Restructuring of the Electric Utility Industry: Implications for the goals of the Northwest Power Act

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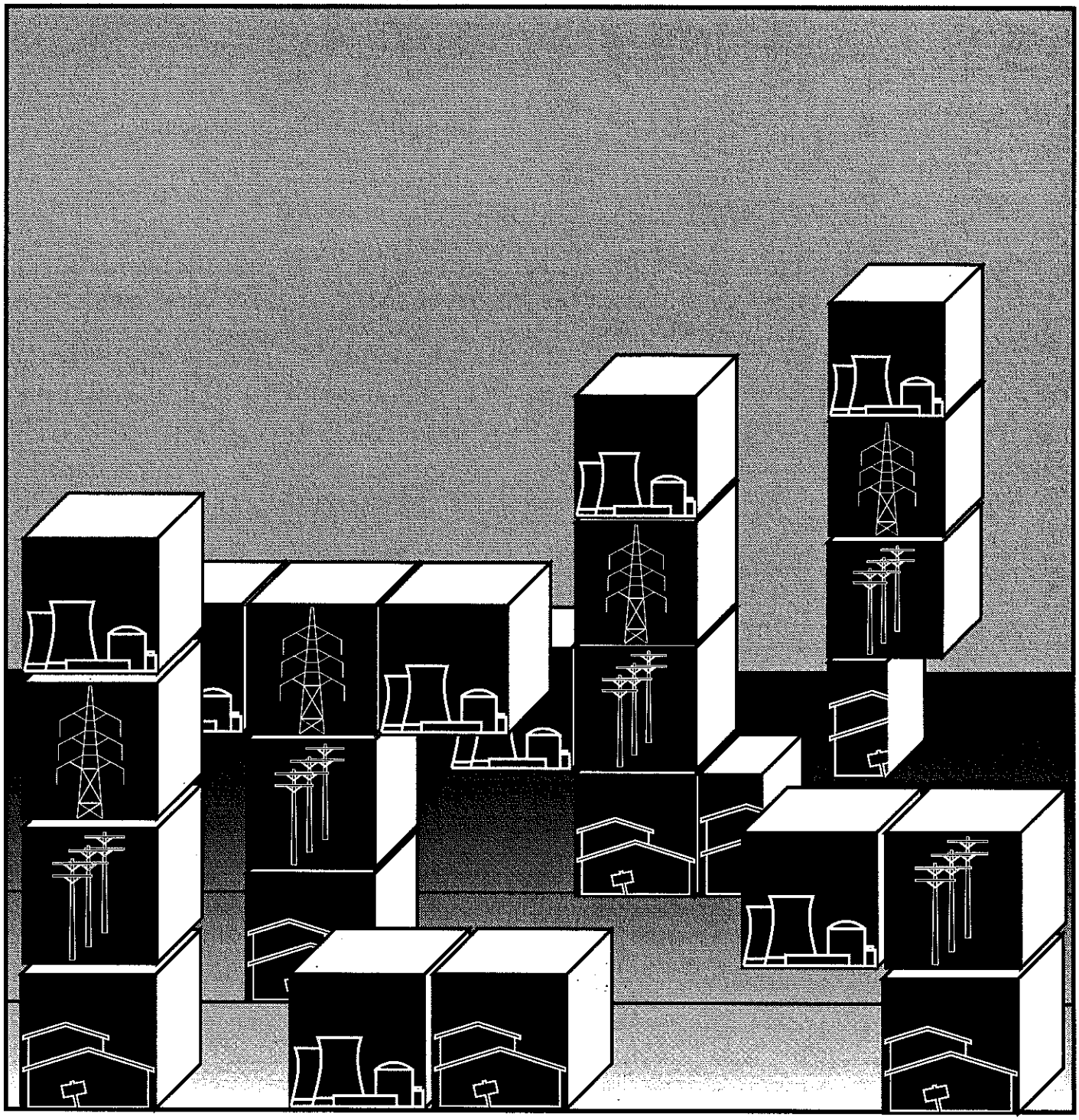

Northwest Power Planning Council

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Introduction

In the view of many, the electric utility industry is in the process of a significant restructuring — a basic realignment of the traditional relationships among those who generate, transmit, distribute and consume power. These changes stem, in large part, from ample supplies and reduced prices of natural gas; from technological advances affecting all segments of the industry; and from new and anticipated utility regulations that will influence power generation, transmission and, possibly, distribution.

In general, the effect of these changes will be to create more competitive wholesale and, potentially, retail markets for electricity. Economics textbooks teach a simple rule: markets are more competitive and efficient when there are many buyers and sellers of a product. Most of the changes under way in the electric industry are working toward that end.

Specifically, in the years ahead, the industry will likely see more electricity produced by both utilities and an increasing number of independent power developers; more pressure for access to transmission and distribution services by new, as well as traditional power producers; and more marketing of specialized electricity services and products to meet individual customer needs. In addition, if the electric industry follows the precedent of the natural gas industry, we may see a retail market for electricity where some individual consumers can shop among competing electricity sellers.

For the four state utility commissions in the Pacific Northwest, these changes are familiar. In the last decade, similar forces have worked to restructure the telecommunications and natural gas industries. In each case, utility commissions have adjusted their regulatory policies to the changing nature of each particular industry. Now the electric industry is undergoing a similar change in its structure, which will require a re-thinking of the way the traditional electric industry has been viewed by *all* of those involved with the industry, not just the regulatory commissions.

The purpose of this paper is to discuss what these changes portend for the future structure of the electric utility industry in this region and how the restructured industry may affect achievement of the goals of long-term, coordinated, least-cost power system planning, as implemented by the Northwest Power Planning Council; the Idaho, Montana, Oregon and Washington public utility commissions and the utilities they regulate; the energy facility siting councils in each state; the Bonneville Power Administration and the region's publicly owned utilities. The paper examines the economic, technological and regulatory forces that are influencing the electric utility industry. It also outlines the specific competitive risks faced by the Bonneville Power Administration and its evolving response. More technical details relating to this paper are contained in a set of appendices, which are available from the Council's central office. (Ask for publication 94-4A.)

For the Power Planning Council, this question pertains to its particular responsibilities under the 1980 Northwest Power Act. The Power Act describes a vision of a coordinated electrical system where resource decisions are made publicly to ensure their compatibility with the region's existing power system, its economy and the environment. The Act calls on the Council to develop a long-term, least-cost power plan that balances the region's need for an economical, efficient and reliable electricity system with the need to protect the environment, particularly fish and wildlife, affected by electric power generation.

As the Council begins the process of preparing its fourth electric power plan for the Pacific Northwest, it is analyzing how the changes in the utility industry will affect the ability of the industry to achieve a long-term, reliable, environmentally responsible and least-cost supply of electricity. To further this analysis, this paper develops one possible scenario for the emerging electricity industry. That scenario is one of significant transition from a predominantly regulatory planning environment to a competitive market environment at the wholesale level with at least elements of competition at the retail level. To some, this scenario may seem somewhat extreme. Council staff believe, however, that this scenario is a logical extension of trends in the industry and represents the views of many industry observers and participants. Many decisions being made in the industry today appear to reflect perceptions consistent with this scenario.

There can be significant benefits to competitive markets for electricity. At the same time, however, if these markets do not provide good price signals, and barriers to efficient market operation are not adequately addressed, competition could put at risk many of the goals of the Power Act and long-term, least-cost planning as practiced in the Northwest. Competitive markets as they are currently structured, particularly at the retail level, appear unlikely to fully achieve those goals. The challenge facing the Council, the regulatory commissions, state siting agencies and utilities is that of capturing the benefits of more competitive electricity markets while fulfilling the societal goals reflected in the Northwest Power Act and in least-cost planning as practiced by the region's utility regulatory commissions and individual utilities.

The Council is seeking public comment on this paper in general, but specifically on the following questions:

- Is the scenario for the emerging electricity industry presented here a reasonable one for assessing the consequences of industry restructuring? If not, what is a more reasonable scenario and why?

- Are the conclusions regarding the consequences of restructuring for the goals of the Power Act and least-cost planning in the region accurate? If not, what are more reasonable conclusions and why?

- Are the issues identified for subsequent analysis the right ones? Are there other issues that should be addressed?

The Council will accept public comment on this issue paper through April 1, 1994. Public testimony may be given at the Council's February and March work sessions in Portland, Oregon, and at the Council's meeting in Helena, Montana, on March 10.

