

ACQUISITION APPROACHES FOR DEMAND-SIDE RESOURCES

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The Bonneville Power Administration (Bonneville) is responsible for providing power resources to retail utilities in the Pacific Northwest region. Power surpluses that have been available in the 1980's, are all but exhausted. The agency plans to increase resource acquisition activity significantly over the next several years. Plans are now being made for the acquisition of both demand-side and supply-side resources. As part of its resource planning process, Bonneville is considering a number of approaches for resource acquisition, including agency-designed programs, programs designed by retail utilities and others, energy pricing, codes and standards, competitive acquisitions, targeted competitive purchases, billing credits, unsolicited proposals, transactions with utilities in other regions, development of resources by Federal agencies, and joint operating organizations. All but the last two are pertinent for demand-side resources.

The best acquisition approach for demand-side resources depends on the characteristics of the specific resource and the relative priority of differing utility objectives. This paper analyzes each approach in terms of ability to meet the following objectives; applicability to a broad range of resources, minimizing utility and societal costs, regional equity, consumer service, comprehensiveness, flexibility and stability of the delivery system, and risk sharing. Recommendations are made for packaging a combination of approaches for different resources that best meet the objectives of Pacific Northwest utilities and power planning agencies.

INTRODUCTION

The Bonneville Power Administration (Bonneville) is a Federal power wholesaler responsible under the Pacific Northwest Energy Planning and Conservation Act for providing electric energy resources to retail utilities throughout the Pacific Northwest. Through the late 1980's, Bonneville has enjoyed a surplus of energy resources, but is anticipating a need to increase resource acquisitions over the next several years. In the 1980's, the majority of Bonneville's resource acquisitions came from conservation programs designed and centrally controlled by Bonneville personnel, and implemented by retail utilities. As Bonneville looks at expanded levels of conservation and generation acquisition in the 1990's, there are questions about whether or not this is the most effective mechanism

for resource acquisition. A number of new approaches, such as competitive acquisition, are being successfully tested elsewhere in the country.

To increase Bonneville's level of preparation for acquiring resources, Bonneville, in conjunction with its retail utility customers and other interested parties, has been conducting an assessment of mechanisms for resource acquisition. In order to decide which approaches to pursue, Bonneville will need to understand how retail utilities will participate in resource development, what role independent power producers should play, and the impact that each approach will have on the quality and availability of resources and Bonneville staffing requirements. This paper summarizes some of the

observations developed and conclusions reached during the assessment of the demand-side approaches available to Bonneville, key issues which will influence the selection of approaches, the ability of each approach to meet specific objectives, and what approaches will work best where.

APPROACHES

Demand-Side Approaches

The approaches described in this section are uniquely applicable to demand-side resources (conservation, small cogeneration, and on-site renewables).

Bonneville-Designed Programs have been the main focus of conservation activity since the late 1970's. Design, overall management, quality control, and evaluation are centrally coordinated by Bonneville, with significant opportunities for advice from the program implementors--utilities, government agencies, or private contractors. Consultants, manufacturers, distributors, and developers play support roles. These programs have provided information, education, technical assistance, and financial assistance to residential, commercial, industrial, and agricultural consumers for conservation actions.

Most Bonneville-Designed programs are largely financed by Bonneville, with payments based on estimates of energy savings. Payments are made in a lump sum once measure installations are approved. Most risk of measure underperformance is assumed by Bonneville, requiring intensive management and review of customer screening procedures, facility energy analyses, measure selection, design of efficiency measures, installation, and provisions for operation and maintenance to assure savings.

Sponsor-initiated programs are developed by retail utility customers and others for targeted conservation resources identified by Bonneville. Retail utilities have recently proposed that Bonneville contract with them for a specified level of energy savings over a specified period of time. Under these proposals, Bonneville would pay a fixed price per kWh as energy is delivered, with provisions for reduced payments if savings are less than predicted.

This approach would give retail utilities considerable discretion to design program features and specifications to match the needs of their customers and their own organization. Bonneville would insist that the savings be quantifiable and verifiable, and negotiate verification procedures (e.g., inspection of installations for measures where savings per unit have been empirically established in the course of other projects, direct measurement of loads, schedules, etc. where this is needed to establish savings.) Performance risk would be shared. While limited testing of this arrangement has been carried out, a long-term program that incorporates these features has not been developed.

