

# REFORMING THE BONNEVILLE POWER ADMINISTRATION

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## Introduction

The Bonneville Power Administration (BPA) is the power marketing agency for the Federal Columbia River Power System (FCRPS), which also consists of the Pacific Northwest generating facilities operated by the Army Corps of Engineers and nonpower-related projects of the Bureau of Reclamation. Taken together, the accounting value of the FCRPS's total assets as of the end of September 1991 was over \$15 billion. In 1991, the BPA marketed over \$2.2 billion worth of electricity from 30 federally built powerplants.<sup>1</sup>

Through its extensive transmission network (Intertie), the BPA markets power to a region encompassing the states of Washington, Oregon, Idaho, western Montana, plus portions of neighboring states. The Intertie makes up nearly 80 percent of this region's high-voltage transmission, with over 14,700 circuit miles of lines and almost 400 substations. The replacement value of the system is estimated by the BPA to be about \$10 billion.<sup>2</sup> In addition to marketing power, the BPA also promotes nonelectricity-related objectives, which include conservation, irrigation, and fish and wildlife protection.

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<sup>1</sup>U.S. Department of Energy (1992).

<sup>2</sup>U.S. Department of Energy (1991a, p. 10).

Along with the four other federal power administrations,<sup>3</sup> the BPA is required to give preference in the sale of power to utilities owned by public entities such as municipalities, public utility districts (PUDs), and rural electric cooperatives. In addition to also providing nonfirm power to investor-owned utilities, the BPA sells power directly to aluminum producers in the Northwest.

The BPA was established by Congress in 1937 to market and transport power from the Bonneville Dam on the Columbia River.<sup>4</sup> Like the four other federal power marketing administrations, the BPA's original objective was to promote economic development by providing low-cost power, particularly to rural areas.<sup>5</sup> At the time, it was believed that the highly concentrated privately owned electric industry was either unable, unwilling, or could not be trusted to provide power at reasonable prices.<sup>6</sup>

The U.S. electric industry has since undergone dramatic change. As a result of technological, economic, and regulatory changes, the industry's early monopoly structure has increasingly given way to a more open and competitive structure.<sup>7</sup> The growing significance of independent suppliers of electricity in addition to the gradual interconnection of local utilities means that competition within the industry is likely to accelerate. By ensuring that prices more closely reflect

<sup>3</sup>The four are the Alaska Power Administration, the Southeastern Power Administration, the Southwestern Power Administration, and the Western Area Power Administration.

<sup>4</sup>An excellent history of the BPA is presented in Shapiro (1989).

<sup>5</sup>When the BPA was established, less than 10 percent of the farms in the United States had electricity; by 1960, in contrast, over 97 percent had electricity, and today over 99 percent do.

<sup>6</sup>By 1932, for example, the eight largest electric holding companies controlled 73 percent of the privately-owned electric business. Holding companies which were severely condemned in a report by the Federal Trade Commission, eventually collapsed because of federal legislation prohibiting or discouraging anticompetitive activities. In 1935 Congress enacted the Public Utility Act, which was comprised of two parts. The one was the Public Utility Holding Company Act, which helped to put into practice present-day public utility regulation in the United States; the other was the Federal Power Act, which gave the then Federal Power Commission authority over the pricing of wholesale power and transmission transactions.

It should be noted, however, that most experts during the 1920s and 1930s considered large integrated electric power systems to be the most economical form of utility structures. Many of the mergers during the 1920s involved the integration of several small operating companies into a few large holding companies. To say, therefore, that holding companies were detrimental to electricity consumers and society at large requires more than presuming they were because of abuses. Holding companies may have represented an economically sensible corporate structure at a time when the demand for electricity grew rapidly and capital requirements were significant (see Hausman and Neufeld 1991).

<sup>7</sup>See, for example, Joskow (1989), Kriz (1991), Ruff (1989), Sawhill (1989), and the Winter 1992 issue of *Regulation*.

the true cost of providing power, competitive power trades and other market arrangements have the potential over the long run to reduce the cost of power, increase service reliability, and take away the need for additional environmentally and economically costly power projects.

These fundamental changes suggest a clear need to reassess the BPA's original mandate to supply "affordable" electricity to preference consumers. As the BPA is presently organized, it lacks the incentive structure to operate in a commercially sound manner or in the long-term interests of electric power consumers and producers in the Pacific Northwest. Thus, while the BPA is directed by statute to price electricity economically and repay its debts to the federal government, it has failed to do so and cannot be expected to do so in the absence of market-based reforms.<sup>8</sup>

The BPA's failure to price electricity to reflect the cost of securing additional supplies has generated a number of adverse effects. BPA's long-standing practice of underpricing power encouraged overconsumption, discouraged conservation, and artificially stimulated the expansion of additional power capacity.<sup>9</sup> As a consequence of having exhausted cheap hydropower by the 1960s, the BPA and other regional utilities had to turn to more financially and environmentally expensive thermal plants.

One of the more well-publicized outcomes of these actions was the \$2.25-billion default of the Washington Pacific Power Supply System (WPPSS) in 1983, the largest municipal default in history. Only two of the five planned (nonfederal) nuclear power projects were salvaged, and the BPA's acquisition of a large share of the generating capability made it responsible for a large portion of each project's costs, including debt service, whether or not they were completed (Cooper 1986 and Shapiro 1989).

