ACQUIRING ENERGY EFFICIENCY MORE EFFICIENTLY

93-23

Northwest Power Planning Council

October 26, 1993

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October 26, 1993

MEMORANDUM

TO: Interested Parties

FROM: Tom Eckman, Conservation Manager

SUBJECT: Council Issue Paper On Conservation Acquisition

Enclosed for your review and comment is a Council staff issue paper entitled "Acquiring Energy Efficiency More Efficiently." The Council, in preparation for updating its 1991 Power Plan, believes that it's time to take stock of how we are acquiring conservation in the Northwest. With increased competitive pressures facing electric utilities, the continued low cost of natural gas-fired generation, and the knowledge we have gained over the last decade, it may be time to modify our approach to conservation acquisition. Give the paper a read and let us know whether we are headed in the right direction, or just spinning our wheels.

The Council will be taking public comment on this issue paper at its December 8-9 Council meeting in Portland, Oregon, at the Council's central office. Written comments will be accepted through Friday December 17, 1993.

Enclosure.

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Introduction

Can electric utilities continue to acquire the efficiency resource in the ways that have been employed since the early 1980s, or are there potentially more efficient and effective ways to secure energy savings that should be given serious consideration? That is the question this paper explores.

Energy conservation programs have been a success in the Northwest. In the first decade following the passage of the Northwest Power Act in 1980, the region's electric utilities captured nearly 475 average megawatts of energy-efficiency improvements through conservation programs. These energy savings cost significantly less than alternative electrical resources available during that period.

In addition, there were significant efficiency gains attributable to improved residential and commercial energy codes. During this decade, the two most populous states in the region, Oregon and Washington, and several local jurisdictions in Idaho and Montana, adopted energy codes for new residential and commercial buildings that are the among the most rigorous in the nation. These codes will result in several hundred megawatts of savings. Utility support has been critical to implementing these codes.

At the federal level, minimum efficiency standards were established for major residential appliances. Also at the federal level, the National Energy Policy Act of 1992 established new efficiency standards for some lamps, lighting equipment, electric motors, commercial heating, ventilating and air conditioning equipment and shower heads. These standards will result in savings that do not have to be sought through utility programs.

The Northwest Power Planning Council's 1991 Power Plan sets an ambitious goal of acquiring an additional 1,500 average megawatts of cost-effective efficiency savings by the end of the decade. So far, the Council's tracking effort indicates that the region is on the path to achieving its conservation goals. Efficiency continues to be an attractive resource. It is environmentally benign and is not subject to risks of fluctuating fuel prices. Analysis carried out since the adoption of the plan has shown that even with the lower natural gas prices experienced recently the acquisition of conservation resources of this magnitude remains regionally cost-effective. That analysis showed that if only 60 percent of the projected energy savings are achieved instead of the 85 percent called for in the plan, it would have a present value cost to the region of approximately $1.8 billion.[1]

Despite the successes of the past decade, there is reason to question whether the region can continue to acquire energy savings in the ways employed since the early 1980s. The changing utility environment may call into question the means by which we acquire the conservation resource.

There are two key factors in this new environment. First, the benchmark resource with which efficiency must compete is no longer a capital-intensive, long lead time, inflexible and expensive coal plant, that costs two to three times more than the average efficiency resources. Now the competition is a low capital cost, short lead time, highly flexible and relatively clean natural gas-fired combustion turbine. The levelized cost of power from a combustion turbine is not much more than the cost of the average efficiency resource. At the very minimum, this implies that developers of efficiency must be very cost-conscious if they wish to compete.

In addition, because combustion turbines have low capital costs and utility revenues are not reduced as they are with conservation, there will be slightly smaller impacts on rates with combustion turbines than with efficiency improvements.[2] Because the costs of conservation are essentially all front loaded capital costs, the rate impact of the conservation will be greatest in the near term. However, as gas prices rise, the power from combustion turbines will begin to be more expensive than most efficiency resources in the long run.

