

**BACKGROUND PAPER 95-16**

**COMPETITION IN THE GENERATION,  
SALE AND TRANSMISSION OF ELECTRIC ENERGY**

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# **BACKGROUND PAPER ON COMPETITION IN THE GENERATION, SALE AND TRANSMISSION OF ELECTRIC ENERGY**

## **INTRODUCTION**

Currently there is significant interest in introducing more competition into both the wholesale and retail markets for electrical energy. Proponents believe that allowing market mechanisms to determine energy prices instead of establishing rates by regulation will promote least-cost electricity generation and foster price signals that encourage efficient use of energy resources. This document briefly outlines some of the many issues associated with restructuring the electrical industry.

## **SUMMARY**

- Rising costs of producing electricity triggered by foreign oil embargoes and inflation in the 1970s, coupled with environmental initiatives mandated by state regulatory commissions and problems with nuclear power plants, led to higher electricity rates for consumers.
- These higher rates spurred interest in a more competitive, free-market mechanism for establishing electric prices, patterned after federal deregulation of basic industries such as transportation and telecommunications.
- Federal enactments such as the 1978 Public Utility Regulatory Policies Act (PURPA) and the Federal Energy Policy Act of 1992 (EPAct), opened the way for new types of energy producers and a more competitive wholesale market for electric services.
- Initiatives by Congress and the Federal Energy Regulatory Commission (FERC), in turn, led states to consider "retail wheeling" as a means of fostering a market-driven, as opposed to a regulated, electrical industry. Retail wheeling allows customers to bypass the local utility, purchasing power wherever it is cheapest and paying the utility a fee for transmitting the electricity over its lines.
- The California Public Utility Commission (CPUC) presented a "Blue Book" proposal in April 1994 that would have allowed retail wheeling for large industrial customers in 1996, extending to all users by the year 2002. This proposal prompted extensive debate on retail wheeling in other states.

- Retail wheeling has significant consequences for long-range planning, environmental issues, and equities between classes of electrical consumers as well as utility shareholders.

### Historical Overview of the Electric Industry

Some background on utilities will assist in understanding how the electric industry is presently structured and how it has evolved. In turn, this information will aid in analyzing how retail wheeling may impact that structure.

#### *Federal Power Act of 1935*

Until 1927, state utility commissions regulated most aspects of electric utilities, including establishment of rates for interstate sales of electricity. In that year, the United States Supreme Court handed down its decision in *Public Utilities Commission v. Attelboro Steam and Electric Company* (273 US 83), prohibiting state regulation of interstate electric rates on the ground that such regulation created a burden on interstate commerce. However, no federal authority over interstate electric sales existed and, therefore, the *Attelboro* ruling resulted in a regulatory gap. The Federal Power Act of 1935 (FPA) was enacted to address this situation. The FPA gave the old Federal Power Commission jurisdiction over transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce.<sup>1</sup>

According to Professor Kenneth Nowotny, the electric industry experienced almost constant growth until 1972.<sup>2</sup> The price of electric energy fell during virtually the entire period due to economies of scale, technological change, and vertical integration of production.

The industry became characterized by large, mostly self-sufficient, vertically integrated utilities controlling exclusive service territories in which generation, transmission, and distribution facilities were owned by a single entity and electricity was sold as part of a "bundled" service or package with one all-inclusive rate.<sup>3</sup> Electric rates historically were regulated by state utility commissions. Rates were based on factors such as the cost of producing and distributing power, the anticipated future demand for electricity, and the cost of building the necessary generating plants. Allowable profits were determined largely on the size of investment in new plants and what the state commissions determined to be the fair rate of return for shareholders on those investments which were "prudently incurred," i.e., considered to be reasonable and necessary. This characteristic structure of exclusive franchise territories coupled with an obligation to reliably serve all customers within the service area and rates based upon prudently incurred investments has come to be known as the "regulatory compact." According to Professor Nowotny, such cost-based policies created pricing structures that encouraged over staffing, "gold plating" investments, cross-

subsidies among consumer classes, creation of excess capacity, and suppression of innovation.<sup>4</sup>

#### *Public Utility Holding Company Act*

Another feature of the traditional electric utility was confinement to a limited geographical area. The Public Utility Holding Company Act of 1935 (PUHCA) prohibited acquisition of any wholesale or retail electric business through a holding company unless that business formed part of an "integrated public-utility system" when combined with the utility's other electric business. This provision largely prohibited a utility from owning facilities that were not located within, or contiguous to, the utility's existing service area. Additionally, PUHCA restricted ownership of an electric business by nonutility corporations.<sup>5</sup>

In the 1970s, foreign oil embargoes drove up the price of oil, the principal fuel used by many electrical utilities. Additionally, environmental concerns, nuclear power plant failures, and inflation all led to increasing electricity prices for the first time in the industry's history.<sup>6</sup> Between 1970 and 1985, average residential electricity rates more than tripled in nominal terms while industrial electric prices more than quadrupled.<sup>7</sup> These price increases, in turn, led to decreased consumer demand and, in some cases, prompted industrial customers to bypass utilities by constructing their own generation facilities.