Power Planning Goals in the Pacific Northwest

When Congress passed the Northwest Power Act in 1980, it had the support and encouragement of Northwest governors as it established specific power planning goals for this region:

> *"...to encourage, through the unique opportunity provided by the Federal Columbia River Power System — conservation and efficiency in the use of electric power, and the development of renewable resources within the Pacific Northwest;*
>
> *to assure the Pacific Northwest of an adequate, efficient, economic and reliable power supply;*
>
> *to provide for the participation and consultation of the Pacific Northwest States, local governments, customers, users of the Columbia River System..., and the public at large in — the development of regional plans and programs related to energy conservation, renewables, other resources, and protecting, mitigating and enhancing fish and wildlife resources."*[1]

The Power Act also calls for inclusion of quantifiable environmental costs and benefits in a least-cost planning methodology,[2] and for a program that will "protect, mitigate, and enhance fish and wildlife ... affected by the development and operation of any hydroelectric project in the Columbia River and its tributaries."[3] Finally, the Power Act establishes priorities among resources. All else being equal, conservation is the first priority, renewable resources the second, high-efficiency resources the third and all other resources the last.[4]

The Act specifically refers to the Council's responsibility in terms of the Bonneville Power Administration and its resource acquisitions. When the Act was passed, it was assumed Bonneville would carry out most of the new resource development in the region. In the decade after passage of the Act, slow economic growth and a power surplus resulted in few resources being developed. As new resources have subsequently been needed, the region's investor-owned utilities have chosen to develop resources to meet their needs on their own. Nonetheless, most of the goals described in the Act still apply to these utilities because the goals have been consistently reaffirmed over the past decade in regulatory orders approved by each Northwest state's legislature, public utility commission and/or energy facility siting commission. In fact, every investor-owned utility and many

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[1] Public Law 96-501, 2.(1) - 2.(3)(A).
[2] Public Law 96-501, 3.(4)(B).
[3] Public Law 96-501, 4.(h)(2)(A).
[4] Public Law 96-501, 4.(e)(1)

publicly-owned utilities have also adopted language that reflects goals consistent with the Power Act into its strategic planning documents (see Appendix A).

The approach mandated by the Act and implemented by Council and state regulatory policies has three characteristics that distinguish it from more traditional utility planning: 1) the life-cycle costs to society and all available resources, including conservation, are analyzed on a comparable basis in order to assemble the least-costly and most reliable resource strategy to meet future energy demand over the long term; 2) certain non-market costs — most often environmental impacts that are not normally reflected in energy prices — are incorporated into the resource evaluation; and 3) the public is actively involved in both development and review of the plans.

There is substantial agreement in the Northwest on power planning goals. The challenge for the region now is to understand how the changing structure of the electricity industry — with all the benefits that the new structure may bring — could affect attainment of these shared planning goals. It is important to determine how the region can secure the benefits of greater utility competition while fulfilling the promise of least-cost planning.

Forces Influencing Restructuring

The restructuring of the electricity industry is largely the product of three key developments: the emergence of natural gas as a competitive, environmentally attractive fuel; technological advances in electricity generation, transmission and use; and changes in regulatory policy designed to encourage competition. These changes, and some of the history that led to them, are discussed in detail in Appendices B and C. Key elements of these resource, technological and regulatory changes are described below.

Natural Gas

Apparently abundant and relatively inexpensive natural gas is playing a key role in shaping the emerging structure of the utility industry, particularly in the development of a fully competitive generation sector. Decontrol of well head gas prices, begun in 1978 and completed in 1989, resulted in increased supplies and declining natural gas prices by creating an incentive for new gas exploration and development. Restructuring of the gas industry to create an open access transmission system and allow direct contracting for gas supplies between producer and consumer resulted in the development of long-term fixed price gas contracts. The creation of a futures market for natural gas has provided a financial mechanism for hedging risk in the gas market. As a consequence of these developments and the advantages of natural gas as a clean, easily handled fuel, natural gas has become competitive with the coal and nuclear fuels that were the preferred resource in the 1970s and early 1980s.

Technology

Going hand in hand with the emergence of natural gas as a competitive utility fuel has been development of relatively small scale, modular, short lead time, low capital cost, high-efficiency and relatively environmentally clean combustion turbines. This development, coupled with the availability of low-cost gas has effectively removed any remaining rationale for the generation sector of the utility industry to be a monopoly. Once it was thought necessary to construct power plants in increments of several hundred megawatts to capture economies of scale in coal-fired and nuclear generation. Today, with gas-fired combustion turbines, there are few instances where there are significant economies of scale in power generation above 100 to 200 megawatts. Such units are less expensive to build and operate than coal or nuclear power plants and present few siting problems. It is now entirely possible for competitive generating resources to be developed by independent entities. While successful independent power producers pre-date low-cost gas and the current generation of combined-cycle gas turbines, the proliferation of independent power production has coincided with these developments. In fact, approximately half the new electrical resources now being developed in the United States are independent projects.

New developments in generation point to a continuing trend toward smaller unit sizes and higher efficiencies. Combustion turbines are expected to become even smaller, more "off the shelf" and more efficient. Fuel cells will probably follow that same trend, becoming more cost-competitive. The net effect of these developments, along with the potential introduction of cost-effective storage technologies, is the potential to move generating resources closer to end users. Many businesses may be able to cost-effectively generate their own electricity in the not too distant future.

These technologies also increasingly make it possible for utilities to develop smaller-scale generating resources nearer their load centers. This so-called "distributed generation," along with targeted demand-side management, can be part of a competitive strategy to limit future transmission and distribution expansion and make better use of existing distribution systems. Such strategies can lower utility costs and improve reliability.

Renewable generating technologies, such as wind power, geothermal and solar photovoltaics, also have been improving significantly, but they seem likely to have a much smaller impact on the structure of the industry (photovoltaics being the possible exception in the long term). Wind and geothermal are becoming more economically competitive, but their high capital cost, relative to new gas-fired generators, is a disadvantage because cost and rate impacts are incurred early in the resources' useful life ("front loaded"). Renewable resources are also site-specific, a fact that limits their ability to be sited close to end users. In addition, the intermittent nature of wind and solar poses some issues for integration of these resources into the power system.

Besides generating technologies, transmission technologies also are advancing in ways that facilitate a more competitive utility marketplace. Utilities have been wheeling power for years, but the prospect of many more producers linked to the system has raised concerns about reliability and inefficient flows. Information and control technology and solid-state switches, however, will make it increasingly feasible to integrate many generating units into a transmission system with greater efficiency and without sacrificing system reliability.

For the end user, information and control technologies, such as computer management systems that enable customers to tailor their electricity use, are advancing rapidly. These could be viewed as either competitive threats to utilities or important elements of a utility's competitive strategy. For example, control systems can be programmed to make power use decisions on the basis of the time of day or other factors. This would reduce customers' bills by enabling them to avoid high demand charges at certain times and simultaneously provide increased service to the customer by more precisely controlling equipment. As the costs of these technologies come down and the applications become more adaptable, more customers will rely on such sophisticated energy management systems to reduce their electricity use as well as perform a number of non-energy functions. An active energy service sector can be expected to market these technologies.

The potential also exists for utilities to extend communications and control to the customer's side of the meter. As high capacity communication is extended into homes and businesses, utilities can use a small part of the capacity to acquire better customer information and even control some customer equipment. This advanced demand-side management could greatly reduce distribution system costs, improve a utility's competitive position and provide the customer better service.

In summary, the technological requisites for a competitive wholesale generation market are already in place or rapidly coming into place. The trends in generation and storage technology have the potential to move those technologies closer to the customer, either in competition with the utility or as part of a utility's competitive strategy for reducing costs and improving service. Similarly, information and control technologies have the potential to be used in competition with the utility or as part of the utility's competitive strategy.

Regulatory Policy

As with technology, the regulatory environment of the electricity industry is evolving toward a more competitive one. The "traditional" regulatory environment reflected the realities of the industry as it existed years ago: an industry that required the construction of large, capital-intensive power plants and the rapid expansion of transmission and distribution systems. The regulatory system that evolved is a cost-based system that generally offers financial stability in return for utilities' obligation to serve. This regulatory framework generally holds true today for both the investor-owned utilities, regulated by the state utility commissions, and the local public utilities, regulated by locally elected boards or commissions.

As technology developed to facilitate more competition, regulation evolved with it. The Public Utilities Regulatory Policy Act of 1978 was passed to promote renewable resources and cogeneration and reduce utility reliance on imported oil. Perhaps most importantly, it created a class of non-utility generators that had the right to sell the output of those facilities to utilities at the price the utilities would have to pay to develop their own resources — their so-called "avoided cost." This was an attempt to mimic market-based economics. and it led to the development of the competitive bidding schemes many utilities now use to encourage developers to compete to supply utility resources.

The next major federal regulatory change occurred in the National Energy Policy Act of 1992. This legislation created a class of wholesale generators that are exempt from the legal and financial requirements of the Public Utilities Holding Company Act of 1935. Exempt wholesale generators have the ability to structure themselves any way they want, although they are still subject to rate regulation by the Federal Energy Regulatory Commission when they sell their power in interstate commerce. The 1992 Act eases entry into the wholesale generation business.

The drafters of the 1992 legislation also recognized that transmission access was a necessary condition for a fully competitive wholesale power market. The Act gives the Federal Energy Regulatory Commission the ability to require owners of transmission systems to provide access to others wishing to use the transmission system and the ability to determine how that transmission service will be priced. While the Commission rules implementing these sections of the Act are still being developed, most observers expect the Commission to vigorously pursue open access to electricity transmission as it did in the case of natural gas.