Codes and Standards include commercial and residential building and appliance standards. Since 1983, the Northwest Power Planning Council (the Council) and Bonneville have worked with Northwest states, utilities, and local officials to support state and local adoption of a standard energy efficiency code based on the Model Conservation Standards (MCS) for residences and commercial buildings. Bonneville also has encouraged the establishment of standards for efficiency in manufactured housing and appliances through funding of demonstration projects, marketing campaigns and consultations with regulators and manufacturers. While Bonneville has no authority to set energy codes and standards, it believes that, when properly enforced by the responsible government entities, codes and standards can contribute a significant amount of savings that otherwise may be lost to the region at a low cost to the utility system and an attractive cost to consumers.

Conservation Transfers was presented in the Council's 1986 Power Plan as a way for regional entities to work together to develop energy resources. The idea (which is further described in the paper presented by Doug Hanlon and Mark Ebberts on this panel) is that in some areas there exists low-cost conservation potential that would remain undeveloped while other utilities who need energy resources would be forced to turn to much more costly alternatives. If this low-cost conservation potential could be developed and then sold to utilities that needed the energy or capacity, all parties involved could benefit. Those purchasing the

transferred conservation would benefit by being able to acquire a cheaper and potentially more environmentally sound source of power than would otherwise be available to them, and those selling the transferred conservation would benefit by the increased energy efficiencies for customers and the additional utility revenues from the transfer sale for the utility. Major economic benefits are expected from this "sharing" of conservation resources.

Conservation transfers may encourage development of conservation resources in the Bonneville service area without reliance on Federal borrowing or revenues. Also, conservation transfers could help maintain conservation programs and the associated infrastructure (skilled labor and experienced program operators) during lean financial times.

Bonneville has been considered a key participant in such arrangements because of its generation capability to support these exchanges, and because it has the transmission interconnections, contractual mechanisms, and statutory ability to contract for power sales and conservation implementation.

Conservation transfers would not be a way of acquiring conservation savings in periods of immediate need. However, it may be one effective way of ensuring the existence of conservation measures for future periods of need. Conservation transfers might be feasible even after Bonneville's power surplus is depleted since the conservation programs would first make additional energy available before being transferred.

While the legal and administrative concept behind Bonneville's planned application of conservation transfers is unique, the overall concept could be useful elsewhere in a simpler and more direct form. Utilities with a power surplus can sell it to neighboring utilities with power needs, thus helping their customers save money by conserving and make money for the utility by selling the conserved energy.

Energy Use Pricing rewards efficient energy use with lower rates. The two most common forms are inverted rate structures and time-of-use pricing. Inverted rate structures charge customers more per unit of energy or demand if they use more. Time-

of-use pricing charges more during periods when utility loads are highest. Bonneville does not set retail rates, and has only limited influence over retail utility rate structures through the design of wholesale rate tariffs.

The impact of energy use pricing tends to be greatest for efficiency measures which are well-known, easily understood and trusted by consumers, and meet consumer's investment criteria (often more restrictive than Bonneville's). Pricing has a lesser effect on leasers and new buildings, where the person owning and constructing the building often does not plan to pay the energy bills, on low-income consumers, who lack the capital to invest, and on smaller businesses and consumers who don't have the management time or expertise to focus on energy efficiency (Gordon et. al. 1986). Utilities throughout the country have used time-of-use rates to persuade commercial, industrial, and, in some cases, residential customers, who have purchased load management equipment, to use that equipment.

Approaches Applicable to Demand- and Supply-Side Resources

Several approaches are applicable to both conservation and generation resources.

Billing Credits may provide an effective mechanism for utilities to independently develop resources to meet their load growth. Section 6(h) of the Northwest Power Act directs the Administrator to provide deductions to wholesale power bills, also called billing credits, to Bonneville's retail utility customers if they provide resources which reduce Bonneville's obligation to serve customer loads. The payments would be equal to the value of the resources which Bonneville did not need to buy because of the load reduction. The billing credit mechanism was included in the Northwest Power Act to permit local initiative in implementing conservation programs and developing generation resources. Bonneville's Billing Credit Policy was published in 1984. It provided that payments in any year should be equal to the value of savings in that year. It has not been tested, largely because Bonneville's power surplus in the late 1980's made the payments under the policy very small or negative

in the early years. At least one Northwest utility now has plans to test a credits program at the retail level.

