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Sustaining Conservation in the Era of Competition

The Bonneville Power Administration and utilities in the Northwest have been vested with the responsibility for acquiring conservation since passage of the Northwest Power Act in 1980. The Power Act established conservation as a resource equivalent to adding new generation except that conservation is generally less expensive over the long term than new generating resources. Unfortunately, there appears to be growing perception that increased competition will bankrupt any utility that increases its rates to pay for increases in the efficiency of electricity use (or for that matter anything else). This has reinforced the views of some who believe that "paying consumers to use less electricity" may once have been a great notion, but is now, in most cases nonsense.

The Northwest Power Planning Council understands that the utility industry is rapidly becoming more competitive. This paper opens with a description of the principal problems facing utilities when they consider future investments in energy efficiency. It then sets forth possible approaches to sustaining the conservation investments of utilities in the face of increased competition. Taken as a whole, these suggestions represent a reasonable starting point for actions that could secure conservation while maintaining utility competitiveness. The Council maintains that Bonneville and the region's utilities can remain competitive if they seriously pursue the conservation approaches discussed in this paper. The Council is particularly interested in comments on this paper that analyze the potential impact adopting these strategies might have on individual utilities. In addition, the Council is soliciting suggestions for other mechanisms that would make conservation more competitive.

Problem 1 - The New Generation of Supply-Side Resources Have Lower Short-Term Costs

One of the primary goals of the Northwest Power Act was to place conservation on a level playing field with traditional sources of new electrical generation. When Congress was debating the legislation that led to the Act, and for that matter, during the development of the Council's first power plan, the principal generating resource options were large-scale (500 average megawatts or more) coal and nuclear plants. These resources had siting, licensing and construction lead times of 10-12 years. They were also capital intensive. That is, a significant proportion of their total production cost was comprised of equipment, and a far smaller proportion was represented by the cost of fuel.

Following the double-digit inflation and rapid escalation in fuel prices experienced during the 1970s and early 1980s, conservation, with its small resource size, short lead times and zero fuel costs was an easy winner over new generating plants.

Due to technological improvements and lower fuel price forecasts, conservation investments are now facing competition from new generating resources that have short lead times (3-4 years), come in much smaller size increments and have a much smaller proportion of their total costs up front. Figure 1 compares annual cash flow requirements to purchase 125 average megawatts of conservation with the same amount of energy from a combined cycle combustion turbine with equivalent levelized costs of 3.5 cents per kilowatt-hour. Both resources are financed over 20 years at a 3 percent real interest rate. Natural gas is assumed to escalate at 3.5 percent real each year.

Figure 1 shows that conservation with the same levelized cost (to the region) as new generation costs nearly twice as much as a combustion turbine in the first few years of production. As a result, the conservation investment has greater near-term rate impacts. If a utility is able to secure the conservation by paying only a portion of the total cost, the difference in a utility's annual revenue requirements can be reduced significantly. For example, in the case illustrated in Figure 1, if a utility could get participants to pay one-half the cost of conservation resources -- or it purchased conservation costing roughly one-half the cost of a combustion turbine -- it would see virtually no difference in its near-term revenue requirements compared to purchasing the turbine. However, because the utility will sell fewer kilowatt-hours if it pursues the conservation option, its rates will be slightly higher, even with an identical revenue requirement. Therefore, strategies aimed at making conservation investments more competitive must not only reduce the near-term direct cost of conservation to the utility (i.e. reduce revenue requirements), but minimize its indirect cost (i.e. lost revenues due to lower sales) as well.[1]

[1] Conservation's higher up front costs make it less financially flexible than a combustion turbine. That is, once a utility has invested money in conservation, it cannot revisit its decision. Whereas, with a combustion turbine, if future fuel prices escalate faster that anticipated, a utility can shift its investments to lower-cost options. Also, if load growth is slower than forecast, the cost of operating the turbine can be avoided, while the cost of conservation is "sunk". Council Issue Paper 94-30 Exploring New Power Planning Considerations, discusses the differences between conservation and combustion turbine flexibility in more detail.

