

NRRRI

RESEARCH REPORT

SUMMARY OF KEY STATE ISSUES OF FERC ORDERS 888 AND 889

The Federal Energy Regulatory Commission's (FERC) Order 888 is perhaps the most important and far reaching FERC electricity order in decades. The consequences on the structure of the industry and how the industry is regulated are significant departures from past methods and regulatory philosophy. This will undoubtedly have a dramatic impact on the manner in which state public utility commissions, which are also undergoing or considering dramatic change, regulate their jurisdictional electric utilities. This report summarizes and discusses the actions that the FERC is taking and their profound repercussions on the industry and state commissions. The report is not a comprehensive summary of the entire order. Rather, it is intended to highlight the order's more important features and discuss what this could mean for the states.

The report is organized into eight sections; the first seven address Order 888 and the last section (section 8) addresses Order 889. Sections 1 through 5 summarize and discuss the main features of Order 888. Section 6 (on jurisdiction) and Section 7 (on property rights) interpret the likely consequences of the order. Section 8 summarizes the FERC's Open Access Same Time System (OASIS) and discusses some concerns about its real-world application.

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**SUMMARY OF KEY STATE ISSUES OF
FERC ORDERS 888 AND 889**

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PREFACE

FERC Orders 888 and 889 were issued by the Federal Energy Regulatory Commission (FERC) on April 24, 1996. Order 888 addresses both access to electric transmission facilities and stranded costs. Order 889 requires jurisdictional electric utilities to execute standards of conduct and an Open Access Same Time Information System (OASIS).

In issuing the orders, FERC's intent was to reduce power rates in wholesale markets by expanding competition. This report, in part, examines the expectation of this outcome. Importantly, it highlights the features of the Order that will have the greatest effect on both the electric power industry and state public utility commissions.

This report was prepared pursuant to a contract with the Georgia Public Service Commission. The report was submitted to the Commission in September of last year. We thank the Commission for permitting the NRRI to print the report and distribute it to our clientele. The report should be valuable to state commissions who want to further understand FERC Orders 888 and 889 and their implications for states.

INTRODUCTION

The Federal Energy Regulatory Commission's (FERC) Order 888 is perhaps the most important and far reaching FERC electricity order in decades. The consequences on the structure of the industry and how the industry is regulated are significant departures from past methods and regulatory philosophy. This will undoubtedly have a dramatic impact on the manner in which state public utility commissions, which are also undergoing or considering dramatic change, regulate their jurisdictional electric utilities. This report summarizes and discusses the actions that the FERC is taking and their profound repercussions on the industry and state commissions. The report is not a comprehensive summary of the entire order. Rather, it is intended to highlight the order's more important features and discuss what this could mean for the states.

The report is organized into eight sections; the first seven address Order 888 and the last section (section 8) addresses Order 889. Section 1 through 5 summarize and discuss the main features of Order 888. Section 6 (on jurisdiction) and Section 7 (on property rights) interpret the likely consequences of the order. Section 8, summarizes the FERC's Open Access Same Time System (OASIS) and discusses some concerns about its real-world application.

1. OPEN ACCESS REQUIREMENT IN FERC ORDER 888

FERC Order 888 establishes open access and comparable interconnection as guiding principles for a transmission owner's behavior with respect to the sale of transmission services to buyers and sellers of wholesale bulk power.¹ Once

¹ *In re Promoting Wholesale Competition Through Open Access Nondiscriminatory Transmission Services by Public Utilities: Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Federal Energy Regulatory Commission Order No. 888, Final Rule, mimeo, (released April 24, 1996), 3.

implemented, these principles are expected to accomplish the FERC's goal of removing the most egregious administrative and technical obstacles to the emergence of a competitive wholesale power market.² *Pro forma* open access tariffs implement these concepts. *Pro forma* tariffs assure the desired level of uniformity with respect to "terms and conditions" across those transmission owners that are required to provide exempt wholesale generators, independent power producers, and others with comparable interconnections and open access services. As each affected transmission owner fills in the blanks of the *pro forma* tariff, the resulting set of specific tariffs will establish the parameters of open, comparable and nondiscriminatory access to transmission services.³ Openness, comparability, and nondiscrimination ensure that transmission owners do not abuse their transmission-related market power.⁴

In addition to comparability and openness,⁵ the FERC has put another restriction on the purchase of transmission services as it implemented the precepts of the Energy Policy Act of 1992 (EPAAct). Each generation company that is affiliated with an affected transmission owner has to purchase transmission and ancillary services from its affiliate's open access tariffs under the same terms and conditions that apply to the nonaffiliated generation companies.⁶ This restriction suggests that generation companies associated with different transmission owners may have to renegotiate their existing coordination agreements and contracts applying to bilateral business

² Ibid., 1-2.