Competitive All-Sources Bidding may provide Bonneville with the ability to systematically solicit, evaluate, and select resources that are offered by retail utilities, third parties, independent power producers and large consumers. Competitive bidding, as it has been applied elsewhere in the country, provides a means to compare and evaluate diverse resource options while providing developers with an opportunity to propose creative programs. Bonneville's Sponsor-Designed Programs of the early 1980's used competition to select conservation resources (Peters and Gustafson 1987), but did not involve competition between conservation and generation resources. While no generation contracts were awarded, the basic process used in Bonneville's 1981 Request for Resources is similar to the competitive processes that are currently being tested by utilities around the country. Most Bonneville-designed efficiency programs require competition for purchase and installation of pre-specified efficiency measures, but do not involve comparison of different resources (e.g., commercial conservation versus small hydro); the basic resource selection decisions are made in advance through Bonneville's integrated resource planning process.

Competitive Targeted Purchases are similar to competitive acquisitions, but with the request for bids narrowed to a specific set of conservation end-uses or generation technologies. This provides opportunities to define guidelines for the characteristics of the desired resource. Bonneville's primary experience with competitive targeted purchases was in the first round of the Purchase of Energy Savings Pilot Program. Under this program, bids were requested of building owners and energy service companies to provide energy efficiency retrofits of buildings in Bonneville's service territory. Nearly all of the technically credible initial bids were at or near Bonneville's stated cost ceiling for the project, resulting in a need for individual negotiation of each bid. The primary lesson regarding bidding from this effort was that, for a competitive market to result in low prices, there must be more qualified and willing resource providers and deliverers than there is work.

Unsolicited Proposals currently may be submitted to Bonneville under an established procedure. When Bonneville receives an unsolicited proposal, it is reviewed to determine whether the proposal offers significant benefits and is too unique to be included in a competitive procurement.

KEY ISSUES

Bonneville is currently discussing the following issues with customers and other interested parties:

All-Resources Issues

Managing Risk. The most important issue for Bonneville in deciding which approaches to use for resource acquisition involves the tradeoffs between two means of reducing financial risks to Bonneville due to resource failure; strong direct control (e.g., oversight over what measures are installed, the quality of installation, operations and maintenance, etc.), and transfer of financial risks and liability to resource providers (e.g., through payments over time based on measured savings, performance bonds, etc.). When project sponsors bear financial risk, it is more feasible for Bonneville to reduce the level of direct control. Some acquisition approaches more readily lend themselves to direct control while others may allow for assigning risk to others. For example, Bonneville-designed programs provide opportunities for Bonneville to specify and oversee customer screening, set energy analysis standards, review analyses and installations, conduct inspection(s), require building commissioning, and assist in ongoing operations and maintenance. Bonneville's design and management role is much smaller for competitive acquisitions and utility-designed programs, so there is a need to place more financial risk of under-performance on the entities operating the programs. This is most feasible for projects with relatively easy-to-measure loads. For example, many small and medium-sized commercial buildings have complex patterns of loads, making it difficult to cost-effectively measure savings.

Many private businesses have a higher cost of capital than utilities, making financial risk-sharing expensive. However, in situations where savings are

very dependent on performance, risk sharing approach may result in significantly more reliable long-term cost savings.

While approaches other than Bonneville-designed programs may give utilities and others the opportunity to tailor programs for small markets or unique applications (e.g., a one-of-a-kind chemical plant), it may in these circumstances be more difficult to hold others accountable for results, and for adherence to Bonneville's other objectives (e.g., environmental protection, comprehensiveness, etc.). Accomplishing these objectives may be more difficult when programs are designed by others.