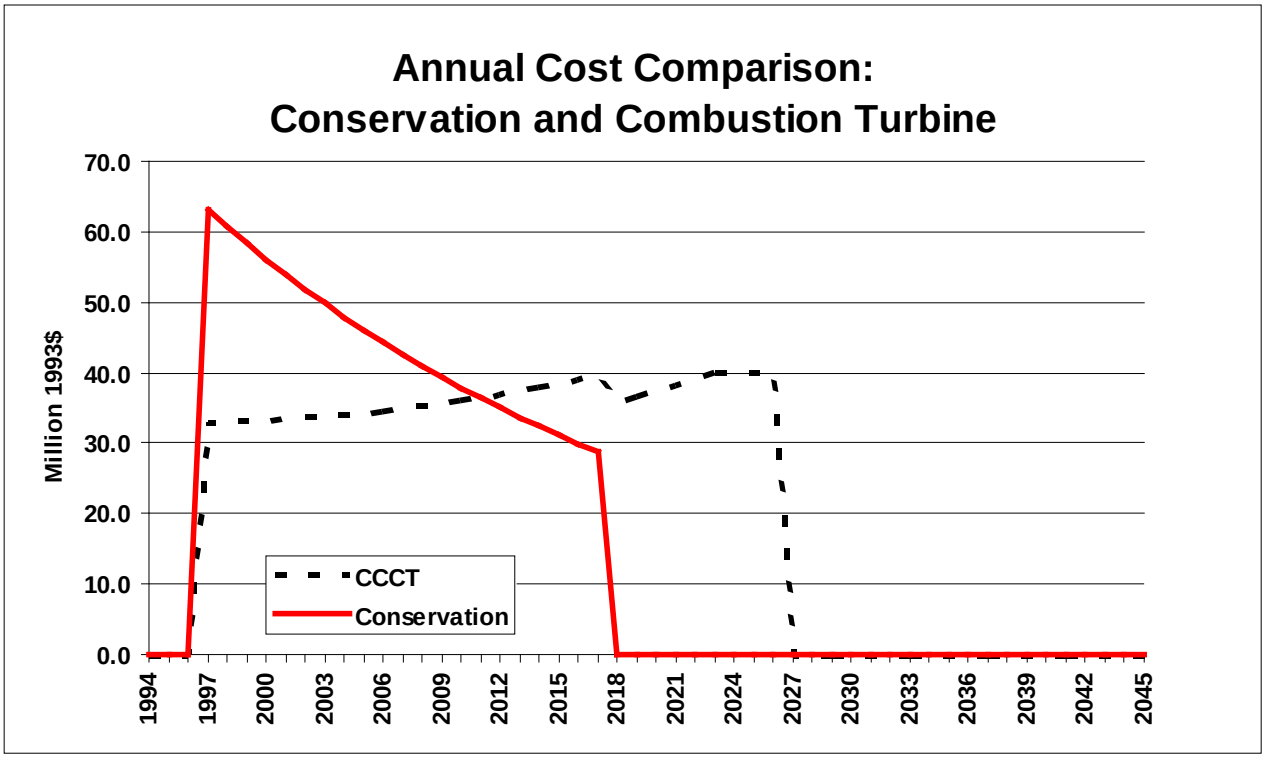

Figure 1

Problem 2 - Recent Regulatory Reforms Exacerbate Concerns Over Conservation's Rate Impact.

Historically, an investor-owned utility's profits were linked to the number of kilowatt-hours it sold. Consequently, when a utility reduced the amount of electricity it sold, it cut its shareholders' profits. In its 1991 Power Plan the Council called upon the region's utility regulatory agencies to establish policies that would remove this linkage between a utility's kilowatt-hour sales and its profits. Whenever a utility's retail rates exceed its short-run marginal costs (i.e., when a utility recovers some of its fixed costs in its kilowatt-hour charge) conservation results in lost revenues. A utility must raise its rates to recover these costs. However, again due to concerns over retail competition, so-called "decoupling/lost margin" recovery schemes, which permit a regulated utility to raise its rates when sales drop due to conservation, are losing favor with utilities. Utility managers understand that there is a distinct difference between a "captive" market where you are *allowed* to raise your rates to offset lost revenues and a "competitive" market where you are *able* to do so, at the risk of losing your customers to another supplier. Niagara Mohawk, an investor-owned utility in New York that has some of the highest retail rates in the country, has asked to opt out of that state's "decoupling" mechanism in favor of an alternative rate-making approach for this very reason.

Problem 3 - Conservation resources, unlike generating resources, are not sold on the open market.

If a utility invests in a generating resource and for some reason finds it either does not need the resource (perhaps due to the loss of a large industrial customer to competition), it can very likely sell the resource to some other party. This region has had only one experience with selling conservation resources. Moreover, since utilities typically only pay for a portion of the total conservation investment, the energy savings are not "owned" by

the utility. For example, many utilities offer rebates toward the purchase of more efficient electric water heaters. Although, the utility does pay for a portion of the cost of the water heater, the homeowner retains title. For investor-owned utilities, this means that their conservation investments are subject to greater regulatory risk than a generating resource. Again, because the generating resource, if disallowed and/or devalued can be sold, whereas the conservation cannot. The Washington State Legislature, has recently enacted legislation that would allow the state's Utilities and Transportation Commission, upon a finding of prudence, to authorize a utility to issue conservation bonds for investments that would no longer be subject to regulatory review.

A secondary problem created by the lack of an open market for conserved energy and the specter of retail competition, is that utilities and some customer groups are concerned that large investments in energy efficiency may become stranded assets. For example, a utility might invest several hundred thousand dollars in energy-efficiency improvements in a large industrial facility. If that industrial customer then decides to leave the utility's service territory because it can find a cheaper source of power, it avoids paying back any portion of the conservation investments in its own or others facilities. In response to these concerns, some utilities have or may soon establish "exit fees." These fees must be paid by a customer who receives conservation funding from its servicing utility if that customer later decides to acquire its electricity from another supplier or to -generate its own.

Are There Any Solutions?

The three problems outlined above present significant challenges for sustaining conservation in an era where heretofore protected monopolies are being subjected to the forces of competition. In a previous issue paper, Acquiring Efficiency More Efficiently (Council Document 93-23), the Council set forth a strategy aimed at reducing the *total cost* of conservation. This strategy has five elements:

1. Transform new equipment markets through utility, government and industry collaboration.

2. Transform building design and construction practices by coordinating government actions and utility programs.

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

4. Expand the energy service delivery system through partnerships with product manufacturers, distributors, designers, architects, engineers and other trade allies.

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.

The first two elements of this strategy focus on transforming the market for energy-efficient equipment and services. Market transformation is a strategic effort by utilities and other entities to induce lasting structural or behavioral changes in the market that result in increases in the adoption and penetration of energy efficient technologies and

practices. Vigorous pursuit of market transformation is clearly the cornerstone of any strategy aimed at reducing the cost of conservation to utilities.[2] Successful market transformation ventures can significantly reduce the cost of conservation to utilities in the intermediate-to-long term, but may not always result in short-term cost savings. For example, between 1983 and 1995, according to one estimate, the utility system is expected to invest approximately $110 (1990$) million in research, demonstration, training and consumer incentives pursuant to the adoption and implementation of the Council's model conservation standards for new electrically heated buildings in Washington. The benefits of this investment are the savings that will be produced by houses built during the entire 20-year period (1983-2003) affected by the energy code. However, even if only the savings attributable to houses built between 1983 and 1995 are counted the estimated levelized cost to utilities is less than 5 mills per kilowatt-hour. This cost drops to below 3 mills per kilowatt-hour if the savings from all homes built over the 20 year planning horizon are tallied.[3]

The last three elements of the strategy are policies that utilities can adopt to reduce their near term cost of conservation. These three elements can be expressed as six objectives.