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[1]See *The Implications of the Current Gas Price Outlook for Conservation Targets - Status Report*. October 7, 1992. Northwest Power Planning Council.

[2]Council staff estimated that if the 1991 Power Plan's conservation targets are achieved, the average price of electricity would be slightly more than 2 percent higher in the year 2010 than if new low-cost gas-fired generating resources were purchased. However, the region's total bill for electricity would be $586 million **lower** due to the energy savings. See June 16, 1992 memo to Council members from Terry Morlan regarding the rate and bill effects of Council's conservation programs.

The rate impacts of conservation interact with the second major factor in the changing utility environment -- increasing utility concerns about their competitiveness. As the utility industry restructures itself in response to ongoing technological and regulatory changes, many utilities are becoming concerned about their ability to be competitive suppliers. This is certainly the case with the Bonneville Power Administration's concerns about being a competitive wholesale supplier of electricity. It is also a concern for some retail utilities that fear the loss of major industrial or commercial customers to lower-price power providers. Some are beginning to question whether demand-side management can be sustained in a more competitive utility environment.[3] Will utilities concerned about near-term rate competitiveness continue to invest in a long-term resource like efficiency?

The Challenge: Maximize Efficiency Gains While Minimizing Costs

The current approach of utility efficiency programs evolved in the early 1980's. It is retail incentive-oriented, house-by-house, building-by-building, factory-by-factory. Utility conservation programs are designed to overcome market barriers to retail customers investing in conservation. Retail customers were first offered consumer education about their energy use in the hope that better information would stimulate efficiency improvements. When utilities recognized that information alone was inadequate to garner sufficient energy savings, they began offering financial assistance in the form of low-interest or no-interest loans to improve the economics of consumer conservation investments. Consumers are now being offered a wide range of rebates and grants if they purchase and install more efficient water heaters, lights, ballasts, motors, heating, ventilating and air conditioning equipment and other major appliances.

These approaches are both capital and staff intensive. To achieve high penetration rates, utilities must directly and successfully intervene in millions of consumer decisions. When few utilities were undertaking aggressive conservation acquisition efforts, targeting individual consumers in one's own service territory was a logical response. However, in an era where many utilities are undertaking demand-side management programs, it is now possible to consider whether collectively utilities can achieve some economies of scale in their conservation acquisition efforts through market intervention at other than the retail level.

Re-Inventing Conservation Acquisition

An alternative approach for acquiring the energy-efficiency component of an energy service is to first ascertain where the utilities' best buys can be obtained. This approach divides the energy-efficiency market into two sources of supply. 1) equipment -- for example, lights, motors, appliances -- and 2) systems -- for example, complex buildings, industrial processes. Once the best buys from each

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[3] For example, see Studness, Charles M., "Utility Competition, DSM and Piano Bars: The Fatal Flaw," *Public Utility Fortnightly*, August 1, 1993, pp 35-37.

of these sources have been determined, then utilities can exercise their collective power as consumers seeking to purchase energy efficiency to alter the marketplace. The strategy for acquiring energy efficiency outlined below is designed to capture energy-efficiency improvements in equipment through market transformation ventures. It focuses utility customer contact programs on the acquisition of efficiency gains available from improving a customer's energy service systems.

Electric energy use in the residential and small commercial market is dominated by the efficiency of individual pieces of equipment in a very large number of installations. Even in a typical electrically heated home, approximately half of the electricity used is consumed by water heating, lighting and other appliances.

Rather than try to influence every individual decision maker to buy efficient equipment, it may be less costly and more effective to transform markets so that only efficient equipment is available. The efficiency of the installed base of this end-use equipment will improve over time as the existing stock is retired. Even if a utility has an immediate need for new resources, it may be more cost-effective to allow natural appliance stock turnover to drive the efficiency gains in these small end uses rather than incur the relatively high administrative cost of obtaining the savings if done site-by-site. Similarly, efficiency gains in the equipment employed by large commercial and industrial customers (for example, motors) can also be obtained as the equipment is replaced.