³ Ibid., 3.

⁴ Ibid.

⁵ Comparability and openness ensure to cogenerators, qualifying facilities, independent power producers, and unaffiliated exempt wholesale generators the availability of transmission services that is virtually equivalent to the transmission services available to the utilities.

⁶ Ibid., 5.

relationships and power pools.⁷ In particular, some transmission companies may have to remove discriminatory pricing provisions from their agreements and contracts.⁸

Another FERC requirement associated with the implementation of EPart is that each affected transmission owner has to develop and deploy a same-time information system for transmission services. Once these systems become operational, they will provide buyers and unaffiliated sellers with the same transmission-related information that is available to the transmission owners and their affiliates.⁹ In an effort to achieve or maintain some scale efficiencies, the FERC has allowed transmission owners to join together and develop and deploy a joint same-time information system that contains transmission-related data for a larger contiguous geographic area. For example, the members of a transmission grid are permitted to implement a single same-time information system covering the same geographic area as the related transmission grid.

Short History of Open Access

Access to and the pricing of transmission services were concerns of the FERC prior to Order 888 and the EPart. During the congressional debate on the reform of the electric industry, the FERC, circa 1989, had instituted a regime of "market-based" rates for selected utilities. To obtain the privilege of charging market-based rates for wholesale power, these utilities had to demonstrate that they and their affiliates did not

⁷ The FERC defines coordination contracts and agreements as voluntary sales or exchanges of power for specialized purposes. These transfers either allow wholesale buyers to obtain costs savings or gains in reliability that they could not realize if they remained isolated from the sellers. Meanwhile, the sellers take advantage of an opportunity to increase their revenue and reduce the level of their temporarily idle capacity. See: *Ibid.*, fn 32.

⁸ *Ibid.*, 6.

⁹ *Ibid.*, 4-5.

possess the market power that would enable them to limit competition in the wholesale market.¹⁰ The potentially anticompetitive situation usually investigated by the FERC was whether the utilities that requested market-based rates had control over transmission facilities in the relevant geographic market.¹¹ Such control could be exercised via dominant or exclusive ownership of the relevant transmission facilities or through contracts that conferred the right to control the use of transmission facilities.¹²

The initial access tariffs underlying market-based rates were substantially different from the *pro forma* open access tariff that is described in FERC Order 888. Previously, the utility was not obligated to offer more than an inferior quality point-to-point transmission service to its competitors.¹³ In this regard, the effect of the early access tariffs in the electric industry was similar to the effect of the early access services available in the telecommunications industry.¹⁴ The utility was not prepared to voluntarily relinquish any competitive advantage that was conferred on it by virtue of its ownership of bottleneck and essential facilities. The *pro forma* tariff is a step toward eliminating this source of competitive advantage. The *pro forma* tariff must contain both point-to-point contract-based and network load-based open access services.¹⁵

The inferiority of the initial open access tariffs led to the comparability standard enunciated by the FERC in the American Electric Power (AEP) case.¹⁶ The FERC adopted the "AEP comparability standard" that requires a utility to offer the same

¹⁰ *Ibid.*, 25.

¹¹ *Ibid.*, 26.

¹² *Ibid.*, fn 50.

¹³ *Ibid.*

¹⁴ *In re Exchange Network Facilities for Interstate Access*, 71 FCC2d 440 (1979).

¹⁵ FERC Order 888, 5.

