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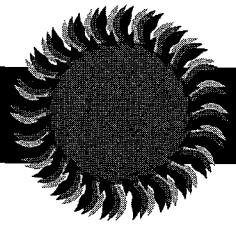

Open Access Transmission and Renewable Energy Technologies

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National Renewable Energy Laboratory
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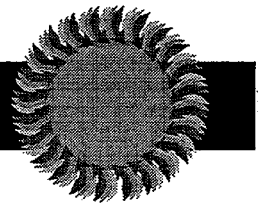

Open Access Transmission and Renewable Energy Technologies

Kevin Porter

Prepared for:

Office of Utility Technologies
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Abstract

In April 1996, the Federal Regulatory Commission (FERC) approved Orders 888 and 889 and released a draft rule for public comment on capacity reservation tariffs (CRTs). Order No. 888 requires electric utilities to file transmission tariffs that would allow transmission access to third parties who want to conduct wholesale transactions. The order also allows utilities, under certain conditions, to directly collect the stranded costs (i.e., costs for power priced above market prices that cannot be recovered) from wholesale customers who turn to other suppliers. Order No. 889 requires transmission-owning utilities to set up open access, same-time information systems (OASIS), using commercial software and Internet protocols. The order also requires transmitting utilities to enact codes of conduct, which require utilities to separate the marketing and merchant employees from transmission and reliability employees. Utilities must also post market information and discounts simultaneously to all parties. FERC also proposes to replace the pro forma tariffs in Order No. 888 with CRTs, to eliminate the distinction between network service (which is generally priced and based on the load of a transmission-dependent utility) and capacity-based point-to-point service.

Order 888 makes open access transmission an official FERC policy and ends decades of debate over whether electric utilities should be required to offer open access transmission. With Order 888, renewable energy interests, which fought long and hard for the limited open access transmission provisions in the Energy Policy Act 1992, can use transmission to access market opportunities beyond the nearest utility. How beneficial open access transmission ultimately is for renewables, however, depends on variables beyond the final rule, such as how the electric power market reacts to it. Open access transmission could vastly increase the number of buyers and sellers, increasing competition and exerting a downward pressure on electricity prices. New market players, such as power marketers and brokers, are emerging, further diversifying the electric power market. Although renewables may be able to access more markets, they may face stiff competition for those markets.

Additionally, how FERC implements Order 888, as well as the terms, rates, and conditions of transmission, will determine whether renewables can take advantage of open access transmission. FERC primarily acts on individual cases and filings. Each case will present specific facts and circumstances that will provide FERC the opportunity to more sharply define how it will treat some of the areas FERC broadly acted upon in Order 888. Some of the issues before FERC with implications for renewables include: transmission pricing; transmission terms and conditions; reassignment of transmission capacity; defining state and FERC jurisdiction over transmission and distribution; the pricing of ancillary services; and the adoption and implementation of independent system operators.

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Open Access Transmission and Renewable Energy Technologies)

I. Introduction

In April 1996, the Federal Energy Regulatory Commission (FERC) culminated a year-long rulemaking by releasing Order No. 888 and Order No. 889, as well as a draft rule on capacity reservation tariffs (CRTs). To do so, FERC sifted through 400 comments totaling 20,000 pages that poured in after FERC released a draft rule, sometimes known as "the mega-NOPR" (Notice of Proposed Rulemaking), in March 1995. All told, the two orders and the CRTs total more than 1,000 pages.[1]

Order No. 888 directs electric utilities to file transmission tariffs at FERC to allow transmission access to third parties who want to conduct wholesale transactions. The order also requires utilities to offer transmission customers "comparable service"; i.e., offer them the same or equivalent terms and conditions a utility has when it uses its transmission system. The order also allows utilities, under certain conditions, to directly collect the "stranded costs" (i.e., costs for power priced above market prices that cannot be recovered) from wholesale customers who turn to other suppliers. In addition, the order requires rural cooperatives, government-owned, and municipal utilities (typically not regulated by FERC) to provide reciprocal transmission access to transmission-owning utilities if they take advantage of open access transmission tariffs. The order also states that FERC has jurisdiction over wholesale and unbundled retail transmission, but FERC will defer to state recommendations as long as a state uses the seven tests FERC developed to distinguish between FERC-regulated transmission and state-regulated distribution.

Order No. 889 requires transmission-owning utilities to set up "open access, same-time information systems" (OASIS), using commercial software and Internet protocols. It also requires transmitting utilities to enact "codes of conduct," which require them to separate the marketing and merchant employees from transmission and reliability employees. Utilities must also post market information and discounts simultaneously to all parties.

Finally, FERC proposes to replace the pro forma tariffs in Order No. 888 with CRTs. The proposed rule would eliminate the distinction between network service, which is generally priced and based on the load of a transmission-dependent utility, and capacity-based point-to-point service. The proposed rule also requests comments on whether the different (and sometimes conflicting) network and point-to-point transmission service can be replaced with a single system devoted to capacity definition and reservation.[2] Space restrictions will confine most of this paper's discussion to Order No. 888, which is sometimes referred to as "the final rule" in this paper.

This paper summarizes the major highlights of Order No. 888 and explores its implications for renewable energy technologies. It also examines some of the comments filed by renewable energy and environmental organizations, and assesses FERC's ultimate decisions in the areas those groups commented on. Although the order grants transmission access, it lays out broad parameters in several areas that will be implemented on a case-by-case basis. These cases, and other issues the rule did not directly address such as transmission pricing, will determine the final rule's ultimate impact on renewable energy technologies.

