilities. Most of the hydroelectric plants were originally developed to provide irrigation, flood control, and to a lesser extent recreational benefits, with power generation being an important by-product. In other words, in view of the multiple, public services provided, the Federal government will likely have a continuing obligation to operate these facilities in order to balance their various benefits with power production. For example, power production from these facilities has always been subject to significant operating constraints stemming from various water use policies and obligations.

Consistent with this broader mission WAPA (unlike BPA) is not obligated to plan for the energy resource

needs of its customers, but only to market the Federal hydroelectric resources "...in such a manner as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles" (WAPA 1991). In fact, WAPA's rates are typically among the lowest available to wholesale power customers ranging from under 0,01 ECU/kWh to slightly more than 0,03 ECU/kWh. As a result, WAPA must allocate its power resources among its customers. Some customers depend wholly on WAPA to meet their power requirements. The low cost and consequent desirability of WAPA power by its customers places WAPA in a unique position to influence the actions of its customers.

Based on a 1990 review of its Conservation and Renewable Energy Program, WAPA began a new program called the Energy Management Program that would link its power resource allocations with long-term energy planning and customers' efficient energy use. In June 1992, WAPA announced a tentative preferred plan, calling for all WAPA customers to prepare an integrated resource plan (WAPA 1992). WAPA's internal planning activities have since been superseded by the Energy Policy Act of 1992 passed by the U.S. Congress. The Energy Policy Act places specific requirements on IRP's prepared by WAPA customers including: (1) identification and comparison of resource options, (2) two-year and five-year action plans, (3) use of least-cost options, (4) minimization of environmental impacts of new resources, (5) full public participation, (6) inclusion of load forecasts, and (7) provision of performance validation methods. As with BPA, WAPA is committed to working with its customers to assist them in complying with the regulation. Extensive technical support is currently being coordinated by WAPA.

The penalty for non-compliance is anticipated to be rate penalties that increase over time for three years. If non-compliance persists for more than three years, the customer will lose their total WAPA allocation. It is important to note that the IRP requirements do not explicitly link WAPA resource allocations to the outcome or implementation of the IRP filing, but the prospect of this occurring will clearly be a motivating factor for customer utilities. The details of WAPA's evaluation criteria are currently under discussion.

Although the final form of the WAPA IRP filing requirement is still under development, the explicit linkage between IRP and future low-cost WAPA resource allocations represents a distinct and certainly more aggressive approach by a Federal agency to influence the actions of their utility customers. It is, however, consistent with WAPA's mission to ensure that Federally subsidized power resources are used wisely. That is, the WAPA power resources are facets of hydrologic projects developed to serve multiple objectives, all of which are grounded in the presumption of an on-going Federal role. The unique Federal role is the stewardship of natural resources that would most likely not be managed efficiently (or equitably) by the private sector.

9. SUMMARY

We examined the rationale for utility involvement in the promotion of customer energy efficiency as part of an economically sound integrated resource planning process. We find that it applies universally to all utilities, although the mix of energy efficiency resources depends critically on conditions unique to each utility. We have also reviewed the experiences of a large public power utility, a public power association, and two Federal agencies to illustrate the multiplicity of strategies being employed to mobilize energy efficiency by public power utilities. The SMUD experience provides *prima facie* evidence for our claim that IRP and utility promotion of customer energy efficiency are no less compelling or viable an option for public power utilities than they are for investor-owned utilities, operating in the public's best interest. The CMUA experience illustrates how a municipal utility association can exploit economies of scale in DSM planning for the benefit of smaller municipal utilities initially lacking the resources, staff, or experience to undertake these activities on their own. The BPA experience shows the leadership role a Federal power agency can play in centralizing the design, implementation, and evaluation of innovative and resource-sensitive customer energy efficiency programs, again exploiting scale economies. Finally, the WAPA experience demonstrates the stimulus a Federal agency can provide by tying the availability of its low cost resources to customer adoption of IRP principles.

In each example, we found that the promotion of customer energy efficiency did not stem from state-

directed rate-regulation. Instead, each activity resulted from a confluence of events that led to adoption of IRP principles and, where economically justified, the promotion of customer energy efficiency. In each case, however, the absence of state-regulation should not be confused with the absence of any intervention by outside influences, many of which had their basis in some form of intervention by government agencies.

On this last score, it is only fair to acknowledge that institutional change is rarely automatic and that action-forcing circumstances have in fact played a critical catalytic role in transforming these utilities from sellers of electricity to providers of energy services. Creating these opportunities for institutional change, when the public interest is clearly well-served by them, seems to us the appropriate role for government intervention, whatever the circumstances. The modern electric utility, itself, is a product of government intervention in electricity markets; in this case, governments grant franchises for the provision of reliable electric service in an exclusive service territory in return for protections to prevent the abuse of monopoly power thereby conferred.

More broadly, governments are always involved in conditioning the operation of all markets no matter how 'deregulated' they may at first appear to be. Public health and safety standards are perhaps the most familiar government 'interventions' in an otherwise 'free' market. What is at issue is the degree of regulation involved. In the case of energy efficiency opportunities, governments have an important role to play in motivating all affected parties to acquire these resources when cost-effective and appropriate. The issue of the appropriateness of involving one affected party (such as utilities through application of IRP principles) versus others (such as manufacturers through equipment standards or utility customers through improved pricing and access to information), moreover, should be considered carefully in the context of the short-comings of energy markets leading to the existence of these opportunities. This consideration will often conclude that a multiplicity of government roles, rather than exclusive reliance on one, is the best strategy for securing the benefits of a least-cost energy future. This finding should hardly be surprising considering the diverse, decentralized, and diffuse nature of energy efficiency resources.

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