Professor Nowotny notes that as environmental concerns about air and water pollution increased, along with attempts to reduce dependence on foreign oil through conservation, state utility commissions began developing demand side management (DSM) programs. These programs were designed to persuade consumers to use less power. The cost of these programs was included in rates.<sup>8</sup>

Additionally, alternative sources such as solar, wind, and geothermal were encouraged. Some commissions began mandating that specific percentages of new power had to come from these renewable sources even though the cost per kilowatt hour was higher. States also began implementing integrated resource planning (IRP) programs to coordinate DSM and supply side management techniques with environmental projects and renewable energy initiatives.

#### *Public Utility Regulatory Policies Act*

In 1978, the United States Congress passed the Public Utility Regulatory Policies Act (PURPA) in response to the energy crisis. Congress' goal was to reduce dependence on expensive foreign oil and avoid repetition of the 1977 natural gas shortage by encouraging utilities to conserve gas and oil. This enactment created a new category of electric business: independent, unregulated companies known as qualifying facilities (QFs). These entities are permitted to build generating plants that use otherwise wasted heat to produce electricity<sup>9</sup> or must meet specific energy requirements such as using prescribed

types of renewable energy like solar, wind, geothermal, or biomass. Once a QF has been certified, it is exempt from the PUHCA restrictions on geography and ownership (except a utility may still not own more than 50 percent of a QF). A QF can be owned by either a utility or a nonutility and may be located anywhere. Additionally, QFs were granted the legal right to sell electricity to utilities at wholesale.<sup>10</sup> By 1988, the Federal Energy Regulatory Commission (FERC), successor to the FPC, had approved approximately 62,000 megawatts (MWs) of QF capacity<sup>11</sup> (each megawatt can supply approximately 1,000 households for a year) and presently there are about 1,200 such facilities.<sup>12</sup>

About the same time PURPA was enacted, traditional utilities were becoming reluctant to build new power plants due to declining demand, environmental concerns, and nuclear power problems. Economies of scale that had helped establish the dominance of large vertically integrated utilities were no longer being achieved. A primary reason was that larger generation plants tend to need more maintenance and have longer down times.<sup>13</sup> Concurrently, technological advances utilizing combined cycle natural gas turbines and circulating fluidized bed boilers allowed newer, smaller generating plants to be brought on line at less cost and with shorter lead times. The optimum sized generating plants changed from 500+ MW facilities with 10-year lead times to 50 to 150 MW units with 1-year lead times.<sup>14</sup> The smaller plants can produce power on the grid at between three and five cents per kWh. The larger coal plants typically produce power at a cost of four to seven cents per kWh, while nuclear facilities average nine to 15 cents.<sup>15</sup> Such conditions led to the rise of independent power producers (IPPs). These companies build power plants for a fee and then sell the electricity to utilities. Frequently, IPPs are subsidiaries of electric utilities. According to Schmidt and Oechsler,<sup>16</sup> IPPs are responsible for one-half of the new generating capacity that has been added since 1989. Along with QFs and nonutility generators (NUGs), which are usually large consumers that have self-generating capacity, IPPs have come to be viewed as potential competitors of traditional utilities in electric power generation.

Then, in the late 1970s and the 1980s, certain basic industries began to be deregulated at the federal level. The theory was that a free market competitive approach based on supply and demand is a more efficient mechanism to establish price and methods of production. Savings and loans, airlines, motor carriers, railroads, telecommunications, and natural gas pipelines were all deregulated.<sup>17</sup> According to one estimate, the nation has realized at least \$36-\$46 billion (in 1990 dollars) annually from deregulation, amounting to approximately a 7-9 percent increase in the component of Gross National Product affected by regulation.<sup>18</sup>

### *Energy Policy Act*

Early in the 1990s, proponents of this competitive market approach initiated steps to extend it to the electric industry. Congress responded by establishing a new national energy policy strategy embodied in the Federal Energy Policy Act of 1992 (EPAct). The



intent was clear: the electric industry was to move toward a fully competitive market system, with FERC being responsible for most of the implementation.<sup>19</sup> The EAct granted exemptions from PUHCA requirements under certain conditions for a corporation whose exclusive business is ownership and operation of a generating plant that sells its power at wholesale. Such an entity is known as an exempt wholesale generator (EWG). An EWG is also exempt from PURPA's cogeneration and renewable energy requirements.<sup>20</sup>

Thus, EAct created the potential for significant deviations from the traditional vertically integrated pattern that had characterized the electric utility industry for many decades. The changes in PUHCA and PURPA under EAct authorized the formation of new generating companies that were separate from, and often independent of, traditional utilities, thereby opening the utility market to wholesale power wheeling among utilities.<sup>21</sup> The evolution beyond the traditional vertically integrated industry structure has also fostered the growth of wholesale power marketers and brokers. Marketers buy electricity from generators and then resell it to a utility; brokers do not actually take title to power but instead match wholesale buyers and sellers for a fee.<sup>22</sup>

However, for all these new entities, generators and middlemen alike, to effectively compete in the wholesale market, they need access to the nationwide transmission grid, which is generally owned by the vertically integrated utilities. Therefore, EAct authorized FERC to order transmission-owning utilities to open their lines to parties desiring to buy or sell electricity at wholesale.<sup>23</sup> Thus, EAct greatly expands FERC's jurisdiction over wholesale wheeling transactions.<sup>24</sup> However, EAct specifically prohibits FERC from ordering retail wheeling to the extent that it would infringe on state laws granting utilities exclusive franchise areas. At the same time, EAct provides 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 consumer."<sup>25</sup> This array of federal actions prompted debate at the state level on how to promote greater wholesale and retail competition among power producers, a topic covered in more detail below.