On the other end of the spectrum, there are large efficiency gains that can be achieved by improving the *energy service system* when equipment is being replaced or added. For example, replacing a large, old, inefficient motor, with a new efficient one may result in a 2-to-3 percent gain in efficiency. However, it may be possible to achieve a 10-to-20 percent improvement in efficiency by replacing the old motor with a new high efficiency one <u>and</u> a variable speed drive. Even greater savings may be achieved when process changes are undertaken.

The number of these opportunities is relatively small compared to the numbers in the residential and small commercial markets, and the degree of staff involvement required is high. But the individual payoffs can be quite large. This approach also gives the utility the opportunity to provide much better service for its key customers.

This strategy consists of five elements:

1. Transform the market for new equipment through utility, government and industry collaboration.

2. Coordinate government actions and utility programs to transform building design and construction practices to meet higher levels of efficiency.

3. Concentrate utility demand-side management efforts on improving the system efficiencies of those customers who are most sensitive to increases in the cost of energy services.

4. Maximize customer systems by collaborating with product manufacturers, designers, engineers, etc.

5. Market energy efficiency to customers as part of a package of energy services (e.g. power quality, environmental compliance, improved productivity, better quality working conditions, etc.) so that utility involvement adds multiple benefits for the customer.

1. Transform the market for new equipment through deliberate utility, industry and government collaboration.

The market for energy services is made up of customers who make choices among combinations of equipment and fuels to deliver the energy services they desire. For our purposes, a market transformation would make more efficient products, processes and practices widely available and used. These changes may be the results of programs that educate and demonstrate the benefits of energy-efficiency improvements, changes in technology that create new products, or changes in demand sufficient to dramatically alter the price and availability of products.

Market transformation ventures target equipment manufacturers and distributors, or appliance standards and building codes to achieve wholesale change in the market rather than site-by-site energy savings. At least two large-scale market transformation strategies have been implemented in the United States. The first strategy is designed to transform the efficiency of a specific manufactured product through coordinated consortium purchases. The second strategy seeks to transform building practice through coordinated utility programs and government actions.

Examples of efforts to transform the energy efficiency of manufactured equipment through deliberate coordination of utility purchases include the Northwest's Manufactured Housing Acquisition Program (MAP) and the national Super Energy-Efficient Refrigerator Program (SERP). Rather than provide rebates to individual consumers who purchase a new energy-efficient manufactured home or new energy-efficient refrigerators, utilities banded together to purchase the energy efficiency "factory direct." This approach has five advantages over programs that offer customers rebates for efficiency purchases.

First, by offering an incentive directly to the manufacturer, rather than to retailers, distributor and retail markups are reduced, keeping unit costs down.

Second, substantially higher market penetration can be accomplished at a much reduced administrative cost. For example, only 18 manufacturers and 30 utilities had to agree to the terms of the manufactured housing program instead of 12,000 home purchasers each year. Once manufacturers agreed to produce only energy-efficient structures, utilities could eliminate costly marketing efforts and related administrative overhead.

Third, when the program results in a substantial increase in market penetration, some of the components that are used to make the equipment more efficient may be reduced in price due to economies of scale. Through the manufactured housing program, for example, the cost of high performance windows came down 40 percent. Insulation costs dropped 30 percent.

Fourth, once resources are captured through market transformation programs, utilities can devote more of their scarce resources to other conservation efforts that require direct customer contact. For instance, instead of maintaining extensive lighting equipment rebate lists and processing rebate claims, utility and trade ally staff can allocate more of their time to helping customers develop more efficient lighting systems.

Finally, by targeting market transformation efforts on equipment that is subject to state or federal standards, it may be possible to reduce or eliminate the need for continued utility financial assistance. One of the explicit purposes of the efficient refrigerator program, for example, is to demonstrate an advanced energy-efficient and "environmentally friendly" refrigerator prior to the next revision of the federal appliance efficiency standards. Similarly, the manufactured housing program demonstrated that highly energy-efficient manufactured homes could be built on a production line and be designed with features consumers accept. This customer acceptance refutes arguments against increasing the stringency of new federal energy standards for manufactured housing.