1. Get the participants (or somebody else) to pay more.

2. Find a cheaper source of money.

3. Acquire first those lowest-cost conservation resources that do not create lost opportunities.

4. Reduce revenue impacts of conservation.

5. Handicap the competition.

6. Make someone else responsible for acquiring conservation.

The remainder of this issue paper focuses on possible approaches for achieving these six objectives. The Council is interested in receiving comments on the viability of these approaches as well as suggestions for additional means for achieving them.

1. Get the participants (or somebody else) to pay more

There are at least three ways utilities can increase the portion of the cost of conservation participants pay. They can reduce the amount of the incentive. They can require that the participant repay all or a portion of the incentive. They can get some other party (besides the participant) to pay a portion of the cost of the conservation.

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[2] The potential economic benefits of successful market transformation ventures are described in Council issue paper 94-30, Exploring Additional Power Planning Considerations.

[3] H. Schwartz, 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.

It should be noted that from a regional perspective these actions *do not* reduce the cost of conservation, they only redistribute it. Therefore, they should not be viewed as more efficient approaches to conservation acquisition.

The most straightforward way to reduce utilities' conservation costs is to reduce participant incentives. Unfortunately, there are no rules of thumb for predicting the impact that reduced utility payments may have on the program's participation rate. What is known is that very low incentive levels tend to attract participants who likely would have undertaken the conservation measures on their own, and very high incentive levels result in very high participation.

Current programs operating in the region are paying between 25 and 80 percent of the cost of conservation measures.[4] It appears that these incentive levels produce program participation rates and achieve savings that are greater than those called for in the 1991 Power Plan for 1993. It is, therefore, quite possible that the level of utility contributions can be reduced without materially reducing the amount of conservation secured. The most likely candidates for reduced incentives are programs that already are "over-subscribed" (i.e., those with long waiting lists). For example, Puget Power reduced its contribution from 80 percent to 60 percent of project costs in its Contractor Initiated Lighting Program, because it was fully subscribed within the first quarter of the year.

In many cases, conservation's higher first cost is the primary barrier that must be overcome. Instead to providing larger grants or rebates, some utilities have offered to loan consumers the up-front capital needed to implement the efficiency improvements. For example, through PacifiCorp's Energy FinAnswer program, a commercial or industrial facility can finance the full cost of cost-effective energy efficiency improvements. The participant is then required to repay the loan (with interest) through an energy service charge added to electric bills. This approach appears to work well for those customers who are capital-constrained or who have a higher cost of capital than is offered by PacifiCorp. PacifiCorp's initial success with this program has been in large commercial buildings.

Another way to get benefiting participants to pay a greater portion of the cost of conservation is to lease them the energy-efficient equipment rather than provide rebates or loans. Because utilities can recoup all or a portion of their conservation costs from participants through lease or rental charges, there are lower near-term rate impacts on non-participating customers. Electric utilities have traditionally promoted a wide range of electrical appliances through rental or lease programs. Re-establishing lease programs for appliances, such as energy-efficient water heaters, or equipment, such as adjustable speed drives, could accomplish three objectives: 1) reduce the net cost of conservation savings to a utility, 2) rapidly increase market acceptance of efficient products and 3) lead to lower production costs for efficient appliances and equipment due to increased volumes. For example, if the region's utilities purchased a sufficient number of heat pump water heaters, one manufacturer has said it can lower its price by $200 per unit.

One of the elements in the Council's overall strategy for improving the competitiveness of conservation is to provide more value-added services to a utility's customers. One approach to implementing this strategy is for the utility to function as a "conservation

[4] In a limited number of cases, such as energy-efficient showerheads, utilities have paid 100 percent of measure costs.

bank," helping customers finance conservation improvements. This approach can also offer financing for other investments. Central Maine Power in New England now offers financing for environmental control and productivity improvements in industrial facilities, as well as for energy-efficiency improvements. The objective of the Central Maine Power program is to improve the competitiveness of the utility's industrial customer and/or assist them in meeting environmental standards and thereby develop a stronger alliance between the customer (who could potentially leave the system) and the utility.

A fourth mechanism for reducing the cost of conservation to utilities is to get someone other than the customer to pay a portion of the cost. Outside parties, including manufactures, vendors and installers of more efficient equipment and products reap financial benefits from utility conservation efforts. It is unlikely that compact fluorescent lights would be a growing market were it not for utility programs. Because of the scale of the sales represented by utility programs, it has been possible to get some manufacturers to provide such things as matching rebates, cooperative advertising and administrative services. This represents a relatively untapped source of funds that could be used to reduce utility conservation costs, without lowering participation by increasing consumer contributions.

2. Find a cheaper source of money

Utilities have three options for financing their conservation investments: 1) they can pay for it and recover its cost through rates over time, 2) they can pay for it and recover its cost in rates immediately and/or 3) they can let the consumer finance it. In this region, typical utility practice has been to borrow money to pay for their conservation programs, recovering the cost of repayment in rates over time. This approach evolved from a perception that individual participants lack access to capital on terms as good as utilities can obtain.[5] Indeed, it is still unlikely that individual consumers served by public utilities have access to a source of capital at interest rates below that of tax-exempt municipal bonds. On the other hand, the region's investor-owned utilities must finance conservation by issuing stocks and bonds that have significantly higher interest rates than many of their customers. Moreover, even Bonneville's Treasury borrowings carry a higher interest rate than its public utility customers can obtain. Currently, tax-exempt municipal bonds have interest rates that are 3.75 percent below the weighted cost of capital for a typical investor-owned utility and 1 percent below Treasury bonds. Therefore, if Bonneville and the regions' investor-owned utilities can find cheaper sources of capital to fund their conservation investments, the utility system cost of this resource can be reduced. Table 1 shows the annualized cost of a $2,000 conservation investment financed over 10 years at the current cost of capital for these three entities.