Which approaches result in the lowest price? Market-oriented approaches, such as competitive acquisition and competitive targeted purchases, use competition to minimize price, while many Bonneville- and utility-designed programs use pre-established formulas to establish utility and consumer shares of project cost (the commodity purchase approach). The market approach tends to work where there are many credible competitors with similarly reliable products with similar costs. While there are few formal evaluations of bidding programs available yet, program managers have noted that, where there is a large demand for resources and few bidders, most bids tend to cluster around the utility's marginal cost, even if some resources are much less expensive.

Conservation Resource Issues

How can a stable conservation delivery system be developed and maintained while still allowing the flexibility to ramp conservation programs up or down as the need for resources changes over time? Bonneville has learned that there are limits to conservation flexibility. In the 1980's, Bonneville's investments in conservation were reduced significantly. As a result, many conservation contracting firms went out of business, and utilities and government agencies eliminated or reduced their conservation staffing. This damaged both the ability of institutions and business to accelerate conservation activity and their willingness to expand their operations in response to Bonneville plans for increased program activity.

Due to the long-term nature of utility hiring practices, utility-delivered programs are particularly sensitive to changes in program budget levels. Competitive acquisition programs may provide Bonneville an opportunity to increase the pace of acquisitions on short notice.

Should Bonneville focus its conservation efforts on the acquisition of savings from programs or projects? Significant low-cost savings can be obtained from relatively few large residential, commercial, and industrial projects. Bonneville could choose to acquire conservation resources from these projects in lieu of maintaining regional Bonneville- or utility-designed programs. By targeting projects, Bonneville can contract for a large block of savings from a single entity without the uncertainty associated with a program where savings must result from sometimes hundreds or thousands of individual transactions. However, running these projects is very different from running large-scale programs, and may not maintain the type of delivery organizations needed to run programs at a later date. It is logical to assume that competitive approaches are likely to work best where the amount of energy saved at each site is big enough to justify the needed investment in verification, and savings per facility are either well-understood based on prior studies or there are unambiguous measurement techniques. These criteria are met at large facilities with major efficiency projects, making competitive acquisition a viable approach here, although large industrial customers have in the past (Peters and Gustafson 1986) expressed preference for a non-competitive program approach. Programs need the support of a long-term institutional arrangement.

Should Bonneville seek to acquire the lowest cost conservation resources where they are available, or should Bonneville assure that program dollars are distributed throughout the region? In the past, Bonneville has maintained a regional perspective by designing and offering programs throughout the region. Consumers located in Bonneville customer service areas have generally had equal access to programs that have operated as acquisitions (weatherization, street lighting, water heater wraps,

and institutional buildings). With competitive acquisition approaches it will be more difficult to maintain an even distribution of dollars. This is a major concern for Bonneville customer utilities.

Should Bonneville continue to focus on programs designed to capture a comprehensive package of cost-effective measures, or should single measure programs be offered as long as lost opportunities are not created? Bonneville has designed programs to encourage the installation of comprehensive packages of measures. This is often inconsistent with the way that consumers make equipment investments. As a result, program costs sometimes may be higher and it is more difficult to attract participation. An effective single measure or single end-use program such as a lighting conversion program for commercial buildings might penetrate the lighting market at a much faster rate than if lighting measures were packaged with heating and cooling system improvements. Even if program implementors agree in principle to encourage comprehensive installations, comprehensiveness is difficult to monitor for compliance if Bonneville is not directly managing the program. As a result, utility-designed and competitive bidding approaches could result in programs where more expensive measures which are cost-effective in the long run are left behind. This is of greatest concern if the remaining measures are not cost effective unless they are installed the first time.

To what extent should consumer services objectives determine the approaches, types of programs, and performance standards used for resource acquisition? Conservation programs have significant potential consumer service benefits (e.g., reduced energy bills, capital improvements, improved building conditions), but, if improperly delivered, may also create customer problems (e.g., decreased equipment reliability, undersizing). One factor that is often cited in conjunction with private sector delivery is that private developers may not be as sensitive to customer service as the retail utility. Even when the deliverers are customer service-oriented, there needs to be a careful balance between giving the customer what is wanted and producing verifiable cost-effective energy savings. This balance is difficult to achieve unless the utility is directly involved.

How can Bonneville best control the rate of resource acquisition? The best approaches have a short lead-time for development and allow Bonneville to accelerate or decelerate programs as needed.