On the other hand, there are at least three potential pitfalls to implementing the wide range of market transformation ventures needed to capture all cost-effective conservation: one is political, one practical and the third is legal. Generally speaking, it is unlikely that all utilities would need to participate in a market transformation venture for it to be successful. Non-participants will be able to take advantage of the impact of the joint actions of others without incurring any of the costs. In a rather perverse sense, then, there is a possibility that some utilities will establish a new form of "free ridership." In fact, in both SERP and MAP there are non-participant utilities that benefit without paying their share of the costs. Such inequity is acceptable if the only alternative to acquiring the energy efficiency through market transformation is for each individual utility to incur much higher costs, operate retail programs for longer periods or both.

On the practical side, significant effort will be needed to establish accurate methods for tracking the costs and benefits of collaborative programs. Each utility should only pay for and be credited with those efficiency gains that accrue in its service territory. Since utilities will be required to develop methods to track the impact of their conventional demand-side management programs, a more coordinated approach should not require substantially more resources. Indeed, it may be more efficient to establish one tracking system for a particular type of equipment (e.g. compact fluorescent lights, high-efficiency refrigerators, motors, ballasts, etc.) for multiple utilities, instead of having each utility develop its own independent system. This is particularly true if the existing industry's inventory tracking system can be modified to carry out this function.

The third factor that may hinder market transformation ventures is that someone may view such collaborative efforts as restraint of trade or price fixing. Such charges could be dismissed if the market transformation venture is carried out through an open and competitive process. Moreover, since utilities are buying only the energy-efficiency component of a product, they do not dictate the price a supplier charges the consumer. For example, under the manufactured housing program, the region's utilities purchase $2,500 worth of energy savings from each new electrically heated manufactured home built for the Northwest. The price the manufacturers charge dealers for these homes is negotiated between the manufacturers and the dealers. The price the dealer charges the home buyer is also agreed to through independent negotiations.

A national consortium of utilities, federal agencies and environmental groups, the Consortium for Energy Efficiency (CEE), has formed to identify and pursue similar market transformation ventures. The Western Utility Consortium (WUC), comprised of utilities and other interested parties from California and the Northwest, has formed to pursue projects of a more regional nature. Over the course of the next 10 years, federal efficiency standards for 15 residential appliances and more than a dozen types of commercial scale equipment and appliances will be established and/or updated. Table 1 shows the U.S. Department of Energy standards rule making schedule. Each of these processes represents an opportunity for utilities, acting in concert with government and industry, to secure energy efficiency at a reduced cost to the utility system compared to retail rebate programs.

Not all energy service equipment is covered by national standards. Also, in some instances, the date the standards take effect does not correspond to the utilities need for energy savings. Under these circumstances, it may be necessary to establish joint utility programs to purchase the energy efficiency until the standard takes effect or the market for the product has been transformed.

Table 1
Efficiency Standards Established under the
National Appliance Energy Conservation Act of 1987 (as amended in 1988)
and the Energy Policy Act of 1992

Product	Effective Date of Initial Standard	Revisions Legislated (Actual)
Refrigerator and Freezers	1990	1993/98/2002
Clothes washers	1988	1994/98
Clothes dryers	1988	1994/98
Dishwashers	1988	1994/98
Ranges and Ovens	1990	1995 (98)
Water Heaters	1990	1995 (98)
Room Air Conditioners	1990	1995 (98)
Central Air Conditioners	1992-93	1999/2006
Heat Pumps	1992-93	1999/2006
Furnaces and Boilers	1992	2002
Direct Heating Equipment	1990	1995/2002
Pool Heaters	1990	1995 (98)
Ballasts for Fluorescent Lamps	1990	1995 (98)
Fluorescent Lamps	1994-96	Revision schedules
Reflector incandescent Lamps	1996	to be determined
Electric Motors (1-200 horsepower)	1998-2000	"
Packaged Commercial Air Conditioners and Heat Pumps	1995-96	"
Commercial Water Heaters	1995	"
Commercial Furnaces and Boilers	1995	"
Showerheads	1994	"
Faucet aerators	1994	"
Toilets and urinals	1994-97	"