[5] In addition, it was generally believed that recovering the cost of conservation by "expensing" in current rates was inappropriate because it charged today's consumers for benefits that would accrue to future consumers as well.

Table 1
Alternative Conservation Financing
Annualized Cost of a $2,000 Conservation Measure Over 10 Years

Source	Cost of Capital	Annualized Cost @ 10 yrs	Percent over Municipal Debt
Municipal Debt - Public Utility	**3.0%**	**$234**	**0%**
Treasury Debt - Bonneville	**4.0%**	**$247**	**105%**
IOU - Weighted Debt/Equity	**6.75%**	**$281**	**120%**

Fortunately there are at least three sources of capital available to the investor-owned utilities that could be tapped for conservation. These sources vary by economic sector. In aggregate, public institutions, such as state and local governments, public schools, hospitals, colleges and universities, represent a significant portion of the commercial sector conservation resource. These institutions usually have access to tax-exempt municipal bonds. The major barrier to their issuing these bonds is the need to find a revenue source to repay the bonds. The cost savings from investments in conservation are a logical source of revenue. However, a second source of revenue could be an agreement with the servicing utility to repay all or a portion of these bonds. Puget Power is working with a school district in Washington to implement this approach. This arrangement has the potential of reducing Puget's interest cost by more than half.

In certain states, it also may be possible to finance conservation in industrial facilities using industrial revenue bonds, either backed by the utility or offered independently. For example, in Washington, "private purpose" bonds to support job-creating activities may be issued by port districts, public utility districts and other public agencies. The Snohomish Public Utility District recently used such bonds to finance a cogeneration facility on the property of Scott Paper Company in Everett, Washington. These bonds, while issued by the public agency, are backed and repaid by the private entity, in this case the Scott Paper, which will use the funds to build the cogeneration plant. Private utilities should explore their ability to secure such financing through public agencies, thereby reducing their cost of capital for conservation.

For investor-owned utilities, there are several sources of lower cost capital available to finance residential sector conservation. One may be the housing finance authorities in each state. In Idaho and Montana, for example, the housing authorities were prepared to provide lower interest mortgages for homes that meet certain minimum efficiency standards. The availability of these lower interest rates enable individuals to finance the higher cost of a more efficient home, therefore reducing the need for utilities to provide financial assistance payments to maintain affordability.

A second source of potential lower cost capital is the Federal National Mortgage Corporation -- Fannie Mae. Recently, Fannie Mae initiated a program with Pacific Gas and Electric in California (PG&E) to provide conservation loans for residential customers. Under the single-family home program, Fannie Mae purchases unsecured loans of up to $10,000 for retrofits that comply with PG & E's program requirements. These loans are originated and serviced by the Bank of America and repaid by the consumer. The interest rate on the loans is just under 12 percent, which is below the current rate for most unsecured consumer credit, but higher than "equity" lines of credit. Under the terms of the multifamily program, Fannie Mae provides up-front financing to a non-profit energy

service company (ESCO) that has contracted to retrofit a number of multifamily buildings in accordance with PG & E's Power Savings Contract Program requirements. PG & E pays the debt service on the loans to Fannie Mae and an incentive to the ESCO based on the level of savings achieved. The advantage of using Fannie Mae as a source of capital is that PG & E does not have to issue stock or sell bonds to finance the conservation.

Fannie Mae has also indicated a willingness to lend utilities money to operate their residential sector conservation programs. While public utilities and Bonneville can secure capital at lower costs than Fannie Mae, it is unlikely that the region's investor-owned utilities can do so. Therefore, it would make sense that the region's private utilities consider the possibility of not only financing new investments in residential conservation through Fannie Mae, but re-financing their outstanding debt for residential conservation as well.

Fannie Mae could also be a source of funds to reduce the utilities' cost of operating the Manufactured Housing Acquisition Program for new energy-efficient manufactured homes. The majority of new manufactured homes are financed with personal property loans. The collateral for these loans is the home itself. At present, there is no secondary market for such loans, and, as a result, they typically carry interest rates that are 2 to 3 percent above standard mortgages. If Fannie Mae were to agree to purchase loans for these homes from retail lenders, such lenders, because they now can reduce their risk, may also agree to reduce the interest rates on the loans. This would allow consumers to qualify for the larger loans needed to buy the more efficient manufactured homes. This might reduce or eliminate the need for utility payments to manufacturers, because consumers could now finance the homes. For Fannie Mae -- or some other entity -- to agree to accept what might be perceived as higher risk, it might be necessary for the region's utilities to provide "insurance" for the increased amount of the loan's principal attributable to the energy-efficiency features. This option, as well as others, are being explored by Bonneville and utilities participating in the Manufactured Housing Acquisition Program.

In addition to capital sources noted above, a potential fourth source of cheaper capital for the region's investor-owned utilities is Bonneville. The Northwest Power Act, in Section 5(c), granted the region's investor-owned utilities the ability to gain access to Bonneville's lower cost power to serve the needs of their residential customers. Under this provision of the Act, an investor-owned utility exchanges the amount of power it sells to its residential customers at its average cost of power for an equivalent amount of power from Bonneville at the agency's average power costs. In practice, no power is exchanged, only money representing the difference between the utility's and Bonneville's average system costs. Presently, the annual cost of the exchange is approximately $200 million, or just under 10 percent of Bonneville's annual revenue requirement. If means can be found to reduce a utility's average system cost *and* its residential loads, this would also benefit Bonneville, since it would reduce the cost of the exchange.