II. Order No. 888 in Brief[3]

The Tariffs

A primary requirement is that "public utilities" under the Federal Power Act (FPA), mostly investor-owned utilities, must have an open access transmission tariff on file at FERC that offers the same or superior terms and conditions as a pro forma tariff that FERC included with the final rule. The tariff must offer transmission services comparable to those a transmission owner provides itself, which is known as FERC's "comparability standard." Utilities must offer point-to-point and network service and charge the same transmission rates or apply for new rates in a separate filing. Power pools must remove member-preferential access and pricing provisions and offer comparable terms and condi-

tions to all transmission customers. Utilities must also practice "functional unbundling," meaning they must:

- Take transmission and ancillary services for all new wholesale sales and purchases under the same tariff terms and conditions as their transmission customers
- State separate rates for wholesale generation, transmission, and ancillary services
- Use the same electronic information network as their transmission customers when obtaining information about their transmission systems.

Reciprocity

FERC has jurisdiction over "public utilities," which transmit electric power in interstate commerce, and/or sell electric power at wholesale in interstate commerce. This means FERC has jurisdiction over investor-owned utilities that own more than 70% of the transmission lines in the United States but generally not over rural electric cooperatives, municipal utilities, or federal power systems like the Bonneville Power Administration (BPA).[4] In addition, Section 201 of the FPA specifically bars FERC from regulating a state or federal subdivision, agency, or authority.[5]

To avoid creating a "patchwork" of transmission access and nontransmission access utilities, Order 888 requires that nonjurisdictional utilities offer open access to FERC-jurisdictional utilities if they use an open access tariff. To prevent utilities from denying transmission access because of reciprocity issues, FERC allows nonjurisdictional utilities to submit a voluntary tariff and ask FERC for an order on whether the tariff meets the reciprocity requirement. FERC said it will also not require reciprocity if a utility's tax-exempt status would be threatened by the private use of tax-exempt facilities, but FERC also said it expects the Internal Revenue Service to rule on this issue soon.

Federal-State Jurisdiction

Historically, transmission has been included as part of a wholesale power transaction between buyers and sellers. This is often termed a "bundled" transaction. The FPA devised a "bright line" between FERC's jurisdiction and state jurisdiction, which essentially gave FERC jurisdiction over wholesale power and interstate transmission and states jurisdiction over retail transactions. Various court cases have given FERC jurisdiction over almost all transmission, including transmission transactions that occur wholly inside state boundaries, on the grounds that transmission electrons could cross state lines while the transaction is consummated.

With greater wholesale competition in the electric power industry, and the growing prospect of retail competition, customers may receive transmission and generation from various entities. Customers will use competition among power generators to select their power supply, then use a utility's transmission system to deliver the power. In essence, the former bundled transaction of generation and transmission has changed to an unbundled transaction, in which a customer uses various sources to provide transmission and generation instead of just one source (the utility). Often, the utility that provides the transmission is the former supplier of the bundled transaction.

With this unbundling, a retail transaction is broken into two products—electric energy and transmission—that are sold separately. FERC believes that states have jurisdiction over the sale of electric power, but the retail unbundled transmission is done in interstate commerce. Consequently, over the objections of many states, FERC claimed jurisdiction over the rates, terms, and conditions of unbundled retail transmission conducted in interstate commerce by FERC-jurisdictional utilities, up to the point of local distribution (i.e., where electricity is routed and distributed to the end or ultimate consumer).

Three months after FERC issued Order 888, the U.S. Court of Appeals for the District of Columbia Circuit largely affirmed FERC's 1992 natural gas pipeline restructuring order, also known as Order 636. The court upheld FERC's determination that FERC has jurisdiction over the interstate transportation component of natural gas when the sale of gas is unbundled from interstate transportation. The court said states retain authority over sales of natural gas by local distribution companies to end-users. Because FERC considers the Natural Gas Act and the FPA to be sister statutes, FERC believes the court's ruling in this area to be directly applicable to the jurisdictional position it took in Order 888.[6]

In Order 888, FERC further stated that there is not a "bright line" separating unbundled retail transmission and distribution and that this must be resolved on a case-by-case basis. Therefore, FERC proposed seven indicators for distinguishing between transmission and distribution:

(1) Local distribution facilities are normally in close proximity to retail customers.

(2) Local distribution facilities are primarily radial in character.

(3) Power flows into local distribution systems; it rarely, if ever, flows out.

(4) When power enters a local distribution system, it is not reconsigned or transported to another market.

(5) Power that enters a local distribution system is consumed in a comparatively restricted geographic area.

(6) Meters are based at the transmission/local distribution interface to measure flows into the local distribution system.

(7) Local distribution systems will be of reduced voltage.

For states that adopt a retail access program, FERC will defer to state recommendations on where to draw the boundary between transmission and distribution, and how to allocate costs for transmission and distribution between FERC and the states, as long as the states use the seven indicators above. FERC also stated that states have jurisdiction over the delivery of electricity to the ultimate consumer. Therefore, FERC believed states can assign charges to recover the costs of stranded benefits and stranded investment based on usage, (kilowatt hours [kWh]), demand (kilowatts [kW]) or any other method or combination.