Two types of collaborative purchases can be used to reduce the cost of energy-efficiency improvements. The most straightforward is to purchase the energy-efficiency component of some commodity that is already being supplied to the marketplace. For example. the efficient refrigerator program will make payments to the manufacturers of refrigerators that won the competition. Note that the payment is to the *manufacturer* not the retail buyer. Where possible. the manufacturer should handle the administrative burden of tracing its production to the final customer, not the utility. The primary targets for joint purchases are markets where competition is already strong, hence margins are low, and the more efficient products are commercially available, but carry a price premium. For example, nearly all of the items that show up on the lighting and equipment retail rebate lists of utilities in this region could be bought less expensively from manufacturers than retailers.

Utilities collectively purchase or lease significant quantities of office equipment, including computers, printers, telecopiers and photocopiers. As a first step, the region's utilities could agree to buy equipment that satisfies the specifications adopted by the Environmental Protection Agency's *Energy Star* program for computer equipment. By buying efficient equipment for themselves, utilities can add their market power to the federal government's to increase the availability and perhaps reduce the cost of more efficient office equipment.

Some demand-side management measures produce savings and benefits for other kinds of utilities. For example, energy-efficient shower heads and horizontal axis clothes washers reduce water and wastewater treatment demands. To expand the bulk purchasing power of the electric utilities, water and sewer utilities could collaborate with electric utilities on such water-related market transformations. For example, in the Seattle area, electric utilities, the gas utility and local water utilities participated in a joint effort to distribute energy-efficient shower heads.

2. Coordinate utility programs and government actions to transform building design and construction practices to meet higher levels of efficiency.

The use of coordinated government actions and utility programs appears to be the most cost-efficient strategy for acquiring conservation savings in new buildings. This strategy has already been demonstrated. When the Council adopted its first regional power plan in 1983, it called upon the Northwest's state and local governments, the Bonneville Power Administration and utilities to initiate three programs whose goal was to dramatically change residential building practices. One was a demonstration program designed to develop cost and performance data for new efficiency standards as well as give builders experience in building to the standards. Another program, the Northwest Energy Code program, was designed to encourage state and local governments to adopt substantially more-efficient energy codes. The third program was a utility marketing program (Super Good Cents) to encourage builders to voluntarily adopt energy-efficient building practices.

The three programs were designed to complement each other. Where there were opportunities that made it possible to adopt the new standards as a local energy code, they could be seized. Where individual builders or buyers wanted to build to the new standards, they could do so with the assistance of their utility. Under both the code adoption program and the utility marketing program, payments were made to the home buyer to cover some of the increased cost of building to the higher levels of energy efficiency. Utilities also covered increased building code enforcement costs for local governments.

As a result of these three programs, approximately 85 percent of the new electrically heated, single-family residential construction and 90 percent of the new electrically heated multifamily construction in the Northwest is now covered by energy codes that reduce space heating requirements by more than half of what they are in houses built to codes established in 1983. This market transformation was accomplished in less than six years.

This approach continues to be applicable to new residential and commercial buildings where regionally cost-effective savings have been identified. However, these programs have been the subject of two criticisms. The marketing element of this strategy (Super Good Cents) has been accused of paying for "free riders." It has been asserted that many participants in this program would have built an energy conserving home with many of the same efficiency measures whether the program -- with its financial incentives -- existed or not.