ABILITY OF EACH APPROACH TO MEET SPECIFIC OBJECTIVES

To minimize long-run resource costs, Bonneville's resource acquisition strategy must meet a number of interrelated objectives; acquire a broad range of resources, minimize costs to Bonneville and to society as a whole, minimize risk of payment for non-performing resources, maximize predictability of selected resources, control the rate of acquisition, maximize consumer benefits and consumer/utility interaction opportunities, and assure a stable system to capture demand-side resources. Each approach is stronger at meeting some goals and weaker at meeting others. The benefits and drawbacks for each approach in meeting these objectives are discussed below.

Acquire a Broad Range of Resources

By designing programs, Bonneville can assure that a broad range of resources are pursued. However, utility-designed programs, unsolicited proposals, and competitive acquisitions may provide greater flexibility to develop small or unique resources. Codes and standards and energy pricing are each useful only for acquiring certain types or resources.

Minimize Costs. Encouraging efficiency through rate structures is the least cost to Bonneville for the resources for which it is effective, because, even though there are sometimes costs for additional metering, the direct investment is usually less than the cost of acquiring resources. Codes and standards tend to be very low cost to Bonneville, since Bonneville's costs are only for implementation support, initial marketing and demonstration. Competitive acquisitions and competitive targeted purchases strive to minimize Bonneville's overhead costs through competition among resource deliverers. Competitive acquisitions also strive to select the least-cost resources by comparing the overall cost of different resources. However, the conditions necessary to foster effective competition may not now

exist for many emerging technologies and for conservation services in some end-use sectors.

Bonneville-designed and utility-designed programs often use incentive designs to minimize Bonneville's overall cost by providing only as much funding as necessary to leverage consumer investment in efficiency measures (Weedall and Gordon 1990). This strategy can be effective in many markets, including those where there is inadequate competition for bidding to work, or where quality control or customer service issues require that the utility remain closely involved with the program. Billing credits hypothetically minimize overall costs by only accepting proposals that are below Bonneville's alternative cost. However, for billing credits to be truly low-cost in the long run, mechanisms must be developed to assure that the delivered resources are verifiable and are acquired in a way which is comprehensive and helps Bonneville learn how to progressively develop additional conservation markets. These objectives may be easier to meet under other acquisition approaches.

Minimize Risks

Bonneville can try to minimize risks of resource nonperformance through quality control and/or through program features that place risk on resource developers. Quality control mechanisms are easier to build into programs designed by Bonneville or retail utilities than other approaches where the retail utility or third party develops specifications. Competitive targeted purchases can be set up to specify an approach to risk sharing, or can rely on the respondent to propose an approach. Based on Bonneville's prior experience with performance contractors in several rounds of programs, the premium charged by private firms to accept risk appears to be high. Historically, only a minority of performance contractors have followed a strategy that reduces risk through greater expertise and quality control. Many have, instead, only made those investments which assure a very high profit margin. This greatly increases utility costs and reduces comprehensiveness of conservation installations.

Control Rate of Acquisition

Bonneville- and utility-designed programs offer limited flexibility to accelerate or decelerate the rate of acquisition because the political decisionmaking, planning, budgeting, and staffing functions are tied to governmental rules and regulatory processes. Codes and standards offer more savings when the economy and loads are growing, but otherwise offer only limited ability to change course. Competitive acquisition, competitive targeted purchases, and unsolicited proposals all provide opportunities for non-utility parties to establish programs. This may mean shorter lead times for resource development, but private businesses are hesitant to develop a response to a market for their services which is not reliable, and require a response time to expand or contract operations.

Maximize Retail Customer Service

The best opportunities for utilities to interact with customers while acquiring demand-side resources are provided by utility-designed programs and utility-designed billing credits, followed closely by Bonneville-designed programs (which are often carried out by utilities). Because competitive acquisitions, competitive targeted purchases, and unsolicited proposals may be run by non-utility parties, there may be less utility contact and more risk that customer services are compromised.