The Energy Policy Act's transmission provisions contain language specific to Bonneville. It provides that the Commission can order Bonneville "to provide transmission, but only to the extent consistent with other applicable laws...," e.g., the Northwest Power Act, the Bonneville Project Act and the Transmission Act. How these sections are interpreted will be important to the development of competitive electricity markets in the Northwest and along the West Coast.

Opening access to the transmission system fosters the need for coordination in the planning and operation of regional transmission grids. The Commission has proposed the formation of regional transmission groups, composed of the users, suppliers and, in some cases, the regulators of transmission in given regions, to coordinate the planning, expansion and operation of transmission capacity. The case for coordinated planning of transmission is probably as strong as that for coordinated planning of generation and conservation. Transmission is capital intensive and transmission plans of one utility affect the opportunities and abilities of others. Moreover, investments in transmission, generation and conservation can substitute for one another to some degree. The development of regional transmission groups and the comprehensiveness of their planning functions may be key factors in the evolution of the competitive electricity market.

Significantly, the 1992 Energy Policy Act stopped short of requiring retail wheeling, i.e., provision of access to retail customers by competing suppliers through the local utility's transmission and distribution system. The 1992 Act prohibits the Federal Energy Regulatory Commission from mandating retail wheeling. It does not, however, prohibit the states from allowing retail wheeling. The law states that "nothing in this subsection shall affect any authority of any state or local government under state law concerning the transmission of electric energy directly to an ultimate customer."

Retail wheeling proposals have been brought before regulators and legislatures in a few states. As of yet, none has acted affirmatively on such proposals. One of the key debates in the evolution of the competitive electricity industry will be between the advocates of retail wheeling, mostly industrial customers of utilities with power rates that are relatively high in relation to the cost of alternatives, and those who oppose it. The proponents argue that retail wheeling will lead to a more efficient power system as uneconomic resources are driven off the system.

The opponents of retail wheeling have two main arguments. First, they argue that the greater efficiency brought about by retail wheeling will come at the expense of those customers who cannot participate. These are the so-called "captive customers" who by virtue of their size, circumstance or lack of market power are precluded from access to competing suppliers. Second, opponents of retail wheeling argue that such access will undercut conservation, renewable resource development and the goals of integrated resource planning. These arguments will be explored in greater detail later in this paper. Because of the relatively low embedded cost of the power system in the Northwest, we may have the ability to watch these issues develop in other parts of the country before they have to be confronted here.[5]

There are significant differences between the effects of deregulation in the natural gas industry (Appendix D) and in the electricity industry. Nonetheless, there may be some lessons in the experience of the natural gas industry as it has undergone significant regulatory change. There are two key conclusions from that experience. The first is that the Federal Energy Regulatory Commission actively supports open access to transmission services. This has been the case in the gas industry for both wholesale and retail transactions. Second, *if* open access is extended to local distribution (i.e., retail wheeling), local utility and regulatory control of electricity supply will become more tenuous as this policy is more fully developed. As is now the case with natural gas, more and more of the commodity will be bought directly by consumers in unregulated markets.

In summary, the regulatory changes to institute a more competitive wholesale electricity market are well under way. How far these changes can and should go

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[5] It should be noted that the same concerns may be raised not only by retail wheeling but also by retail competition from other fuels, other utilities or from self-generation, although perhaps not to the same degree. These other forms of retail competition may occur under current regulation.

at the retail level and under what conditions will be a major policy debate for several years to come.

The Special Case of the Bonneville Power Administration

In addition to the technological and regulatory forces affecting the entire industry, the Bonneville Power Administration is subject to a number of potential risks that many perceive as adversely affecting its ability to be a competitive wholesale power provider in the evolving electric utility industry. Those risks include:

- The risk of repayment "reform": Threats of congressional action to increase the interest rates on Bonneville's outstanding low interest rate debt to the U.S. Treasury could increase rates.

- The risk of additional fish and wildlife costs: Efforts to restore salmon runs in the Columbia River Basin have already affected Bonneville's rates. Providing flows to help smolts survive during their downstream migration in the spring and early summer have reduced the firm energy load carrying capability (FELCC) of the hydropower system and affected system flexibility. Other fish and wildlife program costs have been charged to the power system. The uncertainty about additional fish and wildlife costs constitute a risk in the minds of many of Bonneville's customers.

- The risk of additional nuclear costs: Bonneville faces risks that the costs of operating Washington Public Power Supply System Nuclear Project Two (WNP-2) could escalate as a result of accidents, equipment failure, management problems or regulatory changes. In addition, waste disposal and decommissioning costs for WNP-2 and Bonneville's share of the Trojan nuclear plant could increase above currently planned levels.

- Risk of loss of sales to the direct service industries: Bonneville revenues are highly dependent on sales to the direct service industries (23 percent of total revenues in 1992). The vast majority of those sales are to aluminum smelters. Those sales are sensitive to world market conditions outside of the region's control. In the short run, loss of aluminum load would result in higher rates if fixed costs had to be recovered over a smaller sales base or the power had to be sold out of region at a lower cost. In addition, other arrangements would have to be made to provide the reserves created by the interruptable provisions of direct service industry contracts.

- Cost of doing business with Bonneville: Bonneville is a large federal agency subject to many of the rules, regulations, public process and reporting and approval requirements of federal agencies. As a consequence, it is frequently perceived as being slow moving, bureaucratic and a difficult business partner. The additional transaction costs associated with dealing with Bonneville constitute a competitive disadvantage. Some believe that

customers might prefer purchasing power elsewhere, even at a somewhat higher price.

- The Power Act and the Council: To the extent that the goals of the Power Act and/or the Council's actions are seen as causing Bonneville to incur near term costs that independent power producers and other competitors can avoid, they are perceived by some as putting Bonneville and its customers at a competitive disadvantage.

For the past several months, the Bonneville Power Administration has been developing a comprehensive strategy aimed at addressing its particular competitive risks and positioning itself to be a competitive player in its view of the emerging electricity industry. This strategy is important both in terms of its implications for the region and the insights it provides regarding a major player's view of the future electricity industry.

There appear to be three main goals to this strategy: 1) improve control of internal costs; 2) capitalize on natural areas of competitive advantage; and 3) remove or significantly reduce factors that can increase Bonneville's costs. To accomplish these goals, Bonneville is proposing and/or executing a series of specific actions. These actions include:

- Legislation to become a government corporation. This would allow the agency to better control its internal costs and would give it greater autonomy.

- Legislation to allow Bonneville to buy out the present value of its debt to the U.S. Treasury. This would significantly reduce, if not eliminate, the risk of repayment reform.

- A "function-by-function review" to identify opportunities for administrative savings.

- The offering of more unbundled or specialized products and services with market pricing for some of those products. Currently, Bonneville sells most of its power as a bundled product at its priority firm rate. In reality, that bundled product includes several components that are priced separately. For example, the energy charge varies by season (summer and winter), and capacity is charged for separately with several different time-differentiated rates. Other services, like transmission and reserves, are bundled into the priority firm product. There are, however, many other products that could be defined and, at least in theory, priced and sold separately.

  Bonneville is not going to market all its products and services on an unbundled basis. There will continue to be bundled products for different customer groups, e.g., full requirements customers. Preliminary indications are, however, that those bundles may not be identical to the products those customers receive today. In addition, some products would be unbundled

and priced separately. Unbundling lets Bonneville capitalize on its areas of competitive advantage — the flexibility of the hydropower system and its extensive transmission system. There may be high-value products provided by that system that are worth more than is recovered with current bundled pricing.

Offering unbundled products could facilitate the independent acquisition of resources by Bonneville customers as well as make the full cost of independent acquisition more apparent to those customers. In addition, Bonneville is proposing to unbundle many of its conservation programs, offering them as a service for which a utility would pay directly rather than as part of Bonneville's resource acquisition program. This would remove a cost currently affecting Bonneville's rates.

- The implementation of tiered wholesale rates that would provide a market signal for customer utilities to acquire new resources on their own. Typically, tiered wholesale rates would provide a base amount of power to each utility at one price (for example, 90 percent of current load) and charge a higher price for power above that base amount. Generally, the rate charged for the first tier (the base) would reflect the costs of federal base system resources, while the second tier would reflect the cost of new resources.

  Tiered rates would thus provide customers a signal about the costs of new resources. Such a signal could influence their electricity use. Bonneville is planning on that signal being sufficient to permit it to withdraw many of its conservation acquisition programs. Tiered rates would also protect its first tier rates from a major factor driving up rates — the cost of new resources — and could stimulate demand for unbundled high value products from those utilities who undertake independent generating resource acquisitions.

Bonneville's competitiveness strategy and, in particular, unbundled products and services, market pricing and tiered wholesale rates, have the potential for significantly altering the role of the Bonneville Power Administration in the region. These elements will be examined in detail in a forthcoming issue paper.