In response to this argument, it should be noted that the primary objective of the program is a long-term market transformation rather than just immediate acquisition of savings. One measure of the success of this strategy is that energy codes rigorous enough to capture all energy savings that are economical for consumers have subsequently been adopted in large portions of the region. Super Good Cents was also effective in helping a significant fraction of the building industry (and its suppliers) gain familiarity with the techniques and products needed to meet the new efficiency standards. As a result of Super Good Cents and the Northwest Energy Code programs, roughly 25 percent of new electrically heated Northwest homes were already being built to the standards when the standards were adopted as statewide codes in Oregon and Washington. (For a more thorough discussion of the economics of these programs viewed from a market transformation perspective see Schwartz, Howard, et al. *Getting to Code: Economic Costs and Benefits of Implementing Washington State's Residential Energy Code. WSEO 93-185.* Washington State Energy Office. Olympia. July. 1993.)

The second criticism leveled against the Northwest's strategy is that it has relied on the utility industry to provide financial support for energy code enforcement. The utilities have argued that building permit fees should be raised to cover the increased cost, if any, of enhanced energy code enforcement. Just as ardently, local and state governments, already financially strapped, argue that if utilities want better control of the energy features of new buildings they should provide support for accomplishing the task. This issue must be resolved if the region is to continue to rely on codes as a mechanism for transforming the energy efficiency of new buildings.

Market transformation of site-built housing through the use of better codes and utility programs might be made even more effective if existing market players can be induced to cooperate in the effort. The Federal National Mortgage Association (Fannie Mae) has begun to discuss with investor-owned utilities the possibility of providing the capital for carrying out residential conservation programs. This could provide lower-cost capital for many utilities. Additionally, utilities could help provide more attractive financing for either retrofitting existing properties or buying energy-efficient new properties if they pooled their retail program dollars to "buy down" interest rates for homes or commercial buildings that meet certain energy-efficiency standards. This would make energy-efficient properties more affordable, while encouraging the existing financial community to market the availability of these lower-interest loans, potentially reducing the need for utility marketing efforts.

3. Concentrate utility demand-side management efforts on improving the system efficiencies of those customers who are most sensitive to increases in the cost of electric energy services.

Not all customers are equally sensitive to the cost of electric energy services. For example, residential and small commercial customers' lighting and refrigeration services are not subject to competition from alternative electricity providers. Large commercial and industrial customers, however, have co-generation and self-generation alternatives that may be more economically attractive than continued electricity purchases from a utility or they may be able to get lower price service from an adjoining utility.

Utilities can address the real or perceived competition from alternative electric energy service providers by focusing their direct staff efforts and the work of their trade allies to improve the energy using systems of their large commercial and industrial customers. First, since it appears that efficiency gains achieved in large commercial and industrial facilities, which have proven to be less expensive than in other market segments, the kilowatt-hour cost of the savings will be lower. This translates into less upward pressure on rates. Second, because the efficiency gains reduce the energy used per unit of production, the potential impact of rate increases on a customer's decision to switch to an alternative energy service provider is lessened.

Equipment employed in large commercial buildings or industrial facilities may be subject to market transformation ventures. However, the efficiency of the electric energy service systems of these large customers cannot be reached through market transformation ventures. Improving the energy efficiency of industrial processes and complex lighting, heating, ventilating and air conditioning systems requires specialized onsite expertise. Moreover, experience has shown that changes in these systems are often only undertaken when the customer trusts the utility. Typically this trust is developed over the course of time between plant / building personnel and utility / trade ally personnel. Fortunately the need for such staff intensive marketing can be justified because there are likely to be large savings from these customers.

4. Maximizing the ability to achieve potential energy savings from improving energy-using systems through collaboration with product manufacturers, designers, engineers, etc.

There is an existing network of experts engaged in providing equipment, designing systems, carrying out installation, maintaining and repairing energy service equipment. This network represents a ready-made energy-efficiency delivery system if properly employed. Programs that tap this network should attempt to build alliances with trade allies selling different types of equipment and services (e.g. motor vendors, drive system vendors, lighting contractors), so that they can intervene at different places in the sales chain where decisions are made.