## Role of FERC

### *Creation of Regional Transmission Groups*

Because of its expanded responsibilities under EAct, FERC has pursued several initiatives to increase competitiveness at the wholesale level. The FERC has issued policy statements to address various aspects of wheeling. One of the more significant policy statements encouraged the formation of Regional Transmission Groups or RTGs (August 5, 1993). An RTG is a voluntary organization of transmission owners, transmission users, and other entities interested in coordinating transmission planning, expansion, operation, and use on a regional and interregional basis.<sup>26</sup> To date, FERC has approved three RTGs: the Western Regional Transmission (WRTA), the Northwest Regional Transmission Association (NRTA), and the Southwest Regional Transmission

Association (SWRTA) (approval of SWRTA is conditional at this time). The geographically smaller NRTA and SWRTA function as subregional RTGs of WRTA.

The Federal Energy Regulatory Commission requires RTG members to offer nondiscriminatory equal access to transmission facilities to other RTG members, thus furthering FERC's goal of open access to the grid for all buyers and sellers of electric power. Pursuant to this requirement, a member owning transmission facilities must provide service to other RTG members on a basis comparable to what the owner provides itself. The RTG members also covenant that all transmission requests from members will be met from existing capacity or else a public utility must offer to build new capacity. Furthermore, members agree to utilize the RTG dispute resolution process before resorting to FERC hearings. This requirement is designed to expedite dispute resolutions through arbitration and mediation rather than prolonged litigation at FERC and in the federal courts.

### *FERC's "Giga-NOPR"*

Additionally, FERC has opened several dockets, referred to as NOPRs (Notice of Proposed Rulemaking), dealing with the wheeling issue. Chief among these is the so-called "Giga-NOPR" issued March 29, 1995 (originally known as the "Mega-NOPR"). This 315-page document embodies FERC's proposal for developing a more competitive wholesale electric energy market by ensuring wholesale buyers and sellers can reach each other through elimination of anticompetitive and discriminatory practices in transmission services. This proposal specifies:

- All utilities under FERC jurisdiction are required to file nondiscriminatory, open access transmission tariffs available to all wholesale buyers and sellers of electric power.
- Utilities must use these same tariffs for their own wholesale purchases and sales to avoid reaping any advantage in the marketplace from ownership of transmission facilities.
- Utilities are allowed to recover legitimate and verifiable stranded investment costs resulting from the transition to competition.

According to Commissioner James J. Hoecker, FERC will probably adopt a final version of the rule in the first half of 1996.<sup>27</sup>

### *State and Federal Jurisdictional Issues*

Another important issue involving FERC is the scope of respective state and federal jurisdiction. Wholesale electric sales and interstate transmission of energy are exclusively within FERC's jurisdiction. Under PURPA and EPAct, FERC has specifically

acknowledged that it does not have authority to order retail wheeling.<sup>28</sup> The agency has also indicated that retail stranded investment issues should be resolved at the state level. However, there is not always a bright line between stranded costs attributable to wholesale as opposed to retail operations.<sup>29</sup> Additionally, FERC has suggested that it has jurisdiction of these issues if a state lacks a mechanism or forum for addressing them. The soundness of FERC's jurisdictional analysis has been challenged by the National Association of State Utility Advocates (NASUCA).<sup>30</sup> Some observers indicate that the actual extent of FERC's authority may ultimately have to be defined through litigation. In addressing the jurisdictional issue, one commentator has cautioned:

State legislators and regulators must keep in mind, however, that once transmission service to ultimate customers is offered as an unbundled service, the transmission service is considered *interstate* commerce . . . . Once unbundled transmission service is part of interstate commerce, the FERC has full authority to set prices, terms, and conditions of service.

Thus, even though the authors argue that state legislatures and commissions can permit or require retail wheeling, without the ability to set rates, terms, and conditions of service, they might find this authority more akin to an abdication of jurisdiction to the FERC.<sup>31</sup>

### Retail Wheeling

Turning to retail wheeling itself, open competition would allow electric customers to bypass the local utility and purchase power wherever it is cheapest. There would no longer be exclusive franchise territories. The utilities, as owners of the power grids that transmit the electricity, would be paid a fee for "wheeling" the power over their transmission lines. Much of the demand for retail wheeling originated with electricity-intensive industries like aluminum, automobiles, and petrochemicals. However, many businesses are now examining their electric costs as part of their efforts to remain competitive.

An integral part of retail wheeling is the concept of "unbundling" prices for electric services.<sup>32</sup> Currently, most customers receive a complete package of energy services that includes generation, transmission and distribution. The customer pays a single rate for all of these services. Being able to buy power from the least-cost provider and then pay another entity to transmit it is one form of unbundling. If, in addition, the individual components of the electricity are separately priced, customers can select the kind and quality of services that best suit their particular needs. For example, there are other components of electric service referred to as ancillary services that include reactive power, operating reserves and dispatch service. By unbundling each segment, customers have more choice and can make more efficient use of available energy sources because the price of each component is "transparent." Some observers maintain that, even if retail

wheeling is not implemented, utilities should be required to unbundle at least a portion of their energy services.

Five principal impacts of retail wheeling have been identified.<sup>33</sup>

- The monopoly power of utilities would be lessened, thereby promoting competition in retail markets.
- State regulators would have to change the traditional approach to rate making.
- Vertical integration of the industry would decline as some utilities divest themselves of generating functions to concentrate on transmission and/or distribution.
- The regulatory compact would be reshaped by changing the service obligations of utilities in their former exclusive franchise territories.
- The electric industry would become more cost conscious and responsive to customer needs, including the provision of new types of products, services, and financial arrangements.