The Emerging Power Industry

As noted earlier, the electric power industry of the Pacific Northwest, like that of the nation as a whole, appears to be undergoing a transition from an environment of largely non-competing, vertically integrated, regulated utilities toward a more competitive, market oriented environment. This shift is largely in response to the availability of and continued prospects for low-cost natural gas, as well as the technological and regulatory forces described in earlier sections of this paper.

How far this transition will go and how fast it will take place remains to be seen. Some of the factors that will influence the speed and extent of the transition include: whether natural gas prices stay relatively low; how fast competing generating, storage, control and end-use technologies evolve; and how regulators and other policy makers choose to deal with the potential conflicts between competition and other societal goals. For example, how will state regulators and legislatures deal with the dilemmas posed by retail wheeling? Will they prohibit it, shape it or embrace it?

Some observers believe the transition will be both relatively thorough and fast — taking as little as five years and no more than 10 to 15 years, although some technological changes will take longer. However long the transition, the Northwest, because of the relatively low cost of its existing power system, will probably have some more breathing time for the transition to take place. But it is likely that the region has already been affected in some respects.

The purpose of this section is to describe *one view* of the emerging industry and its characteristics. That view is one of a fairly complete transition to competitive markets at the wholesale level and at least some competitive inroads at the retail level. This description is *not a prediction or a statement of what would be desirable*. It is a scenario put forward for the purpose of analyzing the potential effects of industry restructuring. Council staff believe that this description is a plausible outcome of the restructuring forces currently at work and, as importantly, a reasonable reflection of the perceptions of many in the industry. These perceptions frequently appear to be driving decisions today. A subsequent section will analyze how changes in the structure of the industry might affect the Northwest's ability to achieve the public policy goals reflected in the Power Act and in much of the utility regulatory policy of the Northwest states.

Assumptions

The description of the emerging industry that follows is based on several assumptions:

Natural Gas: Natural gas will continue to be relatively low-priced. The price of natural gas will rise modestly in real terms over the long term, although there will be periods of fluctuations. This assumption is based on the belief that market mechanisms (the product of deregulation in the gas industry) will bring adequate supplies to the market and that competition will limit the extent and duration of price spikes.

Generating Technologies: The evolution of generating technologies will continue the trend toward smaller scale and increasing efficiency. Self-generation will become technically feasible for relatively modest as well as larger loads. Project lead times will continue to be relatively short.

Information and Control Technology: The cost of information and control technology will continue to fall. The technology will increasingly be deployed in transmission, distribution and end uses in increasingly integrated ways to effect greater efficiency in the use of existing generating, transmission and distribution capacity. In addition, end users will employ these technologies to further reduce electricity costs and improve quality of service.

Regulation: The regulatory changes necessary to effect open wholesale transmission access will be taken to completion. The pressures to allow retail wheeling will continue and grow. Some forms of retail wheeling may eventually be implemented in many jurisdictions, at least for large customers with market power. Only those utilities with low-cost supplies and efficient operations will escape these pressures.

The Bonneville Power Administration: Bonneville will implement the key elements of its marketing plan, including some form of tiered wholesale rates and at least partial unbundling of its products and services.

Description of the Emerging Industry

The Supply Sector

The supply sector of the electric power industry will be characterized by many players marketing actively at both the wholesale and retail levels. Some of those players are already prominent in the industry, others will be relatively new.

Utilities with competitively priced supplies can be expected to market to their own retail customers (the vertically integrated utility will not disappear), to other utilities, to intermediaries and, if retail wheeling is implemented, to consumers in other utility service territories. Some utilities, however, will "disintegrate," spinning off their generation into a separate business so that they can charge market prices. Conversely, those utilities with relatively expensive generation will be subject to pressures to write down those investments. Some utilities that are currently full requirements customers of the Bonneville Power Administration may acquire generation, particularly if tax-exempt financing remains available. Very small utilities, for whom the output of a combustion turbine far exceeds the utility's load, may own generation jointly through joint operating agencies or other similar mechanisms through which they can pool costs and risks.

Bonneville will market power and associated products from the federal base system to its traditional utility customers and to new customers outside the region. Bonneville will acquire new resources whose characteristics can support such transactions. Whether Bonneville develops and markets bulk power from new generation will depend on its ability to do so competitively.

Today, **independent power producers** account for approximately half the new generation under development. They can be expected to continue to be prominent

players. In the future, independent power producers could be selling to utilities, to market intermediaries and to end users.

A new set of players — **market intermediaries** — will play a role in the market for generation. We have already seen brokers enter the market. For example, one of the bidders in the Clark County Public Utility District's solicitation for new resources was the firm of Louis Dreyfus, acting as a power broker. A broker, in all likelihood, would not physically own any generating resources. Instead, the broker would own a portfolio of supply contracts from which customer needs would be met. That customer could be a utility or it could be a retail customer. The broker could assemble custom power "packages" from unbundled products available on the market.

A **futures market** for power will be established. It will facilitate the role of the broker by providing a financial mechanism through which the broker can hedge risk. The futures market also will be used by individual utilities and end-use customers for the same purpose.

End users will have expanding options to generate their own electricity. Whether they do so and whether they sell the power or use it on site will depend on the competitive choices available to them. Those end users most likely to generate are ones with relatively large loads who can cogenerate — meet both electricity and thermal energy needs at a high overall efficiency. Combustion turbines will continue to be developed in smaller units. Fuel cells will become economic in many applications. Even absent retail wheeling, self-generation and other factors will place a competitive pressure on retail utilities. The cost of self-generation will serve as a ceiling on the retail prices of utilities, independent power producers and intermediaries for those customers capable of self-generation. Many self-generators, however, will continue to rely on the serving utility or another provider for some services, such as backup.

Products and their pricing will become increasingly differentiated as to the type of product (e.g., energy, capacity, shaping); the timing of product delivery (e.g., on-peak, off-peak, shoulder period); the degree of control accorded the purchaser (scheduled by the purchaser or the seller); the degree of interruptibility; and the nature of the purchase arrangement (long-term contract, spot market). Suppliers will unbundle and, in many cases, rebundle their products and services to meet the needs of specific customers.

All of these product dimensions are available today. In the future, they will be available on a much wider basis to additional customers — utilities, brokers/aggregators, end users. Initially, only large and sophisticated customers will be able to take advantage of this differentiation, e.g., utilities and large industrial customers who can adjust their operations to take advantage of time-differentiated rates. As information and control technologies become more available, however, smaller customers will have more choices and more flexibility in their supply of electricity.

Because of the high degree of competition, bulk power will be treated as a commodity. Those commodity prices will be relatively low and margins will be small. The successful commodity competitor will be one that can minimize costs while providing the desired service. There will however, be particular high value products and services that can command higher prices.

The Transmission Sector

Open transmission access is an essential condition for a fully competitive wholesale power market. The transmission sector will remain an area of natural monopoly regulated by the Federal Energy Regulatory Commission. The Commission, in the interests of promoting supply competition and efficiency, will continue to work toward common-carrier treatment of long-distance transmission. A system of open access and incremental cost pricing will characterize federal regulation. Regional transmission groups (RTGs), composed of owners and users of transmission, will coordinate planning and operation of the transmission grids.

The increasing number of generators accessing the transmission system will raise concerns about system stability. In response, information and control technology and solid state switches will be used extensively to increase the capacity of the transmission system and maintain stability.[6]

Because of the seasonal diversity in loads between the North and the South, the seasonality of the Northwest hydroelectric system, and the increased control capability of the transmission system, inter-regional transactions will assume even greater importance than they do today. There will be a west-region system to an even greater extent than today, including British Columbia, Alberta and possibly northern Mexico.

The Distribution Sector

The distribution sector will also remain an area of natural monopoly regulated by state utility commissions and local utility boards operating under state legislative authority. These legislatures, commissions and boards will be under pressure from major consumers with market power and suppliers to open access to local distribution networks so that large industrial and commercial users can take advantage of competitive supply opportunities. Pressure will be particularly intense in areas where utilities have high power rates and less costly competitors are available. Consequently, some jurisdictions may allow retail wheeling under certain circumstances.

The Northwest already has many distribution utilities that purchase electricity from Bonneville or other suppliers. As described earlier, other utilities that are vertically integrated may divest themselves of uneconomic generating resources and become primarily distribution utilities. Some may "disintegrate" into separate generation and distribution companies. There will be pressure on smaller

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[6] For a discussion of the application of electronic controls to transmission systems see Hingorani, Narain G. and Karl E. Stahlkopf, "High Power Electronics," *Scientific American*, November 1993, pages 78-85.

distribution utilities, particularly those with low load density (few "meters per mile") to consolidate to reduce overhead and remain competitive.

As in the case of transmission, information and control technology will be used extensively to improve the utilization of the distribution system assets and facilitate wheeling transactions. Many utilities will employ the concepts of distributed generation and targeted demand-side management to further improve utilization of their generation and distribution assets. These strategies may take advantage of the capability of information and control technology to extend utility control to electricity using or producing equipment in customers' facilities. Real-time pricing strategies and/or direct control will be employed.