Ancillary Services

As transmission, generation, and distribution become unbundled, a number of services must be provided to ensure system reliability. FERC determined that six ancillary services must be included in open access tariffs. FERC said transmitting utilities may offer other types of ancillary services, and pricing for all ancillary services will be done on a case-by-case basis. The six services are:

(1) *Scheduling, system control, and dispatch,* in which transmitting utilities schedule and coordinate transmission transactions with other entities and confirm the power exchange in and out of their control areas.

(2) *Reactive supply and voltage control from generation sources* help maintain the proper transmission line voltage. This service involves using generating facilities to supply reactive power and voltage control and must be unbundled from basic transmission rates.

(3) *Regulation and frequency response* is generated beyond the current system load requirements used to follow the moment-to-moment variation in a customer's demand or scheduled generation delivery, in order to maintain frequency at 60 cycles per second (60 Hz).

(4) *Energy imbalance* corrects any hourly mismatch (as opposed to instantaneous variations for regulation and frequency response service) between a transmission customer's energy supply and a load being served in a control area.

(5) *Operating reserve/spinning reserve* and (6) *operating reserve/supplemental reserve* are defined as extra generation to serve load in case of an unplanned event such as an outage of a major generation facility. Spinning reserve is generation that is on-line and operating at less than maximum output and can be ready to immediately serve load. Supplemental reserve is generating capacity that can be used in emergency conditions but is not available immediately. Supplemental reserve capacity can be started up very quickly (usually within 10 minutes).

Although the transmitting utility must be equipped to offer all six services, FERC clarified that only the first two ancillary services (scheduling, system control and dispatch, and reactive supply and voltage control from generation services) must be offered to all basic transmission customers. In addition, FERC ruled that transmission customers must buy the first two ancillary services from the transmitting utility, because the

services are local by nature, and the transmitting utility is best suited to provide these services.

Independent System Operators

The electric power industry has increasingly embraced the concept of an independent system operator (ISO) taking control of a transmission system. There are several variations of ISOs being proposed. In the final rule, FERC adopted several principles for how it will evaluate ISOs, which are provided in Appendix A. Among other findings, FERC said ISOs should be completely independent of generation owners and provide fair transmission access.

Reassignment

Holders of point-to-point transmission service can reassign their capacity rights to eligible parties. The original holder can conduct the transaction directly with the assignee, but it remains obligated to the transmission provider. In addition, rates for capacity reassignment are capped at the higher end of the transmission rates charged by the transmission provider to the assignor, the transmission providers's maximum stated firm transmission rate in effect at the time of the transaction, or by the assignor's opportunity costs.

Several parties expressed concern that transmission customers may "hoard" transmission capacity or reserve capacity during times of peak customer demand only. FERC, however, declined suggested policy measures such as a "use it or lose it" system, "take or pay" charges, imposing nonrefundable fees, or imposing limitations on how far in advance reservations for transmission capacity can be made. FERC reasoned that transmission customers will have an economic incentive to reassign unused transmission capacity. FERC also said a transmitting utility is free to schedule and sell any unscheduled firm transmission capacity on a non-firm basis. Finally, FERC said a complaint can be filed with FERC if there is evidence that a transmission customer is hoarding transmission capacity.

Regional Practices

Some utilities and state commissions in the Pacific Northwest protested that FERC's efforts to provide transmission access may unfairly discriminate against hydro-based utilities. These parties noted that the Pacific Northwest relies on hydro to meet about two-thirds of its energy requirements. Utilities in the region said they rely on non-firm transmission to either sell excess hydropower during high water years or to purchase non-firm purchases from other suppliers during low water years. Utilities and state commissions in the region expressed concern that open access transmission would subordinate non-firm transmission transactions to firm transactions. If enough transmission customers reserved firm transmission capacity, utilities would not be able to conduct the non-firm transactions the region has historically relied on. These utilities and state commissions asked to reserve some transmission capacity to protect these non-firm transmission transactions.

FERC said it will allow utilities to modify tariff terms to reflect prevailing regional practices, such as the use of non-firm transmission to either sell excess hydropower or purchase non-firm power during low water years. FERC urged the parties to reach an agreement with other transmission customers in the region on the scheduling and dispatch of non-firm hydro and make that agreement part of utility tariffs to be filed at FERC. The commission also encouraged utilities to reflect regional conditions through the filing of regional transmission groups (RTGs) or ISOs.

III. Implications for Renewable Energy

Renewable energy interests fought vigorously for the transmission access provisions embodied in the Energy Policy Act of 1992 (EPAct), and the greater availability of open access transmission provided by Order 888 may well be beneficial to renewables. Remotely located renewable resources now may be able to use transmission systems to transport renewable electricity to the most favorable market, not simply to the nearest utility. Under the Public Utility Regulatory Policies Act (PURPA), renewable generators sold power to the nearest utility and hoped the avoided cost payment was high enough to justify going ahead with the project. With open access, renewable generators may be able to use transmission to sell power to any utility or, in the advent of retail wheeling, any customer willing to pay the highest price. Indeed, if retail wheeling is adopted, renewables may be able to compete for multiple buyers rather than for a single utility.