<sup>8</sup>Under the Department of Energy Organization Act of 1977, the BPA and the other four power marketing administrations were officially brought under the control of the Department of Energy. The Federal Energy Regulatory Commission (FERC) became responsible for reviewing rates for all power sold within the region, and for transmission services; FERC, however, has limited authority. A 1987 ruling by FERC, for example, argued that the rates charged by the BPA to California utilities are based, *de facto*, on the policies and regulations of the U.S. Department of Energy. Consequently, FERC reasoned that it has no authority to review the rates BPA charged to California utilities ("Proposed BPA Intertie Policy Drawing Criticism," 1987).

<sup>9</sup>The Bush Administration's *National Energy Strategy*, published by the Department of Energy in 1991, similarly argues that the current pricing practices of federal power marketing administrations "discourage energy conservation and efficiency by underpricing electricity. This, in turn, increases demand for electricity and for more federal hydroelectric dams" (p. 38).

As of September 1991, the future principal and interest payments for all "nonfederal" projects of the FCRPS came to \$13.7 billion and may be considerably higher pending the resolution of ongoing litigation over unallocated project cost. This amount is exclusive of the over \$9-billion cumulative repayable investment the FCRPS owes the U.S. government.<sup>10</sup> The appropriated debt dates back to the system's inception and was originally expected to be repaid to the U.S. Treasury within 50 years.

Historically, the interest rates on the FCRPS' debt have averaged around 50 percent below commercial rates. Randomly selecting seven projects completed by the FCRPS since 1960, the U.S. Office of Management and Budget calculated that the average interest rate for the projects was less than 40 percent of the average U.S. Treasury long-term interest rate at the time the projects went into service.<sup>11</sup>

Because of this highly subsidized financing, the BPA's power rates do not reflect the full costs incurred in making the power available, and therefore electric power consumers and producers receive distorted signals for making consumption and production decisions. As of 1989, the FCRPS had paid only 14.7 percent of its federal debt, which from 1987 to 1989 grew by \$302 million.<sup>12</sup>

In addition to the considerable cost to the general taxpayer, the cost of distorted price signals to power consumers, the cost of discriminatory Intertie policies, and the cost imposed on the environment from construction of unnecessary projects, the BPA's noncommercial practices also ensure that it has an unfair competitive advantage over privately owned utilities. For example, as a federal agency, the BPA's income and properties have always been tax exempt. Thus, as it presently functions, the BPA prevents the Pacific Northwest from realizing the real benefits emerging under a competitive U.S. electric industry.

This paper assesses the social costs generated under the BPA's present structure and shows why they can be expected to grow in the future as the U.S. electric industry moves rapidly toward competition and de facto deregulation of wholesale power transactions. Three proposals for reform are offered that, by introducing competitive forces and shifting BPA's resources away from the federal

<sup>10</sup>U.S. Department of Energy (1992).

<sup>11</sup>U.S. Office of Management and Budget (1991). The mean interest rate for the seven BPA projects was 2.8 percent, while the mean U.S. Treasury long-term interest rate was 7.5 percent. OMB calculated that the "top" 228 federal power marketing administrations' projects will cost the U.S. Treasury \$300 million annually or \$13 billion in interest subsidies over the duration of the outstanding loans (p. 4).

<sup>12</sup>U.S. Department of Energy (1991a).

government and toward local control, should benefit not only the BPA's wholesale preference consumers but other power consumers in the Pacific Northwest as well.<sup>13</sup>

## The Economic Costs of the BPA

### *Overview of the Evidence*

The best measure of the magnitude of social costs generated under the BPA's public ownership structure is found by examining BPA's pricing policies and the scope of the federal subsidies the agency has received. Although BPA's originating legislation stipulated that rate schedules shall be established to recover all costs including amortization of the capital investment over a "reasonable" number of years, an examination of its pricing and debt repayment practices indicates that the agency never took this mandate seriously.

Yvonne Levy (1980) calculated that if the BPA had to pay market-based interest rates and taxes that privately owned utilities are obligated to pay, its rates per annum would have been 82 percent higher during the period of 1947 to 1979, 112 percent higher during the period of 1965 to 1979, and 134 percent higher during the period of 1971 to 1979.<sup>14</sup> David Shapiro (1989) calculated that normal, straight-line amortization of BPA's debt alone would have increased the cost of operation (or conversely, decreased U.S. taxpayer subsidies) by \$1.05 billion for the period of 1973 to 1986.

Subsidies to the BPA partly stem from its use of arbitrary debt repayment schedules (it does not have fixed payback periods), and its ability to extract funds from the federal government at below market interest rates. These subsidies run into hundreds of millions of dollars per year. Shapiro (1989) estimated that the total subsidy to the BPA for the period of 1973 to 1983 was about \$4 billion. Timothy Roth (1986) estimated that, as of the end of fiscal year 1972, the BPA had repaid just 19 percent of the total federal hydropower investments. According to Milton Copulos (1986), by 1986 the BPA had repaid only 8 percent of the federal investments it made from 1937 to 1986. Like the other federal power administrations, Bonne-

<sup>13</sup>Recent proposals to deal with the BPA problem focus on repaying BPA's debts to the federal government. Senator Mark Hatfield proposed for consideration the use of private financing to repay BPA's current debts with the U.S. Treasury. Similarly, O'Connor and Olson (1990) propose local ownership of the BPA's electric power system as a political solution to the debate over repayment reform and privatization.

<sup>14</sup>Levy also estimated that for 1980 the BPA sold power at an average price that was only 13 percent of its marginal cost.

ville was, by law, supposed to repay its investments within 50 years of start-up for projects financed with federal funds.