End-Use Services Sector

An end-use service sector will emerge to permit customers to take advantage of the diverse array of products, services and prices available. These services could include traditional conservation services, demand (i.e., peak) management services, power quality services, and on-site generation/reliability services, to name a few. These services may be provided by independent energy service companies or they may be provided by utilities. Whether or not utilities provide these services will depend on their competitive strategy. If a utility views its business as an energy *service* business, where these services are a potential profit center, contribute to load retention or provide other competitive benefits (e.g., reduction in generation, transmission and distribution costs), the utility will actively provide them. Utilities and independent suppliers can be expected to promote electricity as a solution to customers needs, e.g., reduced environmental emissions and increased productivity.

End Users

End users will be faced with a tremendous array of choices regarding the product they buy, the price they pay and from whom they buy the product. For power products, end users will be divided into two general categories: those who can take advantage of the new choices and those who cannot. At least initially, those who can will typically be larger, more sophisticated consumers with market power, e.g., industries and large commercial customers.

Those customers less likely to be able to exercise choice with respect to their electricity supplier will typically be residential and smaller commercial customers. These customers are often referred to as "captive" or "core" customers. However, expanded use of information and control technologies will increasingly make greater choice feasible, even for these core consumers.

Key Characteristics of the Emerging Utility Industry

Competition

The emerging utility industry will indeed be competitive. There will be many sellers competing for the business of many buyers. If other recently deregulated industries are a guide (see appendix on gas industry), one can expect prices and margins to fall. Those competing in the market will strive to become "... the low-

price leader offering an unbundled menu of services to meet customer needs, increase market share and improve earnings."[7]

To evaluate how this may influence the industry, it is important to distinguish between competition at the wholesale level and competition at the retail level. Competition is already intense in wholesale bulk power markets where independent power producers have had a major impact on the market. Such competition is likely to intensify as transmission access becomes more open. Wholesale bulk power is a commodity market. The lowest priced power that satisfies the customer's criteria will be the winner. Those criteria may include environmental considerations that go beyond current regulations or a preference for renewable resources. Or they may be limited to quantity, timing and price. That choice will be the customer's.

Competition will also be evident at the retail level. The threat or reality of retail wheeling will result in competition for major end-use customers, at least in higher-cost utility service areas. However, retail wheeling will not be the only or necessarily even the greatest source of competition at the retail level. For example:

- Competition from other fuels, particularly natural gas, is already well established, although the fact that natural gas cannot substitute completely for electricity tempers its impact.

- Competition from other utilities also exists. Communities already have the ability to form their own utilities if they feel their current utility is not competitive. A community also might choose to give up its utility in favor of service from another utility for the same reason. Individual major consumers might be able to bypass their serving utility by connecting with an adjoining supplier.

- Major customers might choose to generate their own electricity, although there are few instances in the Northwest in which this currently would be advantageous. Further technological development and continued low gas prices could change that.

- Energy services can even compete with supply. An energy service company that sells energy-efficiency improvements can compete with the serving utility by meeting the end user's needs at a lower total cost.

It is worth noting that, to date, there are relatively few actual examples of these forms of retail competition, even in areas where utility rates are much greater than they are in the Northwest. This is a reason to be cautious about the ultimate extent of retail competition. It does not mean, however, that retail competition will not be more extensive in the future.

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[7] Drzemiecki, James H. and Peter Augustini, "The Coming Electric Wal-Mart," *Public Utilities Fortnightly*, July 15, 1993, pages 28-30, 47.

Of particular importance will be what emerges as the dominant form of competition at the retail level. Will utilities choose to compete by being the low-price commodity supplier, or will competition be primarily on the basis of energy services, that is, meeting the customer's energy service needs at the lowest total cost, but not necessarily at the lowest electricity price?[8] The Council has been a consistent advocate of the energy services model because that approach is consistent with the goal of meeting the region's electricity needs at the lowest total cost. Conversely, the commodity model with its focus on short-term rates is, as will be discussed further, much less supportive of the goals of the Act and regional least-cost integrated resource planning.

Reality will probably be a mix of both commodity and energy services competition at the retail level. The analogy often used is that of being a "Nordstrom" or a "Wal-Mart." Both are successful. One serves a higher-priced, higher-quality and higher-service market; the other a lower-priced, lower-quality lower-service market. Utilities may have both kinds of markets in their service territories. The question is, which model will be predominant, and how will that affect the ability to achieve the goals of least-cost planning.

Product Differentiation/Consumer Choice

One consequence of competition will, as noted above, be the offering of a menu of products and services to meet customer needs and protect the competitive position of the provider. With the exception of the still-regulated elements of the business, these products and services will be priced by the market. This menu will include unbundled and custom "rebundled" power products at the wholesale and retail levels designed to meet a particular customer's needs. At the retail level, this could include end-use services provided by the utility or others. From the standpoint of economic efficiency, product choice and market pricing means that consumers will see better market signals regarding the value of the services they purchase and will be better able to match their purchases to their needs. Provided there are no significant market barriers in the way, this should result in more efficient use of those services.

Broader Geographic Scope/Less Regional Identity

The concept of the Northwest as a closed power system has been a fiction for many years. Inter-regional transactions of electricity have been important to the region since the opening of the interties. However, as a consequence of open transmission access and the creation of a West Coast electricity futures market, such transactions will assume even greater importance. Projects will be marketed throughout the interconnected western system. This will cause pressure for greater consistency in local, state and regional policies throughout the West.

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[8] For a discussion of the energy services model, see Piepmeier, Jim, David Jermain and Terry Egnor, "Sell Lumens, Not Kilowatts: The Future for Electric Utilities," *The Electricity Journal*, April, 1993, pages 34-39.

More Efficient Use of Existing Economic Capital Assets

An inevitable and, in the long run, positive consequence of the above changes will be more efficient use of economic generation, transmission and distribution assets.

Risk of Stranded Assets

The other side of more efficient use of existing assets is the risk of stranded investment. The transition to competitive markets has been described as a process of "constructive deconstruction."[9] Unrecovered investment in uneconomic capacity is at risk of becoming stranded. For example, if a utility loses large customers to retail wheeling or self-generation, the debt for capital assets built to serve those customers may be stranded. It will either have to be recovered from the remaining "captive" customers, written down at the expense of investors or some combination of the two. Uneconomic capital assets may be written down to improve competitive position. High operating cost resources will be utilized less or retired. Another effect of the risk of stranded investment is increased financing costs. One of the major rating agencies recently made a change in its rating system to take more notice of competition in its analysis of a company's financial strength.[10]

Because most (but not all) of the existing generating capacity in the Northwest is relatively low cost, there is comparatively less risk of stranded investment in the usual sense in this region. Exceptions are cases where owners of existing capacity have to absorb new costs that were previously not fully internalized. This could include hydropower mitigation costs and additional nuclear waste disposal and/or plant decommissioning costs. Such "new" costs could push the price of those resources out of the range of more competitively priced resources that are not subject to those costs.

The future possibility of customers, either wholesale or retail, leaving the system increases the risk that new investments could become stranded. Bonneville already faces such a risk to a limited degree. There are requirements in Bonneville's power sales agreements that require a customer to give notice well in advance of the time when they no longer intend to have Bonneville serve a load. These notice requirements should minimize Bonneville's risks. It is conceivable, however, that Bonneville might invest in new generation or transmission facilities in anticipation of load growth on its customer utility systems and, instead, some of those customers might decide to develop their own resources, purchase from another supplier to meet load growth, or lose some of their retail load. As a consequence, some of Bonneville's investment could be stranded. There would generally be some market for the new power, but revenues from such sales could be less than needed to fully recover costs.

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9 Stallon, Charles at the Clark Public Utilities Workshop on Competitiveness in the Utility Industry, November, 1993.

10 "S&P Stiffens Rating of Electric Utilities, Saying Sector is in 'Long-Term Decline'," *The Wall Street Journal*, October 28, 1993, p. B14.

A special case of stranded investment could be utility investment in efficiency improvements at a customer's facility. If that customer were to subsequently leave the utility, the utility would continue to pay off the costs of those improvements, unless contracts with the customer provided for the recovery of those costs. Such recovery provisions make it more difficult to convince customers to install the efficiency improvements in the first place, although some utilities have elected to use this approach with large industrial customers. It should be noted, however, that even absent competition, conservation faces the risk of this kind of stranded investment. For example, customers may go out of business after a utility has invested in conservation in their facility.

Emphasis on Near-Term Cost Reduction

Utilities concerned about competition will focus on opportunities for cutting costs. This will be true whether the competitive model is commodity or energy services. To the extent this focus brings about increases in efficiency and reductions in administrative overhead, this is positive. Utility efforts to down-size and redesign administrative processes are current manifestations of this effort.

The focus on near-term cost reductions could have other, less desirable effects, however. Utilities will be tempted to take actions that have low near-term costs in lieu of actions that have a lower long-run total cost, but higher near-term costs. Similarly, utilities and other electricity suppliers will be reluctant to take action to reduce long-term risks if doing so results in greater near-term costs. Environmental concerns and research, development and demonstration activities could fall into this category.