One possible avenue for accomplishing this is to have Bonneville provide financing (and re-financing) for residential conservation undertaken by the exchanging investor-owned utilities. Such financing might best take the form of an energy service charge. That is, Bonneville would contract with an investor-owned utility to acquire residential conservation and in return the utility would repay the agency from its savings. Bonneville might also offer to re-finance existing investor-owned utilities' conservation debt, whether or not such expenditures were made for the residential sector. This action, while it does not reduce the amount of power eligible for exchange, and therefore, has less benefit for

Bonneville, still could have substantial benefits for the exchanging utilities because it could reduce their cost of capital. Also, if the repayment of the energy service charge is viewed by the financial community as a long term energy services contract based on kilowatt-hour savings, rather than debt, it could improve the capital structure of the investor-owned utilities.

A fifth alternative to the "multiple credit card" approach to financing conservation would be to create a state or regional financing authority that is explicitly chartered to issue tax-exempt bonds specifically for funding conservation. The revenue to repay the bonds could come from either recipients, via energy service charges, or a general levy on all electricity consumption. This approach, which has been advanced by several parties, including utilities, is discussed in more detail later in this paper.

3. Acquire first those lowest-cost conservation resources that do not create lost opportunities

Prior Council analysis (Issue Paper 94-30) has shown that the total societal cost and the near-term rate impacts of conservation can be significantly reduced if the region can acquire the lowest cost conservation first. The primary issue raised by this approach is whether such "cream-skimming" will create "lost opportunities," situations where it becomes either uneconomic or physically impractical to secure additional efficiency improvements later. Historically, the Council has strongly advocated that utilities take this issue into account in the design and implementation of conservation programs. However, because there appears to be a substantial benefit from securing lower cost conservation first, some modifications to the "get it all at once" dictum may be in order.

There are several possible approaches to targeting lower cost conservation for near-term acquisition. For example, in the commercial sector, it appears that building owners often undertake conservation retrofits in stages. That is, they will carry out lighting changes one year and then wait until the next year before implementing changes to their heating and cooling system. There is some evidence that this phased approach to conservation does not result in an overall reduction in the total amount of cost-effective conservation achieved. (See Schuler, Vince, "Cream-Skimming and Commercial Retrofits: Real Concern or Effective Marketing Strategy?," Proceedings of the 1991 Energy Program Evaluation Conference, Chicago, IL.) Consequently, it may be possible and desirable to prioritize the measures recommended for installation based on their order of cost-effectiveness, whenever the staging of installation will not create lost opportunities. Indeed, if programs are designed to be market driven, (i.e., operated to take account of existing market transactions, such as normal renovation and replacement cycles), such staging will not only be a natural outcome, but it will also result in lower acquisition costs because utility incentives need only cover the incremental cost of equipment replacement.

A second approach to developing conservation in a least-cost order is to focus on the commercial and industrial sectors where the costs of conservation have historically been lower and where most analyses show the remaining potential to be the cheapest.[6] Also, a utility may wish to target those customers within all sectors that appear to have the most cost-effective resource potential, rather than marketing their programs on a first-come-

[6] Since the largest portion of conservation investments have been spent on the residential sector, concentrating future conservation investments on the commercial and industrial customers also redresses equity concerns these customers classes have raised. However, doing so at the expense of residential programs will no doubt, generate political issues that must be addressed.

first-served basis. For example, in the residential sector, it might be more prudent to identify and target weatherization for customers who heat electrically and, therefore, have significantly higher consumption levels than average customers. In the commercial sector, it may be worth examining customer account data to better target those accounts with higher usage. Moreover, once those customers have been identified, it may be that first priority for action should be building "commissioning/re-commissioning" and operation and maintenance, rather than higher cost capital improvements. That is, it may be possible to get significant energy-efficiency improvements by making sure the existing heating, air conditioning, ventilation and lighting systems in a building are operating as designed, before investing significant amounts of capital replacing those systems.

A third process that could lead to a more optimized acquisition of conservation is a thorough examination of which measures will become lost-opportunities if not implemented now. Conservation measures with levelized costs near the marginal cost of new generation, especially those with long measure lives, should be the focus of these reviews.[7] Long-lived measures with costs near that of new generation may be uneconomic if fuel price escalation assumptions underlying the cost estimates for generation are too high. If these measures are not lost opportunities, then it may be prudent to delay their implementation.[8] For example, the levelized cost of replacing single-pane windows with new energy-efficient windows is currently near the region's avoided cost. Delaying the installation of these windows generally does not create a lost opportunity -- although it may affect the marketing of other weatherization measures.

The fact that many of the conservation measures in the commercial and industrial sector also have short measure lives is another reason why a utility might wish to focus its near-term conservation efforts on these customers. In addition, measures with short measure lives pose less risk to a utility that is concerned about the possibility of being left with stranded assets if a customer chooses another electricity supplier.

4. Reduce revenue impacts of conservation

The principal difference between utility investments in conservation and investments in generation is that conservation investments must be recovered over fewer kilowatt-hour sales. Like most businesses, utilities have fixed and variable costs. Typically, a utility will recover only a portion of its fixed costs using a customer charge. Variable costs and remaining fixed costs are recovered through the kilowatt-hour charge. Whenever a

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[7] The reason that conservation measures with long physical lives are more important to focus on is that their benefits (savings) must accumulate over a long period of time for them to be cost-effective. Consequently, they are more capital intensive than measures with shorter lives and the same levelized cost. For example, if two measures have levelized costs of 2 cents per kilowatt-hour and one has a 10-year physical life while the second a 30-year physical life, the first year cost of the longer-lived measure is more than double that of the shorter-lived measure. The practical effect of this is that the region must invest more than twice as much capital to secure the same conservation that has the same levelized cost. By implication, this means that a utility investing in conservation with long measure lives will experience near-term costs that are higher than a utility investing in conservation with short measure lives, even though both are pursuing conservation with identical levelized costs.