It is important to note who would be affected by retail wheeling. The following interested parties were identified in a February 16, 1995, report by the Public Service Commission of Nevada (PSCN):

1. Large regulated utilities with diverse generation and transmission portfolios.
2. Small regulated distribution utilities with little or no generation, and perhaps some transmission facilities.
3. Municipal utilities with or without generation facilities.
4. Public utility districts.
5. Small residential and business customers.
6. Manufacturers and large energy consumer associations.
7. Independent power producers and qualifying facilities.
8. Federal power systems and agencies.
9. Environmental and energy conservation interests.

### Advantages of Retail Wheeling

Proponents of retail wheeling maintain that the present system of production and distribution causes retail rates that often greatly exceed the cost of new generation, placing a heavy burden on consumers. These proponents say retail wheeling offers the following advantages:

- It increases consumer choice by giving large and small customers access to multiple suppliers of electrical services, including DSM programs, at a lower cost.
- Retail wheeling would reduce existing rate inequalities that currently exist within the same state and between adjoining regions. These differentials can amount to 50 percent to 100 percent.<sup>34</sup> Rouse gives the following examples:

In the Western Systems Coordinating Council (of which Nevada is a member), an industrial facility in one state would pay over \$407,453 per month for 10-MW service with a load factor of 68%; while a competitor located in an immediately *adjacent* state might pay only \$155,129 for the same power requirements—a yearly premium of \$3 million compared to the low-cost competitor. Even within a single state (e.g., California), the monthly bill differential ranges from \$268,627 to \$407,453—an annual penalty of \$1.7 million.<sup>35</sup>

- Retail wheeling would maximize income and growth potentials for owners of generation, transmission, and distribution services by offering improved incentives for economic efficiency.
- It would ensure that environmental protection is achieved more effectively and at a lower cost.

### Disadvantages of Retail Wheeling

Opponents allege that retail wheeling will produce a number of detrimental effects, including the following:

- Retail wheeling will shift costs to small consumers who cannot effectively contract for alternative sources. Part of these will include so-called “stranded investment costs,” or, those already incurred for power plants that were originally built in part to supply the needs of large electrical users that would be among the first customers to abandon the local utilities. These costs might also be passed along to utility shareholders even though at the time of the original expenditure such costs had been deemed prudent by the state regulators and thereby recoverable from customers through the electrical rates.

- Retail wheeling would undermine integrated resource planning and encourage short-range decision making based predominantly on current price rather than future needs and environmental concerns.
- Such a shift in planning decisions could result in delayed development of new power plants or innovative technology. As an example, Flavin and Lenssen note that plans for 1,350 MW of new renewable power projects were put on hold in 1994 after California announced its restructuring plans.<sup>35</sup>
- Retail wheeling would result in the proliferation of smaller, financially weaker electrical producers which would threaten the reliability of electric delivery if these companies failed. Such small competitors would become takeover targets, ultimately creating oligopolies such as occurred in the airline industry after deregulation.

#### Additional Issues Raised by Retail Wheeling

Retail wheeling has potential impacts in many areas and raises additional issues that would need to be resolved as part of a comprehensive industry restructuring plan. A number of these issues are noted here and Assembly Concurrent Resolution No. 49 (A.C.R. 49) contains a more comprehensive list. Several of the more prominent issues and related questions are outlined in greater detail below.

- Will local utilities be required to maintain reserve capacity to serve customers that buy their own power from outside sources? If so, how will the local utility be compensated?
- Will local utilities be required to accept customers whose outside sources have failed? If so, what if any advance notice will the local utility be entitled to receive?
- What mechanism will be employed to dispatch the electricity over the transmission system? Current options under consideration include bilateral contracts and pooling arrangements. Under the bilateral contract model, customers contract directly with suppliers for physical delivery of electricity into the grid and arrange for its redelivery under transmission rights held by either party. Pooling arrangements feature an independent system manager (or "poolco") which operates the transmission system and dispatches all power consumed by the system in hour or half-hour increments.<sup>37</sup>
- What will be the role and extent of any future regulatory involvement? Effective competition among generators may eliminate the need for price regulation but transmission and distribution, cost allocation within vertically integrated companies, siting and environmental considerations may still require regulatory oversight.<sup>38</sup>

- If retail wheeling is instituted, should it be done all at once or phased in?
- What impact will retail wheeling have on adjacent states and is it permissible or necessary to require reciprocity with those states?
- To what extent, if any, should vertically integrated companies be required to divest themselves of generation, transmission, or distribution assets, or spin them off to affiliates, in order to avoid unfair market advantage?

### *Stranded Investment*

One of the major issues raised by retail wheeling is the prospect of stranded investment or stranded cost and how to address the situation if it in fact develops. Because the focus is on costs that are at risk of becoming stranded in the future, some commentators prefer the term "strandable" instead. Under the historic regulatory compact, utilities were required to service all customers in their franchise territory. To discharge this obligation, utilities engaged in long-range planning, frequently with a 10- or 20-year time horizon, in order to ensure that their customers received reliable service. These undertakings resulted in the expenditure of substantial capital outlays for generating capacity as well as transmission and distribution systems. In return, the companies and their shareholders were guaranteed full recovery of all prudently incurred costs, plus a specified rate of return that is usually lower than in unregulated industries. Additionally, many utilities entered into long-term power contracts pursuant to various regulatory initiatives such as PURPA. In some cases, the price levels in these contracts are, or could turn out to be, above current market prices in a more competitive environment.