Emphasis on Near-Term Rates

To the extent that utilities believe it is necessary to compete on the basis of rates, they will focus on opportunities to keep rates as low as possible. This too will influence resource choices and utility operations. Rates are directly a function of costs, but even for choices with identical costs, the rate impacts can be different. For example, because efficiency improvements reduce sales of kilowatt-hours over which costs are recovered, utility investment in such improvements will typically have a somewhat higher rate impact than a generating resource. This will be true unless the conservation is very much less costly than the generation or the end user pays a larger share of the cost than is typical of many utility programs in this region.

Greater Planning Uncertainty for Individual Suppliers

The advent of the ability of customers to choose among competing suppliers introduces a great deal more planning uncertainty for individual suppliers. There is greater uncertainty about who will get to serve new loads, and existing loads might leave the system. However, as long as the utility's obligation to serve, as currently defined, remains in force, customers who leave the system will have the right to return. The utility then faces the need to acquire resources to meet this "new" load. Because of these kinds of problems, most observers believe that the traditional obligation to serve cannot be maintained in a more competitive environment.

Shortened Investment Time Horizons

An almost inevitable consequence of greater planning uncertainty will be a shortening of investment time horizons. Utilities will be unwilling to incur long-term costs if they are uncertain about the loads they will be meeting. The characteristics of some resources, like gas-fired combustion turbines, fit relatively well with this situation. They are low in capital cost and, to the extent that fuel costs can be avoided, there is relatively little risk if loads are lost. And, because they have relatively short lead times, they can be brought online relatively quickly if new loads materialize.

Conservation and renewables have some attributes that fit well with this environment. They come in even smaller, relatively short lead time units. Consequently, once programs or projects are underway, the rate of acquisition of these resources can be adjusted with changes in growth in demand. On the other hand, these resources are capital intensive and conservation has also been overhead intensive. Their costs are front-end loaded. Once these costs have been incurred, they cannot be avoided if the utility loses load or load does not grow as rapidly as anticipated.

Decentralized Resource Decision-Making

Finally, decision-making regarding new resource choices will be much more decentralized than in the past. The actions of Bonneville, the investor-owned utilities and a few of the larger public utilities used to encompass most of the resource decision-making spectrum. These decisions were subject to known regulatory and planning processes. Now it will be the existing actors plus many new ones — independent power producers, brokers, individual utilities and end users — many of whom fall outside of existing regulatory and planning processes, who will make those decisions in the context of competitive markets and broader market regions. System reliability and risk mitigation will increasingly be dependent on the aggregate decisions of all of those players. *Utility* integrated resource planning may lose its effectiveness in that environment.

Implications for the Goals of the Power Act

The preceding sections of this paper examined the technological and regulatory changes influencing the restructuring of the electric industry generally and the Bonneville Power Administration in particular, and posed *one view* of where that evolution may take the industry. That view is of a significant transition of the industry from a predominantly regulatory planning environment to a competitive market environment at the wholesale level with at least elements of competition at the retail level. To some, this scenario may seem somewhat extreme. As noted earlier, however, Council staff believe this scenario is a logical extension of trends in the industry and represents the views of many industry observers and participants. Many decisions being made in the industry today appear to reflect perceptions consistent with this scenario.

The primary purposes of this section are: 1) to analyze the implications of the restructured industry for the goals of the Power Act and least-cost planning as practiced in the Northwest; and 2) to identify issues the staff believes should be analyzed more completely if the region is to guide the evolution of the electricity industry to achieve the greatest public benefit.

Benefits of Competitive Markets for Electricity

There are real benefits to having well-functioning competitive markets for electricity and electricity services – markets in which important and currently external factors have been internalized and barriers to their efficient operation have been adequately addressed. Competition means choice for customers -- certainly for wholesale customers and for a least some retail consumers. Choice means that those customers will be free to purchase only those products and services that provide the customer the greatest benefit for the lowest cost. To the extent that current regulated markets do not provide choice and accurate price signals, the result can be inefficient utilization of the power system. Some customers pay too little and use too much of some products, others pay too much and use too little.

Because competition also means choice of suppliers, it will cause suppliers to rigorously control their costs. To the extent that cost-cutting is achieved through greater efficiency rather than just cost-transfers that affect the environment or future generations, this is a real benefit to society. Competition will also encourage innovation that can reduce costs and meet customer needs more effectively.

There will be difficult and, for some, costly transitions. Some suppliers may find that they cannot compete and will be driven out of the market. Some distribution utilities may have to consolidate or be absorbed into other utilities. Some generation assets may have to be written down. Other regulated industries that have undergone transitions to competitive markets have experienced significant write-offs of uneconomic assets. The end result, however, is a more efficient overall system.

In the short-run, a competitive market for electricity will tend to drive prices toward short-run marginal costs (i.e., variable costs of operation). However, new producers will not enter the market unless *expected* prices at least cover *expected* long-run marginal costs (i.e., total costs including capital investment). At least in theory, if market conditions remain stable and/or producers have accurate foresight, prices and long-run marginal costs will tend to converge in the long run. If, in addition, environmental costs are reflected in the long-run marginal cost, then market prices will be a good approximation of the long-run societal cost of the marginal unit of electricity.

If these conditions are met *and* other market barriers are effectively addressed, market prices should lead customers to use electricity up to the point where the value of using another kilowatt-hour is less than its societal cost. Given the

conditions outlined above, a competitive market for electricity could lead to more economic and efficient patterns of electricity use by customers. Many of these conditions, however, do not now exist.

Least-Cost Planning and the Emerging Industry

Early sections of this paper discussed the goals of the Northwest Power Act and of the utility commissions, siting agencies and individual utilities in the four Northwest states. These goals can be paraphrased as:

- A least-cost power system in terms of total costs to society over the long term;
- Inclusion of environmental costs and benefits in the evaluation of electrical resources;
- Development of cost-effective conservation;
- Development of cost-effective renewable and high-efficiency resources;
- Maintenance of an adequate and reliable power system; and
- An open, public planning process.

The following paragraphs examine the implications of the emerging industry for those goals.

Least Cost to Society Over the Long Term

The term "least-cost planning" means least *total cost to society*, not just the cost to the utility. This includes non-market costs and benefits, although the degree to which these costs have been quantified varies significantly. The least-cost goal also is reflected in the use of a "total resource cost test" rather than a "rate impact test" for evaluating conservation investments. This means that we, as a society, have been willing to accept slightly higher electricity rates and the resulting distributional consequences for non-participants in conservation programs in return for the lower total costs to society associated with securing cost-effective conservation.

The region has also taken a long-term perspective. This has been implemented in part through the use of a societal discount rate that places higher weight on future costs and benefits than do personal discount rates. A lower discount rate makes it possible for capital intensive resources to compete with less capital intensive resources that have higher long-term operating costs.

In competitive markets, shortened investment horizons resulting from greater planning uncertainty will translate into higher discount rates — a reduced willingness to incur costs now for the sake of lower costs in the future. The focus

on rates will make it difficult to choose resources with higher rate impacts, even if they have lower total societal costs and even lower bills.

Inclusion of Environmental Costs and Benefits in Resource Evaluations

Non-market environmental costs and benefits are components of total societal costs. In the current utility regulatory framework, many jurisdictions go beyond existing environmental regulations as a means of minimizing total costs and mitigating against risks of future environmental regulation. For example, the Oregon Public Utility Commission and the Oregon Energy Facility Siting Council require consideration of possible costs of greenhouse gas emissions, even though such emissions are not now regulated. In competitive markets, wholesale or retail, suppliers will have little incentive to account for non-market or unregulated environmental costs if doing so will make their near-term costs less competitive relative to other suppliers who might be able to avoid accounting for such costs.

Development of Cost-Effective Conservation

The acquisition of cost-effective conservation is at risk in the emerging competitive electricity industry, particularly if the commodity model of competition prevails. Improvements in the efficiency of electricity use will still occur in this environment, but it will be limited largely to conservation that can compete at the retail price of electricity *and* overcome the market barriers that impede consumer investment in conservation.

Some amount of conservation will be able to compete in the emerging industry. Technological advances that improve the cost-effectiveness of conservation (e.g., digital control systems) may increase that amount. To the extent that prices actually do move toward the long-run marginal costs, it will encourage efficient choices by consumers. Moreover, there will likely be an energy services industry that will market those efficiency improvements.

Unfortunately, *even with good marginal price signals, market barriers to consumer investment in conservation will remain.* Those barriers include lack of information, lack of access to capital, high consumer investment discount rates and split incentives (e.g., the situation where a landlord does not have incentive to invest in conservation when the tenants pay the energy bills).