How beneficial open access transmission ultimately is for renewables depends on variables beyond the final rule, such as how the electric power market

reacts to open access transmission. Open access transmission could vastly increase the number of buyers and sellers, increasing competition and exerting a downward pressure on electricity prices. New market players, such as power marketers and brokers, are emerging and further diversifying the electric power market. Indeed, a vibrant spot market is emerging in some parts of the country, especially the western United States where short-term and intermediate power is sold for 20-30 mills/kWh. Although renewables may be able to access more markets, they may face stiff competition for those markets.

Additionally, how FERC implements Order 888, as well as the terms, rates, and conditions of transmission, will determine whether renewables can take advantage of open access transmission. Order 888 outlines broad policies and parameters in a number of key issues such as ISOs and stranded cost recovery. However, FERC primarily acts on cases and filings brought before it by parties in the electric power industry. Each case will present specific facts and circumstances that will provide FERC the opportunity to more sharply define how it will treat some of the areas FERC broadly acted on in Order 888. This includes the issues described below.

Transmission Pricing

Despite pleas from many commenters, FERC did not address transmission pricing in the final rule, preferring to leave this to the industry's initiative. There is widespread disagreement within the electric power industry on which approach to take. Many commenters recommended discarding the traditional "contract path" for transmission pricing, for which transmission pricing is based on a contractually defined path between a utility and its customer that can bear little or no resemblance to the actual power flows. Some support a regional approach to transmission pricing, rather than the utility-by-utility approach, with pricing based on a "postage stamp rate"; i.e., the same rate regardless of the distance traveled or the path of the power flows.[7] Others advocate flow-based pricing based on actual power flows, although other parties are just as opposed. In the end, FERC decided flow-based pricing and regional pricing methods were not developed enough to take any action. FERC believed a regional approach, such as through an ISO, could be useful for implementing regional or flow-based pricing. In addition, FERC thought that tariffs based more on reservation of transmission capacity, as called for in the CRTs NOPR, may be more compatible with the goal of some industry participants to move toward flow-based transmission pricing.

Transmission pricing is a critical issue for renewable technologies, because renewable power plants, particularly intermittent resources such as solar and wind, must be located where the renewable resource is located. Simply put, the site-specific nature of certain renewable technologies could make them captive to the transmission location and price. If transmission pricing is designed to encourage new generation to be located to alleviate transmission congestion, it is much easier to move the raw fuels for a new fossil fuel plant than for a renewable power plant.

Future transmission pricing initiatives may also feature congestion pricing where, if the transmission system is congested and there is more demand than available supply, a congestion charge may be added in addition to the transmission rate. Such a rate may encourage transmission customers to defer their transaction or re-route it (if possible) to a less congested transmission line. Congestion charges may also encourage distributed generation such as photovoltaics (PV), fuel cells, and small cogeneration plants, which may help reinforce transmission and/or distribution systems.

A number of utilities are likely to propose innovative transmission pricing schemes as implementation of the final rule proceeds. For example, some utilities advocate pricing by the distance of the transaction; higher rates would be charged the longer the power must be transmitted. This could negatively affect remotely located renewables. Unless these proposals allow transmission customers to receive a "credit" for alleviating congestion by providing power flows the opposite of prevailing power flows, the renewables may get hit with all of the penalties and receive none of the gains.

The American Wind Energy Association (AWEA) proposed transmission pricing based on the load a generator imposes on the transmission system, rather than a pre-defined, contractually based amount. Because intermittent renewable technologies, like wind and solar, have a low capacity factor, they benefit from a transmission pricing system based more on load factor. However, FERC called AWEA's proposal complex and "obviously beneficial to wind."

Renewable power producers who use intermittent resources may wish to consider using non-firm transmission service rather than firm transmission service. Non-firm transmission service is subject to service interruption or curtailment by a transmitting utility, but is more economical than firm transmission service. Therefore, a renewable power producer who uses intermittent renewable resources may find non-firm transmission more advantageous, even with the risk of service curtailment or interruption.

FERC also did not take action on the issue of "pancaked" transmission rates. Pancaking occurs when power is shipped over more than one transmitting utility's system, and the transmission customer pays for the capacity shipped over each utility's system. In other words, a transmission customer who transmits 100 MW over three transmission systems pays for 300 MW of service. Pancaking particularly affects renewables since they, more than other generation technologies, are location dependent. However, FERC does not believe pancaking affects renewables more than it affects other generation resources, and the final rule does not increase pancaking in any event. FERC believed that pancaking should be addressed in individual cases.[8] Indeed, FERC has required utility merger applicants to allow single-system transmission pricing over the merged company's service territory, instead of separate transmission prices over each company's individual service territory.[9]

Flexible Transmission Terms and Conditions

Both AWEA and the Utility Wind Interest Group advocated making transmission available beyond a firm and non-firm basis. AWEA envisioned transmission services being offered seasonally, weekly, daily, and hourly, so that wind energy companies can better match transmission with wind generation. However, FERC decided not to proceed beyond simple "firm" and non-firm for fear of complicating the transmission tariffs. The call for greater diversity in transmission services illustrates a tension between industry participants—those who would like to see a range of transmission terms and pricing versus those who prefer a standard set of transmission terms and conditions. This debate will likely become more pronounced as FERC proceeds with its proposed rule on CRTs.