In 1985, then OMB Director David Stockman testified before a congressional committee that BPA would have to raise electric rates by 20 percent in 1986 with debt repayment reform.<sup>15</sup> Andrew Kleit and Richard Stroup (1987) found that for the \$6.5 billion in loans outstanding in 1986, the average interest rate was only 3.5 percent.

#### *Additional Costs of BPA's Noncommercial Operations*

Although the above estimates of subsidies and required rate increases demonstrate that the social costs generated under BPA's present structure are significant, they are likely to be conservative since they do not take into account the wider consequences these uneconomical practices have had on BPA's consumers, competitors, and the environment.

From the perspective of society at large, subsidies tend to prevent the most efficient electricity suppliers from selling in wholesale or retail markets. Privately owned utility operators have expressed concern that a move toward a more competitive environment will place them at a competitive disadvantage if publicly owned and rural electric cooperatives continue to receive large subsidies from the federal government.

Ironically, the BPA's below-cost pricing policy has led to major problems for electricity consumers in the Pacific Northwest. By artificially stimulating demand for power, underpricing forced the BPA to look for new sources of electricity supply in larger amounts and earlier than it would have otherwise. Through the 1970s, the BPA and a consortium of publicly owned utilities formed the WPPSS to build five nuclear power plants. To get around the legislative prohibition against owning power plants, the BPA bought rights, through "net-billing agreements" with other utilities, to power from three of the plants.<sup>16</sup>

Because of these "net-billing agreements," the BPA acquired most of the generating capacity of the five nonfederal nuclear projects. These contracts made the BPA and its customers financially responsible for the projects' entire costs. The burden was felt particularly

<sup>15</sup>U.S. Office of Management and Budget (1985).

<sup>16</sup>Net billing allowed the BPA to own the long-term contracts for all of the power from nuclear units 1 and 2, and 70 percent of all power from nuclear unit 3. The BPA applied a credit to the prices charged WPPSS utilities to help pay the interest and the principal on bonds the utilities issued to fund the nuclear power plants. Funding for the credit came from other BPA customers in the form of higher power rates.

## BONNEVILLE POWER ADMINISTRATION

by aluminum smelters, whose electricity rates rose about 800 percent over the period of 1979 to 1984 (Spies 1990).

In 1983, after the incurrence of significant cost overruns, the WPPSS defaulted on \$2.5-billion worth of bonds, and two of three plants were mothballed. According to the BPA's annual financial report for fiscal year 1991, the future principal and interest payments required for nonfederal projects total \$13.7 billion, of which \$6.8 billion represents interest.<sup>17</sup> Ongoing litigation over two of the plants could result in the BPA assuming an additional \$1 billion in costs (Spies, p. 33).

In retrospect, much of the blame for the WPPSS financial disaster can be traced to the BPA's below-cost pricing, its inaccurate electricity demand forecasts, (see e.g., Wenders 1986), and the fact that, as a government entity with access to taxpayer funds, it did not have to bear the burden of its actions. Moreover, because the BPA through its "net-billing agreements" shouldered nearly all the risks associated with the projects, the other participating utilities did not have a strong incentive to closely monitor the construction of the projects.<sup>18</sup>

The BPA-subsidized prices, in addition, also encouraged consumers to underinvest in energy conservation. Artificially low electricity prices naturally lead to under-investment in energy conservation. When BPA's prices started to rise sharply in the 1980s, residents and businesses in the Pacific Northwest suffered large losses because of their high dependency on low-priced electricity. The "high dependency" reflects the low electricity rates in BPA's service area relative to the rest of the country. For example, residential electricity rates in Washington, Idaho, and Oregon are the lowest in the country; residential consumers in the three states combined pay about 55 percent of the average U.S. price for residential electricity.<sup>19</sup>

Finally, because underpricing of electricity encourages consumption, increasing the need to expand power capacity, it unnecessarily imposes cost on the environment. The BPA's extensive system of hydropower dams on the Columbia River has contributed to the significant reduction in salmon runs by damaging the fish as they

<sup>17</sup>U.S. Department of Energy (1992, p. 31).

<sup>18</sup>For example, the net-billing agreement forced BPA customers as well as U.S. taxpayers to bear the risks of cost overruns, noncompletion, and other problems encountered by the Washington Pacific Power Supply System (WPPSS) in constructing the nuclear power plants. The BPA's obligations to the WPPSS were on a "take or pay" basis, where credit to WPPSS utilities would accrue regardless of whether their nuclear plants ever generated power. The BPA even lacked the authority to manage the construction of the WPPSS plants.

<sup>19</sup>U.S. Department of Energy (1989).

move out to the ocean and by impeding returning adult spawners (Butcher, Wandschneider, and Whittlesey 1986). By the early 1980s the number of salmon returning to the Columbia River Basin to spawn each year had dropped from a previous peak of 16 million to about 2.5 million.<sup>20</sup>

## The Emergence of a Competitive Electric Industry

The electric industry is becoming more competitive and pressures are mounting for deregulating specific components of the industry. Just a few years ago the electric industry was stridently opposed to competition and reform of traditional cost-of-service regulation. Ongoing technological, regulatory, and competitive changes, however, indicate that the industry is undergoing fundamental and irreversible restructuring.

The positions of many privately owned utilities have shifted toward acceptance of competitive forces over state regulation to determine their future financial fate. For example, many electric utilities now favor purchasing generating capacity from outside parties over building their own generating facilities and being subjected to unpredictable and inflexible regulation (Joskow 1989). In large measure this openness to markets is a direct response of the industry's experience with construction delays, cost overruns, canceled projects, and prolonged rate hearings that occurred under traditional public utility regulation.