Utility programs have been used to bridge the gap between what is cost-effective and achievable by the consumer, taking market barriers into account, and what is cost-effective for society. The payment of utility incentives to overcome the gap is justified by the fact that for much of the conservation resource, the total long-term cost to the utility is less than that of alternative resources. If total societal costs, including non-market environmental costs, are considered, the comparison is even more favorable for conservation. However, the payment of such incentives may not be sustainable in a competitive environment for the following reasons:

- Shortening of utility investment horizons will result in greater discounting of both the future benefits of conservation and the future variable costs of

competitive resources like gas-fired combustion turbines. Since conservation is capital intensive and front-end loaded, greater discounting will erode the apparent cost-effectiveness of conservation. On the other hand, the effects of future fuel price increases or possible environmental regulations will be discounted more heavily, improving the apparent competitiveness of fossil fuel resources.

- Emphasis on minimizing near-term costs will discourage including non-market environmental costs in the evaluation of generating resources, reducing the amount of conservation that would otherwise be cost-effective.

- Emphasis on near-term rates in commodity competition will disadvantage conservation. Unless it is quite a bit less expensive than the alternative resource, conservation will have a slightly higher impact on rates than some generating resources because conservation's costs must be recovered over a smaller base of sales. Utilities competing for a commodity market are less likely to be influenced by regulatory mechanisms like decoupling, which are designed to encourage investments in conservation by allowing them to increase rates to recover lost revenues.

- Emphasis on rates, particularly for large, rate-sensitive customers, will discourage utilities from spreading the costs of conservation incentives to all customers. As one critic of utility conservation programs put it, "Under market pricing, a utility's rates would be no higher than the market would allow, and regulators would not be able to finance their agendas, however laudable they may be. This would put an end to the [incentive based] DSM programs of the type discussed here." [11]

- A likely response will be a move to have consumers pay more of the costs of conservation. Utilities may seek to limit their participation to providing information, technical assistance and possibly financing (i.e., loans rather than rebates). There is nothing wrong with this *if* it is effective. It will be effective, however, only to the extent that these activities successfully address the market barriers faced by conservation. There is little evidence to date that they will be. Alternatively, there could be a temptation to "cream-skim," acquiring only the most inexpensive conservation. This could reduce the amount of conservation that is ultimately achieveable.

- Utility concerns about stranded investment will discourage investment in capital intensive resources like conservation. Conservation in the facilities of customers who might go off-system could be particularly at risk. One response might be to treat conservation expenditures as expenses so that all costs are recovered in the period in which they are incurred. This, however, would exacerbate the rate impact.

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[11] Studness, Charles M., "Utility Competition, DSM and Piano Bars: The Fatal Flaw," Op Cit.

These concerns seem to be borne out by the experience in the United Kingdom. The United Kingdom has privatized its electricity industry and restructured it into several generation companies, a national transmission grid company and several local distribution companies, with retail wheeling available to industrial customers above a certain size. While demand-side activity had never reached the level it has in the United States, that activity has diminished since privatization and retail wheeling. The United Kingdom has subsequently formed a government-managed trust to fund conservation.[12]

The negative impacts on conservation will be tempered to the extent that utilities choose an energy services approach to competition, that is, they use efficiency and demand-management services as part of their competitive strategy. Similarly, utilities that can reap savings in transmission and distribution system costs through targeted conservation and demand management will pursue these savings.

Still, it seems likely that a significant part of the conservation resource will be at risk in the competitive environment. Even utilities that adopt an energy services approach to competition may believe, correctly or not, that there are significant commodity segments to their markets. The potential for competition for those market segments could result in an unwillingness to treat conservation as a resource, i.e., they might be unwilling to recover the cost of the conservation resource from all their customers. This would limit the ability of the utility to overcome market barriers to conservation.

Most of the aforementioned concerns are the result of retail competition, real or feared. Competition at the wholesale level should not be antagonistic to conservation, at least in theory, as long as wholesale purchasers adhere to long-term, least-cost principles in their purchase decisions.

As a practical matter, however, that may not be the case for reasons largely unrelated to competition. For example, although the reality of efficiency savings has been demonstrated repeatedly, the fact that it is difficult to "meter" conservation savings remains an impediment. Conservation programs also require a significant commitment of effort on the part of a utility. Utilities faced with competitive power supply offers may find it simpler and less risky to accept such offers than to plan, finance, staff and carry out competitive conservation programs. Energy service providers may compete with bulk power suppliers by offering "turn key" conservation programs. However, the relatively greater capital intensity of conservation may put those energy service providers at a competitive disadvantage. Even if a utility is not facing retail competition, the somewhat greater rate impact of conservation has been and will continue to be a disincentive

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12 Cohen, Armond, *Retail Wheeling and Rhode Island's Energy Future: Issues, Problems and Lessons from Europe*, remarks presented to the Retail Wheeling Subcommittee of the Rhode Island Energy Coordinating Council, July 22, 1993. Conservation Law Foundation, Boston, MA pages 15-18.

to utility conservation. Raising rates is not a popular activity, even if it leads to lower total societal costs.

Finally, the fact that conservation investment is considered only a "regulatory asset" by Wall Street is already a concern for investor-owned utilities. To the extent that utilities have to expense their conservation expenditures rather than put them in their rate base worsens their rate impact relative to generating resources, whether they are purchased or owned by the utility. Expensing puts all the costs up front. The Northwest's public utilities have not faced this problem, in part because their debt offerings to finance conservation have been backed by contracts with the Bonneville Power Administration. These utilities may, however, also be confronted by this problem when they attempt to finance conservation without Bonneville backing.

Development of Cost-Effective Renewable Resources

For many of the same reasons described above, renewable resource development can be expected to suffer in competitive wholesale utility markets. There may be, however, some potential benefits for renewable development:

- Wholesale wheeling should reduce a potentially significant market barrier to development of renewables — that of transmitting the power from the resource site to customers. In many cases, important sources of renewable energy are far removed from population centers where the energy is needed. The customer may not be the utility in whose service territory the plant is located, or the owner of the closest transmission lines. Open transmission access will facilitate getting the power from remotely sited renewables to markets.

- Unbundling of power products and services may improve the ability to accurately assess the value of renewables. The overall effect of this on the acquisition of renewables in unclear. Some renewables, such as solar and wind are intermittent. Others cannot be economically dispatched or displaced to follow load. The ability to account for the effect of these characteristics on the value of renewables should improve as unbundling and market pricing of power system products and services proceeds. Similarly, the availability of unbundled power products may make it easier to integrate renewables into a customer's system.

On balance, however, the competitive field appears tilted against renewables:

- Reduced consideration of environmental externalities may disadvantage renewables. With the exception of "good will" benefits and reduction in the risk of future environmental regulation, there is little incentive for decision-makers to consider market externalities in a competitive deregulated environment. To the extent that the externalities of renewables are less than those of gas-fired resources, renewables would be disadvantaged by a resource decision-making process that is increasingly independent of

mechanisms, such as utility least-cost planning, which have traditionally been used to encourage accounting for externalities in resource development and operation.

- Shorter investment horizons will hinder renewables. The high discount rates of short-term decision-making emphasize the high front-end investment costs and discount the lower longer-term operating cost savings and reduced vulnerability to environmental regulation of many renewables. Renewables may be further disadvantaged to the extent that longer-term environmental and financial risks associated with fossil fuel use are more heavily discounted by a short-term decision-making focus.

- Reduced research and development investment, a possible victim of cost and proprietary concerns, will slow the development of renewables. With a deregulated, competitive generating sector, it seems less likely that utilities will continue to support research directed toward the improvement of new generating technologies. The small-scale, independent nature of the renewables industry may inhibit needed resource assessment and technology development. Unlike the natural gas and combustion turbine industries, most renewables do not benefit from spin-off resource assessments and technology development that is conducted in non-electric sectors.

- Finally, a reduced system planning perspective will minimize the "diversity premium" that renewables might otherwise be accorded.[13] Again, experience in the United Kingdom tends to support this conclusion. In the United Kingdom, new resource development is largely limited to gas-fired generation with short-term gas supply contracts.[14]

An Adequate and Reliable Power System

Increasing competition and disaggregation of the industry have the potential to lead to improved uses of electric power system assets and the development of efficiently designed and operated individual power projects. Greater inter-regional integration and the addition of more relatively small generating units should reduce reserve requirements. But the emerging structure also has the potential to lead to problems affecting the longer-term reliability and adequacy of the regional power system.

These potential problems include:

- *System stability*: Implementing network access to the electrical transmission system for many suppliers is a somewhat more difficult proposition than doing so in a gas transmission system. Frequency must be maintained or the stability of the entire system can be jeopardized.

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[13] See Cavanagh, Ralph, *The Great "Retail Wheeling" Illusion -- and More Productive Energy Futures*, Natural Resources Defense Council, November, 1993, p. 12.
[14] Cohn, Op Cit p. 15.

Advances in information and control technologies have made this easier and will continue to do so in the future. Pacific Gas and Electric Company, for example, now dispatches several hundred generating units.