FERC did remove some flexibility from the pro forma tariffs in the final rule. Previously, FERC set the minimum term for firm point-to-point service at 1 hour with no maximum term of service. In the final rule, FERC increased the minimum term of service to 1 day and set a reservation priority to favor those who request longer terms of service. Reservations for service of less than 1 year will be conditional until 1 day before the beginning of daily service, 1 week before the beginning of weekly service, and 1 month before the beginning of monthly service. These reservations may be bumped by requests for longer, firm point-to-point service, although the holders of the conditional reservation can match any competing request. Therefore, renewable generators will either need to carefully assess how much transmission they need or purchase long-term transmission and reassign or sell what they do not need.

Reassignment

AWEA supported lifting the price cap on the reassignment of transmission capacity, arguing that the buyers assume the economic risk that they will not use all the reserved transmission capacity. AWEA believed that if the reassignee is willing to pay more than the reassignor's original payment, the customer must have a use for the capacity that is worth the additional payment.[10] However, FERC imposed a price cap, saying it was not confident that enough of a market for reassigned transmission capacity exists to not have a price cap.

How much reassignment of transmission capacity will occur is unclear because it is a relatively new idea that only recently received FERC's blessing. If a vibrant secondary market emerges for transmission capacity, reassignment will take some of the pressure off intermittent renewable generators to accurately predict needed transmission capacity, because they can simply sell unneeded capacity. FERC's price cap may dampen some of the speculation that would occur otherwise, but this will likely be addressed after some experience has been gained. In addition, FERC believes revamping transmission tariffs should be based more on transmission capacity reservations, as called for with FERC's proposed rule on CRTs, and may encourage a secondary market in transmission capacity.

Functional Test for Distribution and Transmission

FERC adopted seven indicators for determining which is FERC-regulated transmission and which is state-regulated distribution. FERC believed this would help states devise a nonbypassable charge assessed on distribution or customer bills to recover the stranded costs and the "stranded benefits" of energy efficiency, renewables, and other social programs that could be lost as the electric power industry moves toward competition.

FERC improved this policy from its draft rule by adding that states have authority over the ultimate delivery of electricity to customers. This distinction avoids hypertechnical discussions of what level the voltage should be for distribution and transmission, and averts possible investment in facilities solely to avoid system-wide charges.[11] Although this distinction between transmission and distribution provides states a mechanism to at least assess nonbypassable charges, FERC's seven indicator test is a fairly involved process. It requires renewable energy interests to collaborate with utilities and state regulators on classifying transmission and distribution and ensures that enough distribution facilities are identified to allow for these charges. The issue becomes more complicated if some facilities are used for both transmission and distribution. The three California utilities who filed plans to establish an ISO with FERC, for example, all note that some facilities are used for both transmission and distribution. These utilities asked FERC to consider a partial classification of both transmission and distribution for ratemaking and jurisdictional purposes.[12]

FERC's test for determining the boundaries between transmission and distribution may be stressed if distributed utility technologies, such as rooftop PV or small-scale fossil-fired systems, make greater market penetration in the future. A new commercial development or residential subdivision that installs a significant amount of rooftop PV, for instance, may produce energy outflow to contradict FERC's assertion that energy predominantly flows into distribution systems but rarely flows out. However, the market for distributed utility technologies must increase beyond current levels for this scenario to occur.

Ancillary Services

The pricing and availability of ancillary services are less well understood. This could be a troublesome issue for some renewables, particularly intermittent renewables. In today's vertically integrated utility systems, intermittent renewable resources are essentially "bundled" together with other utility generation, and intermittent renewable resources are not typically charged for any costs they may impose on the bulk power system. For conventional utility dispatch, the inability of intermittent resources to be "firmed" is relatively unimportant unless the megawatt capacity of these resources is far greater than it is currently.[13]

Once generation is unbundled from transmission, system costs are shifted from the utility to individual generators with possibly dramatic impacts on project economics. In other words, individual generators will have to pay for whatever services they may require. For instance, because wind cannot be perfectly forecasted on an hourly basis, a wind generator is faced with the choice of making hourly schedule changes (and paying significant charges for each change) or possibly underscheduling to avoid these charges but not be paid if more energy is generated than scheduled. Testimony provided in BPA's 1996 Wholesale Power Rate Proceeding indicated that BPA's proposed scheduling charges for a 15-MW wind plant, if the wind generator changed the schedules hourly, alone could exceed its proposed transmission rates. Order 888 includes a deviation penalty if energy deliveries vary 1.5% (plus or minus) from scheduled amounts, which could also be harmful to renewables. Similarly, renewables may be somewhat disadvantaged if charges for individual ancillary services are applied uniformly for very large and very small resources. In essence, this provides economies of scale to larger generators over smaller generators, even though the outage and scheduling costs may actually be higher for larger plants.

Without changes in how ancillary services are defined and applied to renewables, renewable generators may have to find another bundling arrangement besides vertically integrated utilities. Power marketers could play such a role. They could bundle renewable generation with other generation sources as a hedging mechanism against a potential rise in fossil fuel prices, or to meet possible customer demand for green power supplies. However, they often act as a brokers between customers and power suppliers, meaning a renewable

generator may still face ancillary service charges. Depending on how the transaction is structured, a renewables generator may minimize ancillary service costs, either because the power marketer may bundle renewable generation with other generation, or may be able to offer ancillary services to a renewables generator at more competitive rates than a transmitting utility or ISO.