Today, five fundamental changes are occurring in the electric industry that are restructuring it along competitive lines. First, it is expected that as much as 50 percent of new generating capacity through the year 2000 will come from nonutility suppliers. By the end of the 1980s, almost 30,000 MW of nonutility generating capacity was in place in the United States, and 40,000 MW was being developed.<sup>21</sup> Several utilities have successfully conducted competitive power procurement programs to meet their future needs. Additionally, by making small generating facilities more economically attractive, technology has made the long-held presumption of economies of scale in generation invalid.<sup>22</sup> Consequently, less capital-intensive,

<sup>20</sup>"Protection for Fish to Cut Bonneville Power Output, May Boost Use of TPPs." *Electric Power Alert*, 22 January 1992, pp. 4, 5.

<sup>21</sup>U.S. Congress, Office of Technology Assessment (1989).

<sup>22</sup>Until recently, technological changes favored large generating units. The trend in the industry toward smaller-scale and less capital-intensive generating facilities (for example, modular and staged combustion turbine, combined cycle) reflects a rational response to prevailing economic and political realities.



small generators with shorter lead times currently are able to compete with utilities having large generating facilities in regional markets where both have equal access to potential buyers.

Second, in response to competitive pressures, the industry is becoming less vertically integrated and more focused on the primary segments of the electric power generation, transmission, and distribution system. Horizontal integration through mergers and joint ventures has become more common as utilities search for ways to minimize production and transmission costs in the face of increasing competition (O'Connor, et al. 1988).

Third, new and existing industry participants are demanding more access rights to transmission systems that are owned and controlled by privately owned utilities (Houston 1991 and Costello 1988). With greater interconnection of utilities, consumers have more service choices. This trend indicates that increased competition is tied to transmission access. Some utilities are offering, or are proposing to offer, competitors easier access to their transmission system in return for more flexibility in the pricing of wholesale power.<sup>23</sup> As the number of sellers and buyers in wholesale power markets increases, political pressures over access to transmission lines should continue to intensify.

Fourth, pricing in the industry will be determined more by market conditions and less by traditional cost-of-service regulation.<sup>24</sup> Electric services will increasingly become unbundled, with consumers being offered a greater mix of prices and services. In a competitive environment, prices will more closely reflect the marginal cost of generating and delivering additional power.

Lastly, further *de facto* deregulation of wholesale power markets and other workably competitive markets is likely to take place over the next several years. As the number of buyers and sellers increases and the benefits from trading increase, the regulatory system will come under considerable pressure to change and accommodate the growing interests who will gain under a more open and competitive environment. Support for a more competitive electric industry also

<sup>23</sup>For example, Public Service of Indiana received approval from the FERC to price 450 megawatts of wholesale electricity at market prices in return for granting both utility and independent suppliers greater access to its transmission system (Federal Energy Regulatory Commission Docket No. ER-89-692).

<sup>24</sup>In a competitive environment, utilities and other suppliers would be pressured to apply market pricing to both existing and potential new customers. For a utility threatened with "uneconomical bypass," market pricing becomes necessary in preventing customers from switching to higher cost suppliers or technologies. Market pricing increases benefits for society at large and a utility's profits, as well as reduces the need to raise rates to so-called "captive" customers.

is reflected in the Energy Policy Act of 1992. The act will assist in expanding access to electricity transmission for wholesale participants and in lifting key entry restrictions into wholesale power generation.<sup>25</sup>

Increasingly, FERC has allowed transactors more freedom to sign contracts rather than being subjected to traditional rate-of-return regulation (Acton and Besen 1985, and Joskow 1989). As reflected in some of its major rulemakings issued in 1988, the FERC position has shifted to favoring competition over traditional regulation in determining the price of electricity.<sup>26</sup> FERC's liberalization of pricing rules for wholesale services and its policy shift toward lifting regulatory restrictions on suppliers of coordination and transmission services reflect its recognition of the important role competition has to play.

Even state regulators, by endorsing competitive bidding of new generation capacity and market-based rates for consumers who threaten to bypass the local utility, have become receptive to the increasingly competitive conditions in the electric industry. Since 1986 several state regulators have allowed electric utilities to offer special rates to customers who threaten to install cogeneration facilities (Costello 1989). In addition, as of March 1990, competitive power procurement programs operated in twenty-six states (Rose, et al. 1991).

The electric industry's increasingly competitive and demand-responsive character could offer significant benefits in the form of greater access to lower-cost electric power to the Pacific Northwest. The BPA's current structure and its federal agency status, however, make it incompatible with encouraging this beneficial trend.

## Proposals for Reform

The fundamental changes taking place in the U.S. electric industry and BPA's growing demand for additional power make it particularly important that the BPA begin changing its structure and practices. Short of transferring all of BPA's assets and responsibilities to the private sector, a number of other reforms, designed to introduce the discipline of competitive markets, could improve the BPA's perfor-

<sup>25</sup>The Energy Policy Act (P.L. 102-486), signed into law on October 24, 1992, is the first major federal energy legislation enacted in about fifteen years.