If significant portions of a utility's customer base bypass the company by means of retail wheeling, the utility may be left with excess capacity which was originally developed for the benefit of the departing customers. The burden of paying off the already incurred cost of this capacity could become the responsibility of the remaining "core customers" or the shareholders. Important issues remain regarding how to identify stranded investment. Additionally, there are diverse opinions regarding how to pay for these costs once they are identified. Some parties have suggested that a monthly service charge in the form of a non-bypassable wires access charge should be imposed on all customers who use transmission lines. Other parties recommend a one-time "exit fee" assessed to departing customers at the time they leave the utility. There is general agreement that utilities should be required to use their best efforts to mitigate stranded investments before they become eligible for reimbursement.<sup>39</sup>

Some proponents of retail wheeling maintain that the stranded investment issue is overstated. These parties contend that stranded investment will be mitigated by growth and opportunities in other markets. Other proponents assert that stranded investment is

the result of poor management and, therefore, should be absorbed by the utility and not passed on to either departing or core customers. Some proponents note that collecting strandable costs through a recovery charge merely shifts costs from generation to transmission or distribution without reducing overall costs.<sup>40</sup>

### *Impact on Cost of Capital and Equity Value of Utility Stocks*

Because of the guarantees inherent in the traditional regulatory compact, financial markets have historically viewed utilities as relatively low risk operations. Correspondingly, the equity returns on investment have generally reflected this low risk perception by being smaller while the cost of borrowing for utilities has usually been lower as well. To the extent that a more competitive market increases the risk of investing in utilities, creditors will demand higher returns. This pressure for greater returns could impact the ability of utilities to borrow money.<sup>41</sup> The sensitivity of the financial markets to electrical restructuring can be gauged by their reaction to the *California Blue Book*. Shortly after its release, financial service companies began an immediate review of the bond ratings of California utilities while stock market investors bid down the utilities' share prices. Between September 1993 and June 1994, the Dow Jones Utilities Index declined 27 percent, representing approximately a \$70 billion loss to the book value of U.S. utilities. This decline was attributed to a combination of rising interest rates and concern over the impact of retail wheeling.<sup>42</sup> In October 1995, Moody's Investors Service announced that it would institute a surveillance review of the 47 western public utilities as part of a comprehensive report updating each utility's credit position and credit outlook in light of restructuring.

### *Technical Considerations*

Wheeling electric energy presents some technical issues. Unlike natural gas or oil, electricity cannot be stored on a large scale basis. A certain amount of dependable reserve capacity must always be available at all times to handle unanticipated demands or interruptions.

Transmission and distribution networks are constructed of various electrical components such as transmission lines, capacitors, transformers, and circuit breakers. Each of these units is designed to function within a given range of operating conditions. Power loads that exceed the system's capacity could necessitate costly additions. Additionally, because the electric grid is composed of numerous interconnected systems, a problem at any one point may disrupt service to an entire region.

The actual flow of electric current over transmission wires is not direct from one point to another. Electric current moves in accordance with Kirkoff's law and follows the path of least resistance. Any given amount of power may actually flow over several different parallel lines simultaneously. This results in so-called "loop flows." These flows may affect third parties who are quite distant from the intended power flow. Each transmission line



has a maximum thermal capacity that limits the amount of current that it can carry. Because of Kirkoff's laws, a limitation on one line affects every other line on the system. Potential thus exists for network congestion that can interfere with transmissions. If a line's maximum carrying capacity is exceeded, the line may be damaged.

Any time power is transmitted over lines, a certain amount is lost in the form of heat. Such line loss is directly proportional to the mathematical square of the current. Therefore, if the current doubles, the line loss quadruples. Furthermore, line loss is also directly proportional to the transmission distance; the greater the distance, the greater the line loss. Wheeling transactions have the potential to increase line losses significantly.<sup>43</sup> The electrical industry has been pursuing several approaches to increasing the load carrying capacity and efficiency of transmission lines. These approaches include raising the voltage on existing lower voltage lines, converting from alternating current (AC) to direct current (DC), and development of improved capacitor banks and controls.<sup>44</sup>

Wheeling also requires installation of meters to track customers' loads. Since the actual amount of power supplied to the system at any given point in time is dependent on load requirements at that particular instant, transmissions must be carefully and accurately monitored. The most efficient method utilizes meters at the purchaser's delivery points. These meters total the amount of power delivered and telemeter that information to the dispatching utility so that the seller is constantly aware of the user's requirements. Such a system requires a complex network of meters and telemetering equipment.<sup>45</sup>

#### Retail Wheeling in Other States

At least five other states have initiated legislative studies of retail wheeling (Connecticut, Illinois, Maine, New Hampshire, and New Mexico) and others have industry round tables or public service commission studies underway. According to Schmidt and Oechsler (p. 2-1), utilities in some areas currently wheel power to ultimate customers. They identify the following examples, among others:

- The Western Area Power Administration (WAPA) markets power to numerous customers in the central and western United States. Power is wheeled over the lines of 42 different utilities and sold to 148 end-use customers in 12 states.
- The Bonneville Power Administration (BPA) sells electric power directly to nearly 20 industrial consumers. Some of these direct sales involve wheeling over transmission lines owned by other utilities.
- The New York Power Authority (NYPA) sells power to approximately 45 end-users located in Niagara Mohawk Power Corporation's (NiMo) service territory. Although NiMo "resells" the power to these industrial customers, the transactions are not significantly different from a true retail wheeling transaction in that the cost of the

electricity is set by NYPA; NiMo sets only the transmission and delivery charges. The NYPA-NiMo arrangements have been in place since the 1960s.