Finally, because pricing for ancillary services is at an early stage, utilities will have the incentive to move costs from the highly competitive generation side to the transmission and ancillary service side, where competition is not as great. Therefore, transmission-owning utilities will have an incentive to set ancillary service prices as high as possible to improve the competitiveness of their generation.[14]

Reciprocity

FERC's reciprocity requirement reflects the balkanized state of the electric power industry, with FERC extending a 1935 law to cover entities that largely did not exist at the time or were less of an industry presence. Most of the development of renewables in recent years has been by non-utility companies, which generally do not own transmission and will not be significantly affected by this provision. Those companies that do own transmission may have to grant utilities access to their transmission lines if they wish to use a FERC-approved open access transmission tariff. Already, FERC has ruled that Oxbow Geothermal must file an open access transmission tariff if it receives a request for transmission service over a 214-mile, 230-kilovolt transmission line Oxbow owns that connects a 58-MW geothermal project in Nevada with Southern California Edison.[15]

Regional Practices

FERC allowed utilities to submit variations of the pro forma tariff to reflect regional practices. This issue was introduced by utilities and state commissions in the Pacific Northwest, which relies on hydropower to supply 75% of the region's electricity requirements.[16] Hydro is not a totally predictable resource, and transmission is used to either market excess hydro on a non-firm basis, if conditions permit, or to purchase non-firm energy if low water conditions result in lower than normal hydro output. Some parties expressed concern that comparability under the rule would allow third parties to tie up available transmission capacity and prevent these transactions.[17] FERC said it would allow open access tariffs to reflect regional practices, such as the scheduling of non-firm hydropower, on a case-by-case basis.

If done carefully, regional practices could include transmission policies designed to accommodate renewable technologies. For instance, if a pool or a regional ISO is set up, that region could decide, as a matter of policy, to automatically accept intermittent renewables up to a certain penetration level, which FERC may allow as a regional practice.

IV. Summary

Order 888 makes open access transmission an official FERC policy and ends decades of debate over whether electric utilities should be required to offer it. Transmitting utilities also cannot favor their own transactions over third-party transactions and must offer the same or similar terms and conditions to transmission customers that it provides itself. With Order 888, renewable energy interests, who fought long and hard for the limited open access transmission provisions in EPAct, can use transmission to access market opportunities beyond the nearest utility. Renewable generators and other generators will also have greater access to power pools, which must also allow open access and offer comparable terms and conditions to all transmission customers.

Accompanying open access is the continued momentum toward unbundling generation from transmission and identifying and estimating the cost of the individual components that make up the delivery of electric power such as ancillary services. Utilities now deliver electric power as a "bundled" service of generation and transmission, and the non-dispatchability, intermittent characteristics of wind and solar technologies could be "blended" with the utility's other generation. With generation being unbundled from transmission and ancillary services becoming more the responsibility of individual generators to provide, intermittent renewables may face additional costs such as scheduling or load following charges. Unbundling becomes more pronounced as the electric power industry embraces ISOs. Individual ISO proposals vary in form and scope, but ISOs could evolve to resemble a form of power pools with strict dispatch and scheduling protocols that may

be disadvantageous to intermittent renewables. Renewable interests will need to be actively involved as these ISOs are formed, both in the ISO organizational structures and before ISOs are filed for FERC approval.

Order 888 also may provide opportunities to nontraditional industry players and technologies. Power marketers, who have been vociferously active at FERC during Order 888 and in individual utility transmission tariff proceedings, will particularly benefit from greater availability of open access transmission. They may also help renewables overcome some unbundling issues by bundling renewables together or with fossil generation to minimize ancillary service charges. Indeed, a number of renewable energy companies have set up power marketing affiliates.

Order 888 did not directly address transmission pricing, but distributed utility technologies may benefit from increasing interest in new transmission pricing strategies such as congestion pricing. Properly located, distributed utility technologies may act to reinforce or mitigate capacity-constrained transmission lines. A key issue is whether transmitting utilities, and ultimately FERC, will recognize whether the distributed utility technologies are providing an economic value and allow a credit or offset to any transmission or ancillary service charges a distributed utility technology may otherwise face.

This paper addresses Order 888, and the issues renewable energy interests and FERC will face as Order 888 is being implemented, but FERC regulates only the wholesale power and interstate transmission parts of the electric power industry. With retail competition looming, retail markets represent another area for renewables that, except for unbundled retail transmission, will not be regulated by FERC. Renewables will certainly benefit if retail markets offer green marketing opportunities, and there may be market niches for renewables in retail markets that are not as readily available in wholesale power markets. However, renewables will still have to go through the transmission system to reach customers and will face various transmission and ancillary service charges discussed in this paper.

Now that Order 888 is released, FERC is moving toward implementing its provisions and applying its policies to individual cases. In response to the order's requirements, by July 9, 1996, more than 160 open access tariffs were filed, and FERC must evaluate and approve every tariff. Furthermore, FERC will apply Order 888 to a number of important cases, such as the petition by three California utilities to establish a power exchange and an ISO. In addition, Dominion Resources has asked FERC to approve a megawatt-mile transmission pricing system, and the California ISO and a separate ISO application by the Pennsylvania-New Jersey-Maryland power pool contains new transmission pricing proposals. Also, as more states and utilities launch retail wheeling initiatives, FERC and state regulatory commissions will have to decide what is FERC-regulated transmission and what is state-regulated distribution. These cases will likely play an important role in designing the rules and operations of a restructured electric power industry, and renewable energy interests, which have historically not been very active before FERC, would be well-advised to play an active role.