[8] In some cases, the customer may perceive other benefits from such measures and wish to implement them. In which case, it may be worth proceeding with the installation *if* the customer is willing to contribute a higher proportion of the cost.

utility's retail rates exceed its short-run marginal (i.e., variable) costs, it is recovering a portion of its fixed cost in its kilowatt-hour charge. Therefore, when it reduces its sales of electricity, it does not recover some portion of these fixed costs. This lost revenue must then be made up by raising rates charged for the remaining sales.

There are at least three ways to reduce or eliminate lost-revenue impacts of conservation investments. First, a utility can focus its conservation investments on those customer classes whose marginal retail rates most closely correspond to its short-run marginal costs. These are generally a utility's large commercial and industrial customers. Second, retail rate structures that are steeply inverted (i.e., have rates that are higher for greater levels of consumption) could be revised so that the marginal retail rate charge reflects the utility's short-term marginal costs. This would ensure that all of a utility's fixed costs are recovered in the customer's monthly charge and in charges from lower kilowatt-hour consumption levels. Then, lost sales due to conservation would not require the utility to raise its rates. Third, regulated utilities could move from "cost-of-service/rate-of-return" regulation to "price cap/performance-based" regulation.

None of these strategies is without its problems. The first strategy may prove difficult to implement because it may be perceived as *inequitable.* The second strategy may prove difficult to implement because it may be perceived as *inefficient.* The third strategy may prove difficult to implement because it may be perceived as *inapplicable*.

It will, no doubt, be argued that large commercial and industrial customers already pay substantially less for their electricity than do small commercial and residential customers. Why should they also get first priority for receiving conservation services? There are three reasons.

First, conservation investments in the commercial and industrial sectors have historically been less than those made in the residential sector. Thus, for reasons of equity, a greater proportion of new investments should be focused on those customers who have not yet been able to take advantage of utility conservation programs, but may have paid for them in their rates.

Second, the conservation potential in the commercial and industrial sector has not been exploited to the degree that it has been in the residential sector, where low-cost actions have already been taken. As a consequence low-cost measures in the commercial and industrial sectors are still abundant. Utilities -- and their customers -- can get more savings for fewer dollars than if they invest in the higher-cost, longer-lived measures that remain to be acquired in the residential sector.[9] Third, conservation in the industrial and commercial sectors produces less lost revenue than conservation in the residential sector where rates are higher. Therefore, the rate impact of conservation on other customers need not be as large to recover utility fixed costs. Thus, for reasons of efficiency, a greater proportion of new investments should be made where utilities can get the "biggest bang for their bucks."

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[9] While there is low-cost conservation still to be secured in the residential sector, on balance, there is less than exists in the large commercial and industrial sectors. This does not imply that utilities should stop acquiring cost-effective lost opportunities in the residential sector. But they should consider delaying acquisition of higher-cost, conservation measures that would not create lost opportunities.

Economic theory states that in order for there to be an appropriate allocation of resources, a product must be priced at its long-run marginal cost. Given this price, consumers will choose whether to purchase one more unit of the product or select an alternative that produces higher "benefits." Up until the early 1970s, the marginal cost of producing the next unit of electricity was declining. During this period, the practice of pricing electricity at it average production cost allowed existing users of electricity to gain some of the benefits of these declining costs, while new users shared some of the costs of putting the basic infrastructure in place. This resulted in utility rate designs that were either "flat" (the price per kilowatt-hour remained constant regardless of the quantity consumed) or "declining" (the price per kilowatt-hour decreased with increasing consumption to reflect the fact that marginal costs were lower than average costs).

When the marginal cost of electricity production surpassed the average cost, advocates argued that electricity rates should be designed to send this new production cost signal to consumers. Consequently, utilities gradually began to revise their rate structures so that the greater amount of electricity used the higher the price of the last unit purchased.[10] Since only a small portion of the utilities' actual production costs were marginal costs, many utilities also adopted much lower rates for low levels of consumption to avoid collecting more revenue than they needed to cover their total costs. They also reduced customer charges, so that a greater share of their costs could be collected in their "tail block" (highest priced) sales. The upshot of this change in approach to cost recovery has been that more of most utilities' fixed cost are now recovered in their tail block kilowatt-hour sales than had previously been the case. As a result, when a utility's sales are reduced by conservation, it must recover these lost revenues from its remaining sales by charging higher rates.

At least in theory, if a utility were to establish its tail block rate for each sector at a level that was set to recover only its short-run variable cost, lost sales would be directly offset by reduced costs. Conversely, (for public utilities) increased sales would be directly offset by increased costs. Unfortunately, this simple solution to the lost revenue problem is diametrically opposed to the theory that markets can only work efficiently if the appropriate price signal is sent. However, there is very little empirical evidence to support the assertion that consumers, especially residential consumers, respond to marginal rates any differently than they respond to marginal bills. If this were indeed the case, one would expect that consumers in New England would buy substantially more efficient refrigerators, air conditioners, dishwashers, water heaters and other devices than those purchased in the Northwest, where rates are only about half as high. One would also expect new buildings to be substantially more efficient in their use of electricity. Neither is the case.

Even if the region's utilities adopted rate designs that would mitigate the lost revenue impact of conservation, the region's investor-owned utilities could still find it advantageous to meet their load growth with additional generation and pursue increased sales rather than invest in conservation. This is because current rate-making approaches set rates sufficiently high to allow a utility to earn its allowed rate of return on its investment. Rates are set based on anticipated sales. If sales are lower than anticipated, less revenues (and less profits) are collected. If sales are greater than anticipated, more revenues (and more profits) are collected.