- *Market stability — coping with the cyclical nature of unregulated markets:* Unregulated industries sometimes exhibit boom and bust cycles. For example, airlines overinvest in new aircraft. The market becomes over-supplied with planes. Airlines go bankrupt and airplanes sit idle. In the oil industry, rising prices stimulate exploration and drilling — frequently more than is needed. The resulting glut of oil, drives prices down. Capacity is shut in or oil is sold for far less than its long-term replacement cost. Producers withdraw from the industry until reduced supplies and rising prices stimulate reentry. It can be argued that those that are hurt are only private investors who knowingly accepted risk. But the costs of market entry and exit are real costs to society.[15] The Northwest, for example, still pays for overinvestment in unneeded nuclear power plants.

  Is electricity any different? Might we expect rising prices to stimulate overinvestment in capacity? Could the resulting oversupply and falling prices cause underinvestment in capacity and subsequent reliability problems? As witnessed by the region's troubled nuclear program, the regulated industry has not been immune to such problems, although for different reasons. Regional integrated resource planning was, in part, a response to these concerns. Is the competitive market a better response?

- *Institutional and financial reliability:* Will new entrants into the electricity supply business have the same institutional and financial reliability as the established participants with whom they are competing? If the facilities they develop fail to perform, will contractual remedies provide adequate protection? Will others actually bear the risk of non-performance? Currently, most independent power producers appear to be well-established, reputable firms for whom this risk is small. That may not always be the case for all entrants.

- *Stranded investment and resulting equity impacts:* Competitive markets pose the risk of stranded investment at both the wholesale and the retail levels. This is not a reliability issue in the usual sense, but it does relate to the reliability of the business relationship between utilities and their customers. Opponents of retail wheeling argue "that the only benefits which emerge from the proposed transactions are not efficiency-based, but rather distributional in nature: the transfer of embedded capacity costs from industrial customers to other ratepayers or utility shareholders."[16] In considering a retail wheeling proposal, an administrative law judge for the Michigan Public Service Commission noted that he doubted the likelihood

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15 See Lesser, Jonathan and Malcom Ainspan, *Retail Wheeling: Deja Vu All Over Again*, unpublished paper, Green Mountain Power Corp, South Burlington, Vermont, pages 17-21.
16 See Cohn, Op Cit, p. 23.

that net benefits would be achieved for the utilities' customers overall.[17] While these issues are focused at the retail level, there is some potential for similar impacts from wholesale competition in, for example, the Bonneville system.

- *System (cumulative) risks and strategies to cope with these risks*: The power system faces any number of risks: the risk of unanticipated increases in natural gas prices; the risk of greenhouse gas regulations such as a carbon tax; the risk of underperformance of conservation; the risk of cumulative environmental impacts. The current regulatory and planning framework has encouraged strategies such as developing a diverse resource mix that is less sensitive to these risks. In the regulatory environment, utilities have carried out the "portfolio management function: choosing and buying the combination of generating resources, purchased power and demand-side efficiency improvements that will minimize life-cycle cost of reliable energy services for customers collectively."[18] In a competitive market environment, this function is at risk.

An Open, Public Planning Process

The Council's planning process, as well as those mandated by the state utility commissions and local utility governing bodies, were intended to provide opportunities for the public to participate in utility planning decisions that have major consequences for the region's current and future well-being. In a competitive utility future, this role is likely to be usurped by short-term contractual decisions made by individual utilities, major end users, independent power producers, brokers and others. There is an argument that the market system makes public process irrelevant. We do not, for example, have public planning processes for wheat markets. Others, however, point out that the electric power industry is significantly "affected with the public interest" in terms of its environmental and economic significance.[19] This public interest, they argue, requires a public role in planning.

Conclusions

If the electric utility industry undergoes the transition described in this paper, the result will be more competitive markets for electricity — certainly at the wholesale level and quite possibly at the retail level as well. There are benefits to competitive markets for electricity. At the same time, however, if these markets do not provide good price signals and barriers to efficient market operation are not adequately addressed, competition could put at risk many of the goals of the Power Act and long-term, least-cost planning as practiced in the Northwest. For markets to achieve the promise of competition *and* the goals of least-cost

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17 Fetter, Steven M., *Retail Wheeling's Serious Setback*, Fitch Research Special Report, November 15, 1993.
18 Cavanagh, Op cit., p. 7.
19 Ibid, pages 4-12.

planning, prices must reflect environmental and other societal costs that are still external to market decisions. In addition, barriers like inadequate access to information, unequal access to capital, high private investment hurdle rates, split incentives and many more must be remedied.

Most of the risks to the goals of long-term, least-cost planning arise not so much from competition at the wholesale level, but from the perception or reality of competition at the retail level. As long as the actions of wholesale power purchasers are guided by the goal of a long-term, least-power system, a competitive wholesale market is likely to be beneficial. If wholesale purchasers are demanding resources that satisfy long-term, least-cost criteria, the market will strive to meet those demands as efficiently as possible.

Over the last decade and a half, the regulatory and least-cost planning processes in the region have been vehicles for achieving societal goals regarding conservation, renewable resources and the environment. They have tried to insure that utility resource decisions were based on long-term marginal prices, including environmental and other external costs, and that efforts were made to overcome barriers to the efficient operation of markets, particularly for energy efficiency. These efforts have been reasonably successful. With the prospect of more competitive retail markets for electricity, those utilities undertaking actions to secure the goals of long-term, least-cost planning are concerned that they will experience near-term retail rate impacts that competitors can avoid. This concern is undercutting the effectiveness of least-cost planning.

Much of the current public debate is focused on the effects of retail wheeling. Whether or not to allow retail wheeling is an important policy choice that may have to be confronted by utility commissions and legislatures in the region. However, even if retail wheeling is not allowed, other forms of retail competition — competing fuels, formation of new utilities or takeover and self generation — can have some of the same effects.

The concerns about the effects of retail competition will be reduced if utilities recognize, as the Council has advocated, that retail markets for electricity are primarily service markets. Utilities that focus on meeting their customers' electricity service needs at the lowest total cost rather than the lowest electricity rate will be satisfying at least part of the goal of least-cost planning. Even those utilities, however, may believe that there are segments of their markets that are essentially commodity markets. This may inhibit their ability to fully treat efficiency as a resource — spreading the costs of the resource to all the beneficiaries, both direct and indirect, the ratepayers. Moreover, while an energy service approach will greatly increase the probability of acquiring cost-effective conservation, it does not fully address other goals such as consideration of environmental costs and development of cost-effective renewables.

The challenge facing the Council, the regulatory commissions, state siting agencies and utilities during this period of transition is that of capturing the benefits of more competitive electricity markets while fulfilling the societal goals

reflected in the Northwest Power Act and in least-cost planning as practiced by the region's utility regulatory commissions and individual utilities. To the extent that the market provides appropriate signals regarding environmental and other societal costs and benefits, and market barriers are removed, decentralized market decision-making could be as effective or more effective than the planning/regulatory decision processes of today in reaching those goals. The conclusions of this analysis, however, are that competitive markets as they are currently structured, particularly at the retail level, appear unlikely to fully achieve the goals of the Power Act and least-cost planning.

Issues for Further Analysis

These conclusions and possible solutions to the problems they pose need to be more rigorously examined in the specific context of the Northwest's electricity system.

Issues that must be examined further include:

- What are the consequences of shortened investment time horizons and a focus on near-term rates, given the characteristics of the resources, fuels and market mechanisms likely to be available in the future? For example, does the low capital cost of gas-fired resources and the availability of market products for hedging gas price risks mean that there is little risk in taking a short-run perspective? What are the trade-offs between long-term costs and near-term rates? What is the value in a long-term, least-societal-cost perspective in this environment?

- What specifically are the consequences, in terms of efficiency and equity, of unbundling services and tiered wholesale rates by the Bonneville Power Administration? How can these concepts be implemented to ensure that Bonneville is effective in carrying out its responsibilities to achieve the goals of the Act?

- What are the consequences of wholesale and, in particular, retail wheeling? What, if any Northwest resources are at risk of becoming stranded investments? Are there particular conditions that should be established to minimize potential adverse consequences?

- Are there other utility regulatory mechanisms that can provide most or all of the benefits of competition while preserving the benefits of the current regulatory and planning environment? What are they?

- What, if any, role could regional transmission groups play in helping to ensure that the goals of long-term, least-cost planning are met? Should the Council participate in regional transmission groups?

- How can market barriers to achieving cost-effective conservation be overcome in a competitive environment?

- How can we ensure that externalities are controlled to socially acceptable levels in the development and operating decisions of an industry moving away from a traditional regulatory and planning structure? Will the cumulative and long-term environmental impacts of resource development and operation be adequately assessed and controlled in an increasingly decentralized and competitive environment?

- How can we ensure that resource assessment and technology research, development and demonstration are undertaken in an increasingly competitive, decentralized and independent industry environment?

- Will synergistic and system values be adequately reflect in resource acquisition and operation decisions in an increasingly decentralized system? How can we be assured they will be?

- Will adequate power system stability and reliability be maintained in an increasingly decentralized power system? How can we be assured that they will be?

- Can a publicly accountable planning process be maintained in an increasingly decentralized and deregulated industry? Should it be? If so, what should be the principle objectives of such a process?