Finally, Congress is showing increasing interest in enacting national electric restructuring legislation, although congressional action is unlikely until at least 1997. FERC's role in a restructured electric power industry will be a featured part of any congressional legislation. Congressional bill drafts released to date all call for an expanded FERC role, from ensuring utilities recover their stranded investment to ordering and implementing retail competition if states do not act within a specified time. FERC's role and possible congressional encouragement of "public purpose" programs such as low-income assistance, research and development, energy efficiency, and renewable energy will likely be a part of the congressional debate. A difficulty will be designing policies that reflect the various characteristics and technological maturities of the individual renewable energy technologies.

V. Notes

1. Unless otherwise noted, the reference for this paper is *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities*, Docket No. RM95-8-000, Order No. 888, FERC Stats. & Regs. ¶ 31,036 (1996).

2. *Capacity Reservation Open Access Transmission Tariffs*, Notice of Proposed Rulemaking, FERC Docket No. RM96-11-000, April 24, 1996.

3. **Multiple parties have petitioned FERC for rehearing of Order 888 on a number of issues. FERC had not yet acted on these rehearing requests when this report went to press.**

4. U.S. Department of Energy, Energy Information Administration. *Electric Trade in the United States*, 1992.

5. *South Carolina Public Service Authority*, FERC 75 ¶ 61,209 (1996).

6. "FERC: Court Validation of Gas Rule Backs Key Policy Calls in Order 888," *Electric Utility Week*, July 29, 1996, pp. 1, 8.

7. *Comments of American Wind Energy Association on Open Access Rule*, FERC Docket RM95-8-000, August 7, 1995.

8. *Final Environmental Impact Statement*, FERC Dockets RM95-8-000 and RM94-7-001, April 1996.

9. For example, see *Washington Water Power Co. and Sierra Pacific Power Co.*, FERC 73 ¶61,218 (November 29, 1995) and *Cleveland Electric Illuminating and Toledo Edison*, Docket Nos. ER95-1104-000, EC95-14-000 and ER95-1295-000, December 13, 1995.

10. *Comments of American Wind Energy Association on Open Access Rule* and *Comments of the Utility Wind Interest Group,* FERC Dockets RM95-8-000 and RM94-7-001, August 7, 1995.

11. *Joint Comments of the Natural Resources Defense Council and Pacific Gas & Electric Co.*, FERC Dockets RM95-8-000 and RM94-7-001, August 4, 1995.

12. *Petition of Pacific Gas & Electric, San Diego Gas & Electric, and Southern California Edison*, April 29, 1996, FERC Docket No. EL96-48-000.

13. Thomas Johansson, Henry Kelly, Amulya K.N. Reddy, and Robert Williams. *Renewable Energy: Sources for Fuels and Electricity.* Washington: Island Press, 1993.

14. *Prepared Testimony of William B. Marcus on Behalf of the Renewable Northwest Project*, Bonneville Power Administration 1996 Wholesale Power Rate and Transmission Rate Proceeding, File Nos. WP-96/TR-96, September 8, 1995.

15. *Order Conditionally Granting Application for Market-Based Rates*, FERC Docket No. ER96-1196-000, July 12, 1996. Other transmission lines owned by non-utility renewable power developers that the author is aware of include two sets of transmission lines owned by Zond Systems Inc.; one 35-mile transmission line co-owned by Zond and SeaWest Energy Systems; a 115-kV transmission line by California Energy and Luz International. All of these lines are in California. In addition, California Energy has a 5-mile transmission line in northern Nevada. See Susan Williams and Brenda Bateman, *Power Plays*, Investor Responsibility Research Center (1995); and R. Baldick and E.P. Kahn, *Transmission Planning in the Era of Integrated Resource Planning: A Survey of Recent Cases*, Lawrence Berkeley Laboratory, September 1992.

16. *Comments of the Public Generating Pool,* FERC Dockets RM95-8-000 and RM94-7-001, August 8, 1995.

17. *Comments of the Idaho Public Utilities Commission,* FERC Dockets RM95-8-000 and RM94-7-001, August 8, 1995.

APPENDIX A

Independent System Operators

The electric power industry has increasingly embraced the concept of an independent system operator (ISO) taking control of a transmission system. There are several variations of ISOs being proposed. Some versions advocate divesting a utility's transmission system; others cede the dispatch and day-to-day operations of a transmission system to an ISO, but not the ownership of the transmission system; while others simply give an ISO a voluntary coordination role. In the final rule, FERC adopted the following principles for which it will evaluate ISOs.

- Governance of the ISO should be structured in a fair and nondiscriminatory manner.
- An ISO and its employees should have no financial interest in the economic performance of any market power participant. An ISO should adopt and enforce strict conflict-of-interest standards.
- An ISO should provide open access at non-pancaked rates pursuant to a single, unbundled grid-wide tariff that applies to all eligible users.
- An ISO should have the primary responsibility in ensuring short-term reliability of grid operations.
- An ISO should control the operation of interconnected transmission facilities within its region.
- An ISO should identify constraints and take operational actions to relieve those constraints within the trading rules established by the governing rules. The rules should also promote efficient trading.
- An ISO should have appropriate incentives for efficient management and administration.
- An ISO's transmission and ancillary services pricing should promote the efficient use of, and investment in, generation, transmission and consumption.
- An ISO should make timely transmission system information publicly available via OASIS.
- An ISO should develop mechanisms to coordinate with neighboring control areas.
- An ISO should establish an alternative dispute resolution process.