<sup>26</sup>FERC issued three Notices of Proposed Rulemakings (NOPRs) on March 16, 1988 (Federal Energy Regulatory Commission Docket Nos. RM-88-000-4, 5, and 6), addressing independent power producers (IPPs), avoided cost rates for purchased power, and all-source bidding for purchased power, respectively. Although these rules were never enacted, FERC has carried out some of their provisions on a case-by-case basis.

mance in providing reliable, efficiently priced power. To be politically viable, any reform proposal must not only increase the efficiency of the overall system, but also compensate those who benefit from the current arrangement. Essentially, this requires that preference customers suffer no or minimal economic losses. The proposals presented below attempt to achieve this outcome.

*Reselling Preference Electricity*

Allowing the reselling of electricity by preference customers would represent a seemingly simple but important reform that could *eliminate one major source of inefficiency of the BPA system*. This positive outcome stems from the Coase-theorem idea that, when transaction costs are minimal, efficiency is achieved whenever participants bear the full social cost of their actions. To put it differently, efficiency does not depend on the initial allocation of property rights in a world without transaction costs (Coase 1960).

Currently, the BPA prohibits private persons or agencies, with the exception of privately owned utilities, from reselling electricity to privately owned utilities. The economic losses from prohibiting power resale reflect the difference between the market value of "preference" electricity and the value placed on it by preference customers themselves, who are the original recipients of the electricity. Reselling would therefore achieve roughly the same efficiency gains as would auctioning off all the available hydropower in a world where all preference rights are eliminated.<sup>27</sup>

Under one proposal that preserves existing preference rights, the original preference recipient would have the option of either consuming the low-priced electricity marketed by the BPA it is currently entitled to or reselling any portion of it in the marketplace. A good analogy is the current trend in water reallocation in the West, where farmers with preferential rights to cheap water are being given the rights to resell the water they conserve at a market-based price up to their traditional allocations (Anderson 1983). Preference customers would have an incentive to resell whenever the value they place on electricity lies below the value placed by market bidders. The cost of energy conservation illustrates one possible value that preference customers, at the margin, may place on the electricity they consume. A privately owned utility may assign a higher value to a preference customer's electricity if the alternative is to build an expensive new power plant.

<sup>27</sup>The major difference in outcome between the two arrangements (assuming minimal transaction costs) lies with the distribution of gains; unlike reselling, auctioning off all hydropower at market prices would directly benefit U.S. taxpayers.

Reselling would also promote energy conservation and, at the same time, protect the environment from unnecessary damage. By reselling in a competitive market, the preference customer would more efficiently consume electricity since the opportunity cost of electricity consumption to the customer would reflect the true market value of electricity rather than the subsidized, below-market price the customer currently pays the BPA. By facing the real market price for electricity that would more accurately reflect the value of the resource, preference consumers would have better information and incentive with which to make efficient consumption decisions. Moreover, by encouraging conservation and trading of power, reselling would diminish the reliance on financially and environmentally costly new generating capacity.

As a major outcome, reselling electricity would benefit the original recipients, namely preference customers and their retail customers.<sup>28</sup> If the original recipients decide to resell the electricity, they would be better off economically than if they lacked the right to resell. But just as importantly, by facilitating exchange, another party would also benefit; namely, a buyer who is able to purchase a source of valuable electricity whether because it is lower-priced, more conveniently available, or more attractive in some other way than alternate sources of supply.

One method of facilitating the exchange of preference power would involve the federal government soliciting bids from all interested purchasers specifying their willingness to pay for different quantities of power. The auction would include all of the hydropower available to both preference and nonpreference customers. Taking into account individual bids, the buyer's willingness to pay for available power can be measured. The market price would be determined by the interaction of bidders' willingness to pay with the total available power offered by the federal government. Bidders without preference rights would pay the market price. Preference customers also would pay the market price for the electricity they wish to consume, but would receive a credit equal to the market price times their original rights to power.

To illustrate the above mechanism, assume that a preference customer is willing to buy 500,000 kilowatthours of electricity at the market (bid) price of five cents per kilowatthour; assume also that the customer has an original preference right to one million kilowatt-

<sup>28</sup>Preference customers typically are power distributors owned by the retail customers they serve. The average customer would therefore stand to benefit from the economic gains of resale.

hours. Consequently, the customer would pay \$25,000 (five cents times 500,000 kilowatthours) for electricity it wishes to consume and, concurrently, would receive a credit of \$50,000 (five cents times one million kilowatthours) for its original rights. The preference customer, on net, receives \$25,000 for allocating 500,000 kilowatthours of its original rights to the market. In other words, the preference customer receives the market value for electricity that it makes available to others.

Customers would gain from reselling whenever they could be compensated for the unused electricity, for example, by "buying" energy conservation at a cost of less than five cent per kilowatthour. Under the current regime, the preference customer would tend to only conserve when the cost of conservation is less than the subsidized power prices charged by the BPA. If the preference price equals three cents per kilowatthour, for example, and the cost of conservation equals four cents per kilowatthour, the customer would rather consume than conserve since conserving is more expensive than buying electricity.

If instead the market price was five cents per kilowatthour, the preference customer would be better off by reselling electricity and purchasing conservation since the price received for selling electricity is greater than the cost of offsetting the sale by conservation. Under this arrangement, preference customers would tend to have an incentive to resell any time the market places a higher value on electricity than what they do individually. Preference customers would reduce their electricity consumption up to the point where the cost of conservation is equal to the market value of their allocated electricity. Reselling, then, would give preference customers a stronger incentive to conserve electricity. Currently, because of the prohibition on reselling, preference customers overconsume electricity at artificially low prices, and nonpreferential consumers underconsume at artificially high prices.