- Pacific Gas & Electric Company (PG&E) wheels power from certain generating facilities owned by the City of San Francisco to the city itself as an end-user. This power is provided contractually to a number of city loads, such as sewerage treatment facilities.
- Under a self-service arrangement, power produced by a Dow Chemical subsidiary in Sarnia, Ontario, Canada, is wheeled through Ontario Hydro Company, Detroit Edison, and Consumers Power for use by Dow's Midland, Michigan, facility.

Michigan is moving forward with a five-year pilot project that allows for limited retail wheeling involving two utilities and their larger industrial customers. Additionally, New Hampshire passed legislation in June 1995, authorizing a pilot program.<sup>46</sup> Georgia Power Company, along with a group of cooperatives and municipalities, has engaged in retail wheeling for some time. However, nonutility generators and nonmembers of the association cannot compete for retail loads.<sup>47</sup>

#### Retail Wheeling in California

According to Flavin and Lenssen (p. 50), California added impetus to the retail wheeling discussion early in 1994 when the California Public Utility Commission (CPUC) proposed major restructuring of the state's utility regulatory system in its so-called "Blue Book" proposal.

A February 16, 1995, PSCN report states that California has some of the highest electrical rates in the country. This is attributed to the fact that the CPUC dictated the mix of utility supply sources, including DSM and renewables, for nearly ten years. Local utilities were required to purchase the output of QFs. As a result, electrical rates became so high some businesses left the state and others opted not to locate there.

In response, the CPUC announced its Blue Book initiative on April 20, 1994. This was a proposal to radically restructure the state's regulatory system. The CPUC stressed that the Blue Book was just a proposal and that implementation was two to eight years away. Legislation might also be required since the CPUC apparently does not have the power to alter existing franchise agreements. Among the significant changes was a proposal to authorize retail wheeling to large industrial customers commencing in 1996, followed by extension to all consumers in the year 2002.

California's action is particularly significant since it has been the pacesetter for national utility reform for more than two decades. Recently, the CPUC has indicated that it favors an approach other than a rapid shift to full scale retail wheeling. At a presentation before

the PSCN on September 11, 1995, CPUC President Daniel Fessler indicated that his agency voted 3-1 in May 1995 to institute a two-year moratorium on further advances toward retail wheeling. In the interim, California proposes to institute a so-called "poolco" approach. The poolco arrangement would involve establishment of an independent service operator (ISO) subject to FERC jurisdiction that would have two primary characteristics. First, all transmission operations would be under the control of poolco, although the transmission assets themselves would remain the property of the current owners, who are mostly utilities. Secondly, electric power would be sold through an auction process that would only allow the most efficient producer to actually sell power on an hour-by-hour basis.

On September 10, 1995, Southern California Edison and three consumer groups filed a Memorandum of Understanding (MOU) with the CPUC, proposing an alternative to the poolco model. The MOU proposes a voluntary, statewide power exchange with direct access for retail customers and power suppliers, coordinated by an ISO. The proposal also includes the establishment of a power exchange by 1998 that would manage a spot market auction, augmented by a bilateral contracts market.

The CPUC is currently awaiting comment and direction from the California Legislature before formalizing its final proposals.

Despite California's acknowledged leadership role in the energy arena, representatives from some other states point out that California's situation is unique in many respects and its solutions may not be applicable in other jurisdictions.<sup>48</sup> As previously noted, the state's electric rates are among the highest in the nation. According to CPUC Commissioner P. Gregory Conlon, these rates are primarily due to state-mandated environmental initiatives and nuclear plant write-downs. Each California citizen pays approximately 25 cents per day for environmental programs, amounting to about \$3 billion annually.<sup>49</sup> Some officials in surrounding states are concerned that a more competitive retail electricity market in the western region may result in lower rates for California at the expense of higher prices in adjoining states.

#### Retail Wheeling In Nevada

Noteworthy events in Nevada relating to restructuring the electric industry include:

- The 1983 Legislature enacted the Utility Resource Planning Act (*Nevada Revised Statutes* [NRS] 704.741 to 704.751) to assure that Nevada utilities managed resource additions in an orderly and prudent fashion.
- During the 1993 Session, Nevada enacted Senate Bill 231, now NRS 704.223, the so-called "Northstar" bill. This measure was designed to encourage the construction of a steel mill in the state by the Northstar Company. The statute authorizes a

business with a new industrial load, if certified by the Commission on Economic Development, to enter into retail wheeling transactions under the auspices of the PSCN.