Maximize Long-Term Resource Development

This demand-side objective is achieved by capturing lost opportunities, acquiring as much of the cost-effective resource in a facility with one stop, and by commencing efforts to reach difficult markets as soon as possible. Bonneville-designed programs provide the best opportunity to focus on these goals, followed by utility-designed programs and billing credits (assuming that utilities running the billing credit programs share Bonneville's resource goals). Codes and standards tend to focus on lost opportunities and address markets which are otherwise difficult to reach. Competitive acquisition, competitive targeted purchases, and unsolicited

proposals place long-term resource objectives on the table for negotiation alongside many other issues which must be resolved at the same time. This reduces the ability to focus on these issues. Energy use pricing tends to reach a limited group of consumers who focus their attention on immediate savings, not long-term resource goals.

CONCLUSIONS

Bonneville plans to employ a diverse resource acquisition strategy that acknowledges the advantages of each approach to acquire certain resources. Some conclusions include the following:

Efforts to encourage passage and utilization of codes and standards are first priorities in all situations where they can be effective and reliable (e.g., new buildings and appliances). However, other approaches are needed to capture resources which these mechanisms cannot reach because there is no entity with the jurisdiction and desire to regulate efficiency.

Bonneville-designed programs should be used where economies of scale, opportunities for efficiency through centralization, consistency, and the need to address multiple policy issues are most significant. Demand-side opportunities in smaller facilities and buildings, with their large number of sites and low savings per site, are a logical target. So are service territories of retail utilities which are too small to design their own programs. Bonneville programs are likely to focus on lost opportunities because it will be more difficult to acquire those resources through less-controlled approaches.

Utility-designed programs are best where creativity and autonomy provide opportunities for cost savings. This may be the case for smaller and/or unique resources. These also can be offered to Bonneville as billing credit opportunities or through competitive acquisition processes.

Bonneville will make opportunities available for resources to be proposed by utilities and other parties through competitive acquisition, sponsor initiated purchases, and through the billing credit

mechanism. These vehicles may be used as a "swing" vehicle, to provide additional resources beyond Bonneville's lost opportunity programs. These approaches may focus on larger retail utilities with resource development capability and larger facilities where the resource value is sufficient to justify spending Bonneville time to focus on detailed quality oversight. The precise approach should be tailored to the nature of the resources to be acquired.

Billing credits will be available for situations where it is practical for Bonneville retail utilities to reliably develop resources for their own use rather than purchasing equivalent amounts of power from Bonneville. Bonneville intends to test the billing credits mechanism.

Bonneville does not plan to meet its resource acquisition targets by acquiring resources that are offered outside of a structured program or process. However, in certain circumstances Bonneville may conclude that negotiating and offering a contract to acquire a resource that is offered as an unsolicited proposal may be in the interest of the power system. If a resource offers unique benefits at very low cost, or if a resource may be lost to Bonneville unless immediate action is taken may be sufficient justification for accepting an unsolicited proposal for negotiation.

Bonneville recently contracted with three preference customers to put in place the region's first conservation transfer arrangement as a pilot project to "test the waters" for this type of acquisition approach. This test project will provide Bonneville with knowledge about the utilities' abilities and methods of carrying out independent conservation programs, and a better understanding of the institutional and contractual nature of a conservation transfer.

As a wholesaler, Bonneville has limited ability to influence retail rates. However, Bonneville will continue to encourage retail utilities to set rate structures which provide rewards for efficient energy use. This is considered to be a "baseline" activity which increases the effectiveness of other resource acquisition efforts.

REFERENCES

Gordon, F. M. 1980. "Using Commercial Data for Strategic Program Planning", in *Proceedings of the 1986 ACEEE Summer Study on Energy Efficiency in Buildings*, ACEEE, Washington, D.C.

Peters, J. S., and G. C. Gustafson. 1987. "Process Evaluation of the Sponsor-Designed Site-Specific Program", International Energy Associates, Limited.

Peters, J. S., and G. C. Gustafson. 1987. "Summary Report: Non-response Evaluation--Site Specific Sponsor-Designed Program Focus Groups", International Energy Associates, Limited.

Weedall, M. J., and F. M. Gordon. 1990. "Utility Demand-Side Management Incentive Programs: What's Been Tried And What Works To Reach The Commercial Sector" in *Proceedings of the 1990 ACEEE Summer Study on Energy Efficiency in Buildings*, ACEEE, Washington, D.C.