In sum, the auctioning off of excess preference rights has two major benefits. First, preference rights would be transferable to the highest-valued uses. In the above example, if the preference customer values its allocated electricity at less than five cents per kilowatthours—the market price—it would have an incentive to sell to a buyer who values electricity higher. Second, by allowing any party to bid on electricity that preference customers are willing to offer at the market price, auctioning off of excess preference rights would stimulate competitive conditions, and the price of electricity should therefore more closely reflect the cost of providing additional power.<sup>29</sup>

<sup>29</sup>The economic benefits and political palatability of reselling preference power in the Pacific Northwest also are discussed in Kleit and Stroup (1987).

*Sale of BPA's Transmission System*

Sale of the BPA's transmission line to interested buyers would promote competition in the Pacific Northwest electric industry and increase the efficiency gains from reselling. The recent debate over competition in the U.S. electric industry has focused on the rights of independent power producers and customers to gain fair access to transmission networks.

Competitive conditions require that privately owned utilities, independent power producers, publicly owned distributors, rural electric cooperatives, and other participants in the electric industry have access to the transmission network. A 1989 study by the Office of Technology Assessment concluded that, in competitive wholesale markets, technical conditions should not hamper the increased demands that would be placed on transmission systems.<sup>30</sup>

In the absence of nondiscriminatory access, some interested entrants may face difficulties acquiring financial capital or selling their electric services in a spot market, or under long-term contracts, to nonlocal buyers.<sup>31</sup> In addition, distributors and other purchasers would be deprived of the lowest cost, available electricity in a regional market.<sup>32</sup>

The major policy issue revolves around the question of what is the most efficient institutional arrangement for giving "nonBPA" groups access to the transmission network: How much, and at what level of, control of the current and future BPA transmission network do the various suppliers and consumers located in the Pacific Northwest need to foster competitive conditions?

The major argument for joint ownership of BPA's transmission network centers on the need to establish well-defined rights that would give users incentives both to utilize the network efficiently and to invest in new capacity when warranted by market conditions. By possessing the rights of access, exclusion, and transferability, users would realize maximum benefits from investing funds in the

<sup>30</sup>Congress of the United States, Office of Technology Assessment (1989).

<sup>31</sup>Under many circumstances, the spot market can shift risks efficiently. In a spot market the risks of planning and operation fall on investors rather than consumers. A spot market can also promote efficiency by setting prices that correspond to actual market conditions.

<sup>32</sup>"Shopping around" induced by fair transmission access should improve both allocative and productive efficiency: sellers would be pressured by competitive forces to offer prices corresponding to their marginal costs, or else lose customers to other suppliers; it is also more likely that electricity consumers would be served by the lowest-cost suppliers since consumers would not be constrained to purchase their electricity from local suppliers (see Costello 1988).

## BONNEVILLE POWER ADMINISTRATION

network as a response to new demands brought on by a growing market.

The benefit to society of joint ownership stems from the likelihood that the transmission assets currently owned by the federal government will have a higher value in the marketplace than what they now have. This is because joint ownership would create new incentives stimulating economical investments in new capacity and efficient use of existing capacity. Individual owners would have the right to lease or sell their portion of the transmission network to outside parties or other existing owners of the network.

One proposal would involve the BPA auctioning off capacity that is not needed to serve preference customers and other customers with which the BPA has existing service obligations. The funds from the sale could be used to repay BPA's outstanding debts to the U.S. Treasury. For example, the value of BPA's transmission system is roughly \$10 billion; this equals about 65 percent of BPA's total outstanding debt to the U.S. Treasury and other bondholders.<sup>33</sup> Alternatively, the BPA could offer to sell parts of existing capacity to preference customers at a discounted price. In either case the current BPA transmission network would evolve into a joint privately owned/ publicly owned network.

The newly formed regional transmission company would devise rules giving managers wide discretion to operate the system in a way necessary for maintaining technical integrity. Rules also would require that new users be allowed to purchase and to receive the same rights as current users. Such rules would prevent existing owners from foreclosing the entry of new generators into the regional power market. The new users would have to abide by the operational rules established by the transmission company and meet their financial obligations for funding new capacity and maintaining current capacity.<sup>34</sup> Without these requirements the value of current and future assets would likely fall, thereby discouraging current owners from making additional investments.

The owners collectively would form pricing rules falling under the scrutiny of antitrust laws. It is expected that, under newly developed competitive conditions, owners-users would refrain from price-fixing practices since it would not be in their interests to establish arti-

<sup>33</sup>See U.S. Department of Energy (1991a, p. 10) and (1992, p. 21).

<sup>34</sup>Separation of ownership rights and operation rights currently exists for the National Grid Company, which is the newly formed British common-carrier, electric transmission utility. The company is owned by twelve regional electric distribution companies.

cially high prices that would lower each owner's share in the wholesale power market.

Joint ownership by regional users of the transmission network has distinct advantages over other proposals such as contract-common carriage and incentive-based pricing of transmission services.<sup>35</sup> Joint ownership would: (1) avoid the costs of monopoly power currently being exhibited by the BPA, reflected in the priority given to power generated and sold by the federal government; (2) transfer ownership-control rights among parties on the basis of economic value since access would be available to those who value it the most, as reflected in the prices they are willing to pay for transmission service or for ownership rights in the regional transmission company; (3) eliminate transaction costs that would otherwise be incurred in negotiating complex contracts with the BPA; (4) eliminate the need for complex access and pricing rules that would induce costly legal and judicial interference (antitrust enforcement and FERC oversight could ensure that the regional transmission company does not artificially restrict the entry of new owners); and (5) eliminate the ambiguity of ownership rights and governance under the present arrangement, and thus reduce legal and political costs in addition to encouraging efficient use of the transmission network.