- On June 30, 1995, the United States Department of Energy (DOE) released a request for proposals to supply power to the Nevada Test Site, which is presently served by Nevada Power Company. No decision has been made as yet by DOE.
- On July 1, 1994, the PSCN opened a docket on Regional and Federal Electric Generation and Transmission issues to solicit industry and public input regarding the commission's formulation of positions on regional and national electric utility issues. Hearings were held on August 18 and October 28, 1994. On December 5, 1994, the commission announced the opening of a docket specifically devoted to retail wheeling and a workshop was held on February 23, 1995.
- The PSCN denied Nevada Power Company's petition for a special rate agreement with Mirage Resorts on July 20, 1995. Nevada Power had sought approval of a scaled rate reduction for the Mirage in order to encourage the company to forego potential plans to build its own generation unit.
- In August of 1995, the Colorado River Commission (CRC) considered a request from the Southern Nevada Water Authority (SNWA) to build and operate transmission and distribution facilities to serve SNWA's water treatment and transmission plant, as well as supply electricity for the plant. Such an arrangement would bypass Nevada Power Company, SNWA's current power provider. The PSCN raised the issue of the appropriateness of proceeding with retail wheeling in this manner at this time. In conjunction with these discussions, the Office of the Attorney General rendered an opinion on August 15, 1995, concluding that the construction of the proposed facility for SNWA and the subsequent provision of power to it by the CRC was not subject to regulation by the PSCN. On October 5, 1995, the CRC voted to submit a proposal to SNWA.
- Also in August, Citizen Alert in conjunction with the Land and Water Fund of the Rockies released a concept paper outlining a plan to disaggregate Nevada Power Company into two new entities. One of the new operations would be a member owned, nonprofit distribution cooperative and the other would be a competitive, for-profit generation company. Nevada Power shareholders would receive compensation for the sale of their ownership interest in the utility's transmission and distribution assets, which would be transferred to the cooperative. According to proponents, since cooperatives pay no federal income taxes on electric operations and can obtain less expensive financing issued by organizations such as the Cooperative Financing Corporation, substantial savings can be realized. These savings are estimated to be in excess of \$70 million annually or \$800 million in

present value benefits over a 20-year horizon. Supporters maintain that the proposal would address issues currently facing Nevada Power in southern Nevada due to the rapid growth of its service territory. Advocates of the plan say it will provide immediate rate reductions as well as foster end-use efficiency improvements and energy service options.

- On October 6, 1995, the PSCN approved the merger of Sierra Pacific Power Company and Washington Water Power Company, a transaction designed to enhance the competitive capacity of the two utilities as the industry moves toward restructuring. The CPUC approved the proposal on October 18, 1995. Washington authorities, who had originally acted favorably on the plan at a meeting held September 28, 1995, are evaluating some additional terms subsequently included in the Nevada agreement. The arrangement must still be approved by FERC.

### Alternative Proposals

#### *Performance-Based Rates*

Some parties, recognizing that traditional cost-of-service regulation does not provide incentives for utilities to operate efficiently but concerned about the potential impact of retail wheeling, have proposed performance based rates as an alternative. Under one such approach known as price-cap regulation, prices are established for several years into the future. A utility is allowed to retain the revenue from efficient operation that brings its cost of service below the price-cap. Conversely, the utility must absorb any loss caused by inefficient operation that causes the cost of service to exceed the price-cap. Resources are acquired through an auction mechanism. The ceiling price is set based on the results of the most recent auction, plus inflation, minus a productivity factor. Since rates are only modified as a result of exogenous factors under a price-cap methodology, the utility has increased incentives to minimize costs and operate more efficiently. This link between earnings and performance offers the utility management a stronger incentive to control operating costs than does the traditional cost-of-service regulation.<sup>50</sup>

Another type of performance based approach is capped revenue per customer. A utility is allowed to collect a fixed amount of revenue per customer, depending upon the customer's size and usage. To the extent the utility provides service below that cost, the utility and its shareholders recognize a profit; if cost of service exceeds the allowable cost per customer, the company absorbs the loss. While this type of regulation creates incentives for increased efficiency, determining the correct capped revenue per customer may be difficult.<sup>51</sup>

Many proponents of a more competitive electrical industry maintain that performance based rates will not adequately address the concerns that have led to consideration of retail wheeling.

### *Municipalization*

Municipalization is another potential alternative to retail wheeling advocated by some parties. Under EPAct, entities such as municipalities and political subdivisions like schools and hospitals, as well as industrial parks and trade associations, may be able to qualify as an "electric utility" under certain specific conditions. Once established as an electric utility, such an entity is entitled to a wheeling order from FERC. It may be possible to achieve utility status without actually having to acquire a complete transmission and distribution system through condemnation proceedings or construction of new facilities, both of which can be expensive.<sup>52</sup>

### CONCLUDING REMARKS

The literature on retail wheeling and testimony from actual proceedings before utility regulatory bodies indicate that there is a great deal of disagreement on the potential impacts of restructuring the electric utility industry. Similarly, there are divergent opinions on how to address specific issues within retail wheeling such as recovery of stranded investment. This document should be viewed as merely supplying basic background information and highlighting some, but certainly not all, issues concerning competition in the generation, sale, and transmission of electrical energy. The Research Division of the Legislative Counsel Bureau has more detailed information on many of these topics and can provide additional materials upon request.