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[10] Because utilities had charged less per kilowatt-hour consumed as the total number of units consumed increased, these revised rate structures came to be known as "inverted" rates.

Over the past few years, several regulatory approaches have been developed to "decouple" private utility sales from shareholder profits. These approaches usually allow a utility to raise rates when sales drop due to conservation. Concerns regarding retail competition have led at least two utilities that were "decoupled"(Pacific Gas & Electric and Niagara Mohawk) to request that they be subject to price-cap/performance-based regulation instead of traditional rate-of-return/cost-of-service regulation.

The primary difference between price-cap and rate-of-return approaches to regulation is the degree of oversight (or as some view it "micro-management") exercised by the regulator with respect to the actual rate paid by individual customers. Overly simplified, the focus of regulators shifts from *rates* (i.e., how costs are recovered and from whom) to *revenues* (i.e., how much money can be collected). Proponents of price-cap regulation argue that to meet the changing needs of a competitive market, electric utilities need the ability to rapidly disaggregate and re-aggregate products and services and quickly establish prices for these products and services based on market conditions. They assert that utility management, once constrained in how much money they can collect, should be free to establish the price of their products based on the market. Typically, regulators who have accepted this argument have also established performance standards that require the utility to increase its efficiency over time or see reduced profits. This has been done by constraining revenue growth to less than inflation by imposing "productivity indexes." To the degree that a utility can surpass its efficiency targets, it can either reward shareholders or reduce rates to retain a competitive edge without need of a general rate case.

Price-cap/performance-based regulation has some limited potential for eliminating lost revenue impacts created by conservation if the cap is placed on the maximum average revenue allowed per customer rather than on the maximum average revenue per kilowatt-hour sold. For example, assume a utility was allowed to collect no more that $10,000 per average commercial account each year, regardless of the amount of electricity each customer used. This utility would have an incentive to invest in any conservation package that would reduce its average cost of service to the account below $10,000. Only the direct cost of conservation would matter because revenue from that account would be fixed. However, in an environment were retail competition is permitted, this utility would still have to price its energy services competitively, otherwise the customer would seek an alternative supplier. Therefore, the utility, because it might not collect $10,000 per account, would likely invest in only the least expensive conservation actions.

Alternatively, under price-cap regulation, utilities could sell energy *services*, rather than electricity. For example, assume again that the utility is permitted to earn a maximum of $10,000 per commercial account. Also assume that roughly half of the electricity used in the commercial sector is lighting, and therefore, $5,000 per account is spent each year to pay for "lighting services." If the utility were to sell energy services, it could price its lighting service at up to $5,000 per account. If a competitor's electricity were priced lower (or higher) the first utility could price its lighting service at up to some other amount based on a current building's lighting efficiency (watts per square foot per year) times the electricity price offered by its competitors. It would be an economic advantage for the first utility to invest in lighting efficiency improvements that reduce its cost of providing the building's lighting to below the $5,000 or the competitor's price. Since it would still receive the $5,000 per account for lighting services, the utility could choose to provide the lighting with kilowatt-hours or a combination of kilowatt-hours and efficiency improvements.

5. Handicap the competition

With de-regulation of the wholesale electricity market, electric utilities face at least two types of competition.[11] In this region, particularly in the short run, the primary competition for an electric utility is another electric utility. Those utilities with low-cost resources and surplus power can and will attempt to displace the wholesale markets of others that are currently using higher priced power. For example, one California utility (Southern California Edison) with excess capacity recently offered low-cost power to a Northwest utility (Snohomish Public Utility District). If approved, such a sale would reduce Snohomish future purchases from Bonneville. Within the region, Washington Water Power also proposed to supply Snohomish with power in lieu of further purchases from Bonneville.

The second type of competition the region's electric utilities must face comes form independent power producers and brokers. Electric utilities assert that, because these non-regulated entities do not incur any of the "social obligations" (investments in conservation, renewables and environmental stewardship) placed on utilities, they will undercut utility prices. Specifically, utilities have asserted that because independent power suppliers do not have to pay for conservation (in their rates), they can offer to sell electricity cheaper than can the utility. The utilities also assert that they are even more disadvantaged because these competitors do not have to purchase conservation resources up to a "cost-effectiveness limit," which includes still to be internalized environmental and social costs.

To the extent that regulatory treatment of environmental externalities and siting requirements can be made consistent across the region, and perhaps the West Coast, the fear of unfair competition among utilities can be reduced. Requiring the same level of environmental control of independent power production facilities and electric utility generating facilities can also help to level the playing field between utilities and independent suppliers.

There have been two proposals ensuring a level playing field for conservation investments in the face of potential retail access to transmission services. The first, advocated by the Natural Resources Defense Council and others, is to "just say no" to retail competition/wheeling. If regulators do not allow retail customers to bypass their utility in search of a better deal then the utility , retains its ability to charge what it cost to serve that customer, including the cost of securing conservation and reducing environmental externalities. While this does not prevent a customer's generating its own electricity, it does reduce the possibility that some other supplier will undercut the utility's price. Whether regulatory commissions can withstand the pressure to allow customers, faced with their own competition, to seek out lower-cost electricity suppliers has yet to be tested.

The second approach being promoted for securing a level playing field for conservation is to make all electricity suppliers incorporate environmental and social costs of production into their prices. Several utilities have suggested that all electricity suppliers

[11] In fact, electric utilities will also face several other types of intensified retail competition due to changes in technology, such as fuel cells and photvoltaics. Although in the intermediate to long run this form of competition may be more powerful and pervasive, this paper is limited to a discussion of those forms of competition that are most likely to be driving forces behind near-term utility actions.

include a "fee" for investments in conservation and perhaps renewable energy resources in their price. This fee could be charged all users, based on their consumption, or charged to all suppliers, based on their output. Both the United Kingdom and New Zealand, where the electric industries have been deregulated at the retail level, established levies for such purposes. These funds are collected and administered by a governmental body under the guidance of local electricity distribution companies.