The BPA currently controls about 80 percent of the Pacific Intertie extending from the Northwest to California.<sup>36</sup> The BPA faces little oversight by FERC and is exempt from antitrust laws and therefore is able to discriminate against privately owned utilities and other groups to favor its preference consumers. BPA's Intertie pricing and access policies over the years have met with bitter opposition by regional and nonregional electricity producers and consumers. California utilities and regulators for years had protested against BPA's Intertie access policy as both anticompetitive and discriminatory. Specifically, they have charged that the BPA sells power to the California market at discriminatory prices, reflecting a BPA policy of minimizing revenues that the BPA needs to collect from its preference customers.<sup>37</sup>

<sup>35</sup>For problems associated with contract-common carriage, see Houston (1991). "Better pricing" may be a remote possibility in a world where the BPA continues to have ownership and control rights of the transmission network. Political considerations and exploitation of BPA's market power make it highly unlikely that prices would be set at efficient levels.

<sup>36</sup>The combined capacity of the Pacific Intertie equals 5,156 megawatts of which 4,056 megawatts fall under the BPA's control.

<sup>37</sup>See "Proposed BPA Intertie Policy Drawing Criticism" (1987, pp. 36-37), and Tussing (1988, pp. 111-19).



## BONNEVILLE POWER ADMINISTRATION

The major economic constraint under the current single-ownership regime is that new competition in alternative transmission lines is impractical because individual generators are severely restricted from constructing their own transmission lines over different rights of way. In contrast, under joint ownership, competition would be directed to vying for ownership and control rights in existing transmission lines. Thus, even in the presence of scale economies, competitive conditions would still prevail by allowing groups to sell or lease rights in transmission capacity to others.<sup>38</sup>

Finally, the joint owners would perform the same functions as the BPA currently does, including planning for and financing new transmission capacity, operating with sufficient capacity and system interconnections, and coordinating electricity flowing from different generators to their purchasers.<sup>39</sup> Participants in the electric power market would gain essential rights that they currently do not have, namely rights for market-based access and prices. In contrast to the BPA's present Intertie policy, joint ownership would promote competition in ownership control and provide strong incentives to coordinate power efficiently and to make economically sound capacity expansion decisions.

### *An End to Centralized Government Energy Planning*

The Pacific Northwest Electric Power Supply and Conservation Act of 1980 contains a provision that can diminish the efficiency of the region's electric power industry.<sup>40</sup> The provision requires the

<sup>38</sup>Arguments for joint ownership of electric transmission lines also are presented in Houston (1991), Costello (1988), and Smith (1987).

Alger and Toman (1990) have proposed joint ownership of natural gas pipelines to promote competition in the natural gas markets. According to the authors, joint ownership would allow pipelines to "reap scale economies by competitive offering of transportation services by multiple shareholders to limit the exercise of market power" (p. 276).

<sup>39</sup>Joint ownership must reckon with three major technical conditions required for a smoothly functioning electric power system. First, the electricity flowing from individual generators to purchasers and from different generators, all using the same transmission network, would have to be coordinated. Second, the regional transmission company would need to take into account the interdependency between the three primary components (generation, transmission, distribution) of an electric power system. The workings of the three components are intertwined in a way that allows an electric power system to operate as a coordinated whole. Third, the flow of electricity on outside electric power systems should be held to a tolerable level or, if not possible, compensation should be paid to utilities located outside the intended transmission path.

<sup>40</sup>The act was a response to growing threats, starting in the 1970s, of rising energy prices and anticipated power shortages in the Pacific Northwest. These threats jeopardized the future availability of low-priced power to privately owned utilities and direct service industries located in the Pacific Northwest. Politically, the act tried to appease all electricity consumer groups by expanding the BPA's role in the Pacific Northwest

newly formed Northwest Power Planning Council to give priority to energy conservation as a new resource to meet future demand needs.

The act applies a 10 percent premium to energy conservation by discounting its cost for environmental advantages when placed side-by-side with traditional resource alternatives. The act also gives priority to renewable resources and generating resources applying waste heat or high fuel conversion efficiency over other resources (for example, gas-fired facilities).<sup>41</sup>

In accordance with the act, the BPA is required to take actions that are consistent with the approved plan of the Northwest Power Planning Council. The Council is composed of representatives from Oregon, Washington, Idaho, and Montana, and its primary job is to develop a twenty-year power plan for the Pacific Northwest. In every approved plan, the emphasis has been on promoting "cost-effective" energy conservation. The Council defines "cost effective" as a condition under which the cost of energy conservation is less than the cost of new supply resources.<sup>42</sup>

A basic premise of the Council's planning is its perception that energy conservation should be subsidized at the cost of new supply resources (for example, base-load coal plants); the Council believes that energy-conservation actions subsidized up to the cost of new resources are "cost effective." To the contrary, however, subsidies based on the cost of new supply resources provide a consumer with excessive incentive to conserve electricity: the opportunity cost to the consumer of using more electricity includes both the price of electricity and the cost of new supply resources (that is, the subsidy offered to the consumer for using less electricity). The consumer's opportunity cost from using additional electricity therefore would exceed the marginal cost (see e.g., Joskow 1988 and Kahn 1992).