EnergyACR49.2  
Revised 11/3/95

## **ENDNOTES**

1. "Overview of Issues Relating to the Retail Wheeling of Electricity," Kenneth W. Costello, Robert E. Burns, Youssef Hegazy; The National Regulatory Research Institute, May 1994: p. 36.
2. Kenneth Nowotny, "Expectations and Ideology Define Electric Utilities, in *Electric Utilities Moving Into the 21st Century*, ed. Enholm and Malko, Public Utility Reports, Inc., Arlington, 1994: p. 25.
3. Federal Energy Regulatory Commission Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, Docket No. RM95-8-000, "Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities," and Docket No. RM94-7-001, "Recovery of Stranded Costs by Public Utilities and Transmitting Utilities," May 29, 1995: p. 29. 70-FERC, ¶ 61,357.
4. Nowotny. *Electric Utilities Moving Into the 21st Century*, p. 27
5. Department of Public Utility Control, State of Connecticut, decision in Docket No. 94-12-13, "DPU Investigation into the Restructuring of the Electric Industry," July 14, 1995: p. 5.
6. Nowotny. *Electric Utilities Moving Into the 21st Century*, p. 25.
7. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 32.
8. Nowotny. *Electric Utilities Moving Into the 21st Century*, p. 31.
9. Nowotny. *Electric Utilities Moving Into the 21st Century*, p. 28.
10. Department of Public Utility, State of Connecticut, p. 5.
11. The National Regulatory Research Institute (May 1994), p. 28.
12. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 39.
13. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 34.
14. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 35.
15. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 36.
16. Dr. Michael R. Schmidt and Dr. Ronald G. Oechsler, "The Challenges of Retail Wheeling," unpublished work presented to the Utah Department of Public Utilities, September 7 and 8, 1994, Resource Management International, Inc., 1994: p. 2-1.
17. Nowotny. *Electric Utilities Moving Into the 21st Century*, p. 29.
18. "Economic Deregulation: Days of Reckoning for Microeconomists," Clifford Winston (The Brookings Institution), *Journal of Economic Literature* at 1264, 1284-1285 (September 1993), cited in "Investigation by the Department of Public Utilities on Its Own Motion Into Electric Industry Restructuring," D.P.U. 95-30, Commonwealth of Massachusetts (August 16, 1995): p. 2.
19. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 45.
20. Department of Public Utility, State of Connecticut, p. 6.

21. There is presently a bill before Congress, S. 708 sponsored by Senator Don Nickles (R-OK), that would repeal Section 210 of PURPA dealing with QFs. Senator Alfonse D'Amato (R-NY) also has a bill pending that would repeal PUHCA and create a new holding company act. Additionally, in October 1995, the Electricity Consumers Resource Council (ELCON) proposed that PUHCA and PURPA be repealed in their entirety and that the FPA be substantially amended.
22. Department of Public Utility, State of Connecticut, p. 7.
23. Department of Public Utility, State of Connecticut, p. 6.
24. The National Regulatory Research Institute (May 1994), p. 40.
25. Pub. Law 102-486, 106 Stat. 2904, § 722(3), found at 16 U.S.C. § 824k(h).
26. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 56.
27. Address to the Western Electric Power Market Conference, October 16, 1995, San Francisco, California.
28. Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking, p. 101.
29. Roundtable on Competition in the Electric Utility Industry in New Hampshire Draft Report (July 28, 1995): p.11.
30. Letter dated December 7, 1994, and filed in Docket No. RM94-7-001.
31. The National Regulatory Research Institute (May 1994), p. 48.
32. Department of Public Utility, State of Connecticut, p. 9.
33. The National Regulatory Research Institute (May 1994), p. 69.
34. Flavin and Lenssen. Worldwatch Institute Paper 119, June 1994: p. 50.
35. James B. Rouse, "Beyond Retail Wheeling: Competitive Sourcing of Retail Electric Power," *The Electricity Journal*, April 1994.
36. Flavin and Lenssen. Worldwatch Institute Paper 119, June 1994: p. 54.
37. Schmidt and Oechsler. Resource Management International, Inc., 1994, pp. 2-16.
38. Roundtable on Competition in the Electric Utility Industry in New Hampshire Draft Report (July 28, 1995): p. 24.
39. Roundtable on Competition in the Electric Utility Industry in New Hampshire Draft Report (July 28, 1995): pp. 32-34.
40. Department of Public Utility, State of Connecticut, p. 57.
41. Roundtable on Competition in the Electric Utility Industry in New Hampshire Draft Report (July 28, 1995): p. 34.
42. Flavin and Lenssen. Worldwatch Institute Paper 119, June 1994: pp. 51-52.
43. The National Regulatory Research Institute (May 1994): pp. 57-62.
44. The National Regulatory Research Institute (May 1994): pp. 65-66.



45. The National Regulatory Research Institute (May 1994): p. 63.
46. Legislative Energy Advisory Program (LEAP) Quarterly Legislative Letter, Summer 1995.
47. Schmidt and Oechsler. Resource Management International, Inc.. 1994, pp. 2-3.
48. "Status of Electric Utility Regulation in Oregon." Address delivered by Oregon Public Utility Commissioner Roger Hamilton at the Western Electric Power Market Conference. October 17, 1995, San Francisco, California.
49. Address by CPUC Commissioner P. Gregory Conlon at the Western Electric Power Market Conference, October 17, 1995, San Francisco, California.
50. "California's Electric Services Industry: Perspectives on the Past, Strategies for the Future," California Public Utilities Commission (February 1993): pp. 172-179.
51. Department of Public Utility, State of Connecticut, p. 60.
52. "Municipalizing to Access the Competitive Power Markets," by John P. Williams, Esq. Paper delivered at the Western Electric Power Market Conference, October 17, 1995, San Francisco, California.