¹⁶ *In re American Electric Power Service Corporation*, 69 FERC sec. 61,035 (1994), *reh'g denied*, 72 FERC sec. 61,071 (1995).

transmission service to its competitors that it uses itself, if this utility expects to avoid sanctions associated with undue discrimination and anticompetitive behavior.¹⁷

The AEP comparability standard clearly does not require the utility to offer network transmission service to its competitors. This standard only requires that the utility cannot use network transmission service when it does not offer network transmission service to its competitors. The FERC addressed this gap in the availability of transmission services in the Kansas City Power and Light Company (KCP&L) case.¹⁸ After investigating the utility's sources of market power, the FERC decided that the market power currently wielded by this utility could not be sufficiently mitigated without requiring it to offer network transmission services to its competitors. The practical effect of this decision was to tie the utility's privilege to offer market-based rates with the availability of network transmission services for use by third parties.¹⁹

The pricing of transmission service has evolved much more slowly than the availability of different transmission services. Prior to Order 888, the utility offered transmission services to its competitors at "postage-stamp rates" and along "contract paths." A postage-stamp rate is a single price per unit of transmission service that does not vary by distance and load flow.²⁰ Such a price is easy to administer, but it does not conform to the realities of load flow according to Kirchoff's laws or the costs of supplying transmission services over long distances. A contract path is a tractable construct that has been applied to the flow of power over several transmission systems. This construct says that power flows through identifiable transmission owners that lie between the points of generation and the ultimate points of receipt and delivery.²¹ Now,

¹⁷ FERC Order 888, 35-37.

¹⁸ *In re Kansas City Power and Light Company*, 67 FERC sec. 6,183 (1994), *reh'g pending*.

¹⁹ FERC Order 888, 38.

²⁰ *Ibid.*, 94.

²¹ *Ibid.*

the FERC is prepared to approve distance-sensitive and flow-based rates for transmission service.²² However, such rates may be difficult to implement in practice. Moreover, they may be a long time in coming because the FERC concluded in Order 888 that the AEP comparability standard applies to the pricing of transmission services as well as their terms and conditions.²³

Comparability and open access are necessary to eliminate undue discrimination with respect to transmission access.²⁴ The FERC has for some time believed that ownership or control of transmission facilities is a major source of market power.²⁵ Consequently, nondiscriminatory open transmission access is a necessary condition for the emergence of a competitive wholesale market.²⁶

The FERC made special provisions that allow utilities to reserve transmission capacity for existing native-load service.²⁷ The level of reserved transmission has to be consistent with reasonable forecasts of growth in native load. However, until these forecasts materialize, the utilities are required to offer the reserved capacity for resale in a secondary transmission market. The FERC's expectation is that resold transmission capacity will be released by the utilities if the expected growth does not materialize in an acceptable time frame. The FERC is less clear on what happens if the utilities require the resold capacity to serve native load before the expiration of the lease.

The FERC's reciprocity decision is meant to solve a free rider problem. Essentially, the public policy question is: Should utilities under the FERC's jurisdiction

²² *Ibid.*, 44.

²³ *Ibid.*, 45.

²⁴ *Ibid.*, 1-4.

²⁵ *Ibid.*, 26; fn 50.

²⁶ *Ibid.*, 50-51.

²⁷ *Ibid.*, 170-171.

be required to provide open access and comparable interconnections to utilities that are not under the FERC's jurisdiction when it has been established that the nonjurisdictional utilities have the capability to provide open access and comparable interconnections to the jurisdictional utilities? The FERC answered this question in the following manner: nonjurisdictional utilities, if they are capable of doing so, have to provide open access services and comparable interconnections to jurisdictional utilities, if the nonjurisdictional utilities want to use the jurisdictional utilities' open access services and comparable interconnections.²⁸

The FERC's *pro forma* tariff is the template for the pricing of open access services. This tariff contains the minimum set of the mandatory terms and conditions that accompany the sale of these services to wholesale and eligible retail customers. Any additional term or condition requested by the utilities or other interested parties is a candidate for approval by the FERC only if it does not frustrate or impede the economic and policy objectives that are expected to be accomplished through open access and comparable interconnections.

The opportunity to add terms and conditions to the *pro forma* tariff represents the basis for different classes of open access services. For example, the FERC's decision to allow volume discounts for a specific customer and its similarly situated brethren creates a class of volume-discounted open access services.²⁹ Another area of flexibility is rate level. A *pro forma* tariff does not specify the actual rates and charges for open access services. Instead, rates and charges are allowed to vary across utilities and groups of coordinated utilities because they may be characterized by different costs of providing open access services. However, some uniform rates and charges across groups of utilities may emerge over time.

²⁸ Ibid., 160-162.

²⁹ Ibid., 96-98.