APPENDIX B

The Environmental Impact Statement

As part of the rulemaking process, FERC wrote an environmental impact statement (EIS), which it released in draft form in October 1995, and in final form in April 1996. FERC concluded that without Order 888, nitrogen oxide (NO_x) emissions are expected to decrease until at least the year 2000 and increase after that until 2010. The amount of NO_x depends on the relative prices of coal and natural gas. Based on two scenarios (one favors natural gas and the other coal), FERC concluded that Order 888 will not significantly affect NO_x emission trends. FERC also said that the economic benefits of Order 888, which could be between $3.8 billion and $5.4 billion annually, would dwarf the possible environmental impacts.

Various parties asserted the rule would have adverse environmental impacts by providing a competitive advantage to older coal-fired plants, primarily located in the Midwest and South, that are not subject to the NO_x emission controls in the Clean Air Act (CAA). These parties expressed concern that coal plants will generate more power and emit more NO_x, contributing to the formation of ozone that would be transported to the Northeast by air currents. These commenters suggested that FERC must use its authority under the FPA and the National Environmental Protection Act to promulgate environmental controls to mitigate the possible emissions increases that could result from the final rule. They also suggested that FERC include a NO_x emission allowance program, similar to the sulfur dioxide (SO_2) trading program enacted by CAA; condition the use of open access tariffs on power source compliance with air emission limits; and an emission charge to establish a FERC mitigation fund.

FERC concluded that the rule's possible environmental impacts were not large enough to justify mitigation measures. Further, FERC believed the mitigation proposals exceeded FERC's statutory authority and could undercut the regulatory framework created by CAA. FERC believed Congress, not FERC, should address these issues. Although sympathetic to the issues,

FERC believed it is best for the U.S. Environmental Protection Agency (EPA) to create a NO_x emissions cap and trading program similar to the SO_2 trading program. FERC also hoped that the Ozone Transport Assessment Group, a regional group of northeastern states charged with reaching an agreement on controlling ozone emission levels, will reach a successful conclusion.

Ultimately, EPA referred Order 888 to the Council on Environmental Quality (CEQ), an executive agency of the White House, for review under CAA. In its referral letter, EPA said it agreed with FERC that Order 888 is "unlikely to have any significant adverse environmental impact in the immediate future, and that in light of its anticipated economic benefits, implementation of [Order 888] should go forward without delay."[1] However, EPA expressed concern that several key assumptions could have been defined differently, which could have led FERC to assign a higher potential NO_x increase to Order 888. Specifically, EPA suggested using higher natural gas price forecasts; greater predicted increases in transmission capacity; lower system reserve margins; higher electricity generation; and possible increased emissions from improved heat rate levels from fossil fuel plants.[2]

FERC acknowledged that while "reasonable minds" may differ over what assumptions should be used in performing an EIS, FERC believed EPA's suggestions offered no justification for changing the assumptions underlying FERC's EIS. However, FERC said it would act as a backstop by initiating a Notice of Inquiry (NOI) to determine which air pollutant mitigation strategies are appropriate under the FPA, if EPA determines that the Ozone Transportation Assessment Group process is unsuccessful in meeting its objectives. Furthermore, FERC said that if EPA must take federal action to mitigate air pollution from "demonstrable environmental harm" attributable to Order 888, FERC would begin a rulemaking to propose possible mitigation strategies allowable under the FPA. FERC said it would rely on materials gathered in the NOI and focus on mitigation strategies that are "workable, tailored to address consequences attributable to [Order 888] and consistent with our statutory authority."[3] Given EPA's powers under CAA, FERC said it expects EPA to succeed but if EPA does not succeed, FERC said it does not believe that other agencies operating under more limited authority can adequately resolve NO_x emissions. Congressional action, FERC declared, may be necessary.[4] Based on FERC's order, and subsequent communications between the U.S. Department of Energy, EPA, and FERC, the CEQ believed the concerns raised in EPA's referral were resolved.[5]

Separately, FERC did not incorporate the possible negative effects of the final rule on "stranded benefits" such as energy efficiency, low-income customer assistance, and renewable energy in the EIS. Some parties believed that the final rule will increase competitive pressures and discourage utility investment in renewable energy technologies, and the resulting reductions in these technologies will contribute to significant environmental impacts. FERC said the final rule is meant to be technology neutral and is intended to encourage generator competition by requiring nondiscriminatory open transmission access. According to FERC, state regulatory policies are a more important factor for investment in demand-side management and renewables than Order 888, and nothing in the final rule will affect those state policies. FERC also noted that Order 888 confirms state jurisdiction over local distribution facilities, and that states can assign fees to those facilities or services to recover costs for public purpose programs that states believe are in the public interest.

Notes to the Appendix

1. Letter from Carol Browner, Administrator, EPA, to Kathleen A. McGinty, Chair, CEQ, May 13, 1996.

2. *Technical Analysis of FERC Final Environmental Impact Statement on Open Access Rule (Order 888)*, EPA Staff Analysis, May 1996.

3. *Order Responding to Referral to Council on Environmental Quality*, FERC 75 ¶61,208 (May 29, 1996).

4. Ibid.

5. Letter by Kathleen McGinty, Chair, CEQ, to Carol Browner, Administrator, EPA and Elizabeth Moler, Chair, FERC, June 14, 1996.