One approach to accomplishing this is to design programs that encourage contractor-initiated projects. Puget Sound Power and Light operates a program that encourages commercial lighting contractors to sell their clients efficient lighting systems. Puget reviews the designs and inspects the work, but it does not have to do any of the marketing, system design or auditing.

Other trade ally networks that can be tapped include lighting and HVAC design firms, equipment vendors, building maintenance firms and HVAC contractors and engineering firms that specialize in specific industrial processes. If utilities with adjoining service territories collaborate to establish programs that encourage trade ally activities, there will be a sufficient number of potential projects to make it worth the allies time and attention to participate.

It is important that utilities work with trade allies and vendors so that their programs influence existing transactions, rather than induce new sales. This can be done by establishing financial incentives that more closely resemble the incremental replacement cost of energy service equipment and systems, rather than payments that cover the total cost of new equipment and systems. It is also critical that vendor / trade ally programs be designed to avoid "opportunity sabotage," i.e., the installation of measures that get only a portion of the available savings, while rendering it uneconomical to get the remainder. In the commercial sector, a frequent example of opportunity sabotage occurs when contractors install efficient bulbs and ballasts in a fixture where it is more cost-effective to totally redesign the lighting layout. Opportunity sabotage also often results from rebate programs where utilities pay for equipment without analyzing whether it is the best equipment available. Under many rebate programs, contractors profit most from installing the highest volume of equipment. This leads them to promote measures that require minimal analysis and customer contribution, and are easiest to install. These are often not the measures that provide the most savings.

5. *Market energy efficiency as part of a package of utility energy services.*

Experience has shown that customers, particularly large commercial and industrial customers, do not view improvements in the energy efficiency of their buildings and facilities from the utility's perspective. These customers have other demands on their time and resources. Consequently, energy-efficiency improvements are frequently undertaken as part of a larger corporate agenda, such as plant modernization, mitigating power quality problems, satisfying more stringent environmental regulations, etc. Utilities and their trade allies will likely be more successful if they market their energy-efficiency projects as part of a package of services that meets the client's more immediate needs than as an isolated proposition. For example, one California utility is surveying its large industrial customers to ascertain what they will be required to do to meet the requirements of the Clean Air Act. The utility then works with these customers to develop energy-efficiency improvement packages that are linked to the scheduled investments needed for air quality enhancements.

Summary - Meeting the Challenge

The changed environment in which utilities operate dictates that they revise their approach to the acquisition of energy efficiency. The market they must compete in is not for "low-cost energy," but for "low-cost energy *services*." To remain competitive, a utility must provide not only low rates, but the lowest cost means of achieving the energy service (e.g. cooking, heating, cooling, pumping, smelting, etc.). A utility must not only seek to minimize the impact on its *rates* of new resource acquisitions, it must also minimize the impact of its resource acquisitions on its customers energy ***bills.*** It must seek to provide "value-added services" to customers that they cannot obtain elsewhere.

The strategy set forth in this paper seeks to reduce both the utilities' cost of acquiring energy efficiency (in order to minimize its revenue requirements) *and* the total cost to society of the resource acquisition. Utilities collectively -- potentially in collaboration with government -- can permanently transform the market for energy efficiency at a lower cost and faster pace than if they operate as individual entities. It also assumes that utility and trade ally staff are most effectively deployed to achieve energy-efficiency gains in large commercial and industrial facilities. Direct personal contact with these customers is not only justified because of the magnitude of the savings potential, but because it is necessary to demonstrate that the utility is providing the most economical energy services rather than just cheap kilowatt-hours.

This does not mean that traditional utility demand-side management programs can be abandoned. This transition will entail a gradual winnowing of today's programs as market transformation ventures substitute for individual retail utility activities. Some existing utility energy-efficiency programs, although expensive, will no doubt be maintained for legitimate equity and customer service reasons. Others will be maintained because no workable market transformation venture can be designed or implemented to capture the savings cost-effectively or in a timely fashion.