To illustrate this point, if the price of electricity equals three cents per kilowatthour and the cost of new supply resources (the marginal cost) equals five cents per kilowatthour, a consumer would "pay" eight cents for using an additional kilowatthour of electricity; that is, the eight cents represent the opportunity cost to the consumer from using more electricity. The consumer therefore pays a real price of eight cents for using electricity, while the real cost to society is only five cents. From society's perspective, the consumer would have an incentive to use too little electricity.

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power market.

<sup>41</sup>See Northwest Power Planning Council (1989, p. 4).

<sup>42</sup>See Northwest Power Planning Council (1989, p. 4).

## BONNEVILLE POWER ADMINISTRATION

In addition, such subsidies would harm nonrecipient consumers, since BPA's distributors receive less revenues and make subsidy payments equal to the cost of new supply resources. To make nonrecipient consumers no worse off, the maximum subsidy should not exceed the difference between the cost of new resources and the current price of electricity. Instead the BPA subsidies require nonrecipient consumers to help pay for conservation investments that would generally benefit only a small minority of a preference customer's retail buyers.

The Northwest Power Planning Council apparently believes that the pricing system is deficient at achieving the socially efficient amount of conservation because electricity consumers are either irrational or ill-informed, or both, when making decisions on how much energy conservation to purchase. But, evidence of market imperfections serious enough to justify subsidies for energy conservation has not emerged. Studies that allege the presence of market imperfections fail to account for factors such as consumers expecting to earn higher returns from other types of investments, the high uncertainty of actual electricity savings, and the transaction costs associated with purchasing conservation measures (see e.g., Newlong and Weitzel 1991).

Ironically, by failing to price electricity at its real cost, the BPA not only undermines the most effective mechanism for fostering conservation but, by seriously underpricing power, it actually encourages consumers to overuse electricity and underinvest in conservation.<sup>43</sup>

The most effective way for BPA to promote energy conservation in the Pacific Northwest is to set the price of electricity at its market value. The right to resell preference power, the first reform offered in this paper, would achieve the same objective by informing preference users of the real value of the power they consume.

The Northwest Power Planning Council's experience indicates why government attempts at energy planning are often likely to be misguided and counterproductive. By suppressing the crucial role prices play in guiding consumption and investment decisions, subsidies, whether for below-cost power or for energy conservation, impede the ability of consumers to make cost-minimizing energy decisions. At the same time, by distorting market prices, subsidies

<sup>43</sup>Substitutes for electricity in various uses also may be underconsumed. For example, many households in the Pacific Northwest may decide to switch from electricity to natural gas for water heating if BPA's prices were more comparable with economic costs.

impede efficiency-enhancing competition in the supply of electricity. By making power artificially cheap, subsidies in the Pacific Northwest have likely discouraged the development of independent power production, which may in fact be the most cost-effective source of new supply.

*Beneficiaries*

Taken together, the three reforms advanced would go a long way to benefit the nation, the Pacific Northwest, and various interest groups affected by the BPA's current practices. They offer environmentalists a way to curb the unnecessary expansion of new generating capacity, including hydropower facilities and fossil fuel plants, induced by politically based pricing practices. To conservationists the proposals promise to offer electricity consumers in the Pacific Northwest and adjacent regions more opportunities to make efficient conservation investments. For privately owned utilities the proposals open new markets for both the electricity they sell and the electricity they buy. U.S. taxpayers would benefit by allowing BPA to reduce its debt with the U.S. Treasury from the sale of transmission assets and by seeing that BPA's operations are put on a sounder financial basis. Independent power entrepreneurs would gain by having more opportunities to compete fairly with power marketed by the BPA. To public power entities and their customer-owners in the Pacific Northwest the proposals offer the choice of whether to continue consuming the power they are currently allocated or to resell a portion to interested buyers at a profit.

Most importantly, the reforms would benefit the nation as a whole by stimulating competition in the electric industry and by promoting efficient pricing and trading. Competition almost assuredly would benefit the long-term interests of both electricity consumers and the nation.

Finally, the proposals would eliminate wasteful political costs currently being expended by special interest groups in their quest for low-cost hydropower. It is questionable how much preference customers have benefited since the inception of the BPA. Because of the constant battles involving high litigation and lobbying costs to maintain preference status, in addition to the inefficiencies of the BPA, much of the initial benefits received by preference customers may have disappeared over time.

## Conclusion and Policy Implications

The future of the Bonneville Power Authority should be assessed in light of the competitive and efficient market-oriented arrange-

ments that are increasingly emerging in the U.S. electric industry. Because as a government entity it does not bear the costs of its actions nor is capable of being positively influenced by competitive forces, the BPA's present structure is incompatible with this emerging trend.

The federal government can make three fundamental reforms which, by making the agency's practices more compatible with market incentives, would improve the BPA's performance and allow it to participate in the economically beneficial changes occurring in the rest of the electric industry.

First, the BPA's preference customers should be allowed to resell electricity to those who value it more highly. Second, the BPA's transmission system should be privatized gradually over time to reduce the agency's market power over the system and to facilitate access to the system. Third, the BPA should rely on efficient market pricing of electricity rather than special treatment for conservation for promoting the wise use of energy.

By placing greater reliance on market arrangements and less on federal control, these reforms have the merit of both increasing efficiency and accountability, whereby those groups most affected by BPA's policies and practices will be in a better position to influence its direction. By making the BPA more responsive to market incentives, these proposals will make the BPA's actions more compatible with the competitive changes sweeping the rest of the U.S. electric industry.

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