While this approach could ensure that investments in conservation and renewables are sustained even in a more competitive environment, it has some significant implementation problems. First, in the case of the United Kingdom and New Zealand, the federal government owned the utility prior to privatization and deregulation. Because both countries deregulated their industries nationwide, there was no possibility that some independent supplier could undercut prices in one or another area. In the Northwest, no regional government has the capability or authority to establish a fee on all electricity sales to fund conservation and/or renewables. Since the region's boundaries are not closed to trade (either physically, as in the United Kingdom and New Zealand, or institutionally), outside suppliers also would need to set aside the same fee.

Second, if individual states were asked to adopt such a fee, there would likely be competition among the states to be the *last* to change. This would serve short run political and business interests because it would keep electricity prices lower than in surrounding states. This positioning could forestall state action indefinitely unless significant political forces are mounted in support. Such support for what could be considered by some to be a "tax" on electricity is unlikely.

Finally, there is no entity charged with distributing the funds, nor are there terms and conditions for tracking and evaluating the impact of such expenditures. Bonneville, individual utilities and their regulators have all evolved mechanisms for allocating conservation costs and tracking conservation investments. For example, the cost of conservation is now collected as if it were a "progressive tax." That is, the greater the usage, the larger the total payment. If a "levy" were to be collected according to this same principle, large industrial and commercial users might well argue that they should receive their proportionate share back in conservation program investments. On the other hand, it might also be argued that the funds should be tapped through a competitive bid process. The problem is not that these are intractable issues, it is that no institution is presently vested with the authority to decide them at the regional level. The next section of this paper addresses the possibility of creating such an entity.

6. Make someone else responsible for acquiring conservation

Due to changes in the structure of the utility industry and new technologies, it is worth considering whether some other entity should be charged with carrying out conservation. This section discusses the characteristics and capabilities this entity might need to effectively acquire conservation. It also discusses likely candidates.

What authority would an entity need to successfully implement the conservation and renewable energy future Congress envisioned when it enacted the Northwest Power Act? First, it needs to be able to take the long view when weighing the costs and benefits of its decisions. Second, it needs to have the ability to spread the cost and risk of developing these resources across all who benefit from the investments. Third, it needs to have the ability to raise money on competitive terms, with a minimum of transaction costs. Fourth, it needs to have *intrinsic responsibility* for the performance of the investments. That is, if the investments fail to produce the anticipated energy savings (or renewable

resources), the entity must be held publicly accountable. Similarly, it must be rewarded for its successes.

When one compares the four characteristics set forth above with the capabilities of any existing institution in the Northwest, the closest match is with the Bonneville Power Administration. Bonneville, as a public agency is, at least in theory, charged with taking the long view. It has the ability to spread both the benefits and risks of conservation and renewable resource development over the largest rate base in the region. It can borrow money on competitive terms from the U.S. Treasury with very low administrative costs. Its management is at least *politically* accountable for their decisions. Congress recognized all of these capabilities in 1980 when it charged Bonneville with the responsibility for acquiring conservation under the Act. It is not evident that the region needs to abandon this avenue for conservation acquisition in the face of greater competition.

Several of the strategies set forth earlier in this paper were specifically aimed at using Bonneville's capabilities to reduce Northwest utilities' (both public and private) conservation acquisition costs. However, none of the approaches outlined would eliminate the cost of conservation to utilities -- at least not in the short term. Therefore, utilities would still be faced with the possibility that potential competitors (including other utilities that do not invest in conservation) might be able to undercut their prices which include conservation's costs. One avenue that might be available to Bonneville for leveling the playing field is to collect a "conservation fee" on all of its transmission charges. That is, access to the publicly financed regional transmission system would be conditioned on payment of this fee. The proceeds of this fee could be used to fund conservation actions undertaken both by the agency and by public and private utilities. If the fund were administered on a cost-sharing basis, it might be possible to even out rate impacts created by conservation investments. The primary limitation of this approach is that not all power sales transactions in the region pass through Bonneville. Therefore, it would still be possible for some power suppliers to escape these fees, unless the Federal Energy Regulatory Commission imposes such a charge on all transmission actions it regulates.

The scenario discussed above assumes that Bonneville is willing to continue to serve as the region's principle conservation "developer" in the face of competition. It is not clear that the agency believes that it either should or can continue to do so. Can some other entity be charged with this responsibility?

In the absence of a regional government, each state could create its own "conservation acquisition authority." These could either be state agencies or public corporations, such as the state housing authorities. In either case, it would be advantageous if the entities have tax-exempt bonding authority. Funding for conservation investments made by such entities could either come from surcharge on all electricity sales and/or through a direct levy on those who use the funds. The benefit of funding acquisitions through a general levy on all electricity sales, is that funding would be available to all citizens in the state, regardless of whether local utilities provide conservation services.

The actions of these entities could be coordinated by requiring their investments to be consistent with the Northwest Power Act and plans developed pursuant to the Act. Once they help establish these entities, Bonneville and the region's utilities could be relieved of their responsibilities for acquiring conservation, although they certainly should be permitted to pursue conservation, using either their own funds or the states'. The

primary advantage of transferring the responsibility for conservation acquisition to non-utility entities is that it eliminates the conflict between selling electricity and saving it.

There are likely to be other approaches to establishing some institution whose sole responsibility it is to acquire regionally cost-effective conservation. The Council is interested in receiving comments on these, plus the question of whether existing institutions or new ones should take the regional lead on this issue.

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