The following summarizes recommendations for the design, management and evaluation of the next generation of demand-side management programs. It also sets forth guidelines for governmental policies that could facilitate utility demand-side management initiatives.

1. To improve our ability to meet our conservation goals, the next generation of demand-side policies and programs must focus on the transformation of entire market segments while tailoring programs to meet the specific needs of those markets not amenable to transformation.

2. Market transformation programs should be designed to make use of existing infrastructures (manufacturing, distribution and delivery) wherever practical. I.e., we should build bridges not bureaucracies.

3. Acquisition of energy efficiency from manufacturers and distributors of major energy-consuming appliances and other products should be approached by utility consortia following the SERP and manufactured housing program models (linking utilities with key markets, e.g., chains and franchises, multi-site industrial, motors, lighting equipment, etc.).

4. The private sector (trade allies, vendors, energy service companies, etc.) needs to target its efficiency improvements at market segments that are not targeted by utility or government actions. The private sector will go where the profits are, so utilities need to work with customers to help make energy management profitable, and with vendors/contractors to make high-quality energy services profitable.

5. To avoid "opportunity sabotage," particularly in competitive bidding and vendor/contractor-driven rebate programs, utilities should specify the demand-side measures, then call for bids for hardware, installation and upkeep.

6. Quality control mechanisms, such as building commissioning and operation and maintenance requirements, should be inherent in program designs rather than imposed after-the-fact.

7. Conservation acquisitions should be scheduled so that the type and pace of acquisitions can be matched to the resource needs of the utility and to minimize costs by taking advantage of market opportunities when they occur.

8. Programs that acquire cost-effective lost-opportunity resources should receive top priority and should be budgeted on the level of new construction and major remodel/renovation activity.

9. Programs that acquire efficiency improvements that can be deferred when a utility is in resource balance should be operated only at the level needed to build and maintain the infrastructure necessary to secure such resources.

10. Programs that are targeted at market segments that will take considerable time to penetrate and transform should be started and paced with this characteristic in mind.

11. When a utility is in a period of resource surplus, it should use this time to build the capability to acquire conservation, including the development of cooperative agreements needed to take advantage of joint purchasing power.

12. When near-term resource needs are large, governments and utilities should cooperate to secure the largest, most economical resources first. These resources typically are characterized as having centralized decision-making and contracting authority. An example is chain stores where energy management investment decisions are made at corporate headquarters.

13. Indices for monitoring/evaluating conservation program progress should be consistent with those used to establish conservation targets, i.e., if the target is stated in terms of the gross penetration achieved by a specific technology, then progress should be based on the total penetration achieved by both program participants and non-participants. In some cases, free riders may be more appropriately viewed as "early adopters," and conservation actions taken by non-participants (free drivers) should count as additional program benefits, not as a reduction in program impacts.

14. Impact evaluation results should be used prospectively, to encourage innovation, unless all parties agree that acquisition payments are to be based on verified performance. Both process and impact evaluation findings should be communicated quickly to decision-makers so programs can be adjusted accordingly.

15. Utilities must be given an intrinsic responsibility to aggressively pursue conservation. Institutional rules and policies that financially reward actions that result in efficiency improvements and market transformation should be set in place by utility regulatory agencies. These include the recognition of utility investments in conservation as equivalent to investments in generation for rate treatment and taxation purposes, and the decoupling of utility sales from profits.

16. For market transformation ventures, the cost-effectiveness of utility investments that result in free riders should also be adjusted to account for non-participating consumers who make efficiency investments on their own, i.e., free drivers. In addition, utilities should receive credit and/or rate treatment for investments in programs that are explicitly designed to induce market transformation, including support of more energy-efficient building codes and appliance/equipment standards.

17. Federal, state and local government energy policies and utility demand-side activities should be coordinated with regard to improving building, appliance and equipment efficiency standards.

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