The final area of flexibility is the utilities' freedom to choose from a set of pricing concepts. Previously, a transmission price consisted of a postage stamp rate over a contract path.³⁰ A postage stamp rate is distance insensitive; and a contract path essentially is a single straight line connecting the selling, buying and intervening utilities.³¹ Typically, these rates are pancaked; that is, the transmission service user has to pay each utility along the contract path its postage stamp transmission price.³² Now, the FERC has chosen to allow the option of transmission prices that are based on distance and the actual flow path of electric power between the buyers and sellers.³³

The premise for the new rate structures is that transmission costs do vary with distance. That is, the total cost of transmitting electric power for fifty miles is greater than the total cost of transmitting electricity over twenty-five miles. The premise for flow-based rates is that the distribution of transmission capacity and Kirchoff's Laws make it very unlikely that the electric power that reaches the buyer actually flowed along the contract path. Instead, these factors imply that a given amount of electric power with specific points of origination and destination actually flows simultaneously over multiple interconnected paths.³⁴ In recognition of this fact, flow-based pricing attempts to provide compensation to the owners of the transmission facilities that were actually used to transport a given amount of electricity from one geographic location to another.³⁵

³⁰ *Ibid.*, 45.

³¹ *Ibid.*, fn 94, fn 184.

³² *Ibid.*, 93.

³³ *Ibid.*, 95.

³⁴ *Ibid.*, fn 185.

³⁵ *Ibid.*, fn 95.

The FERC did not mandate the substitution of flow-based pricing for contract path pricing because it felt that such a regulatory requirement would decelerate the deployment of open access services.³⁶ Other reasons why the FERC declined to mandate flow-based pricing are the lack of a proven flow-based pricing methodology and an expectation that flow-based pricing is most applicable at the regional level.³⁷

The development and deployment of open access services and comparable interconnections are a long way from being complete. Although the definitions of open access and comparable interconnection are easily understood at the policy level, the implementation of these concepts at the technological level is quite demanding. Open access means that anyone with a legitimate interest in connecting to a transmission network, transmission grid, or independent system operator has the opportunity to purchase such a connection at a posted price that is subject to approval by regulators. Comparable interconnection means that each wholesale or eligible retail customer that wants to connect to a transmission network, a transmission grid, or an independent system operator does so on essentially the same technical terms.

However, open access and comparable interconnections are much more complex at the technical level. It is one thing to say that the transmission owner or its agent should provide access and interconnection services fairly to all wholesale and eligible retail customers. It is another thing to redesign and open up a integrated transmission system that up until now has been mainly noncompetitive.

Comparable interconnection is likely to follow the same path as open access. Any blatant discrepancies between the interconnections available to utility-owned generators and nonutility generators will be corrected as quickly as possible. Features

³⁶ *Ibid.*, 96.

³⁷ *Ibid.*, 97-98.

and functions that are absolutely required by the nonutility generators and are available to the utility-owned generator will be in the first wave of comparable interconnections. Features and functions that are required by the nonutility generators and of competitive value to the utility-owned generators will be in the second wave of comparable interconnections. Features and functions that are required by the nonutility generators toward which the utility-owned generators are ambivalent will be in the third wave of interconnection services. Features and functions that are wanted by the nonutility generators, but are of no competitive value to the utility-owned generators, will be in the fourth wave of interconnection services. Features and functions that are wanted by the nonutility generators and that create competitive problems for the utility-owned generators will be in the fifth wave of interconnection services. There is virtual certainty that the first three waves of interconnection services will reach the shore. There is a significant probability that the fourth and fifth waves will break up on jetties and other barriers raised by the utility. In all, comparable interconnections will not emerge overnight.

2. POWER POOLS AND INDEPENDENT SYSTEM OPERATORS

Coordination Agreements: Power Pools, Public Utility Holding Companies, Bilateral Coordination Arrangements, and Independent System Operators

A coordination agreement is defined as any nonrequirements wholesale power sales agreement including interchange, interconnection, pooling, and other agreements. Certain existing contracts including coordination agreements that may be unduly discriminatory need to be modified so that the parties to the agreement use unbundled transmission service obtained under the same open access tariff available to nonparties. Four categories of coordination arrangements are identified:

1. Tight power pools.
2. Loose power pools.
3. Public utility holding company arrangements.
4. Bilateral coordination agreements.
 - a. *Bilateral economy energy agreements*: for short-term economy trading based on availability and cost criteria without any contractual obligations.
 - b. *Other Bilateral coordination agreements*: long-term and open-ended transactions with a contractual obligation to support one another under prespecified conditions.

Tight and Loose Power Pools

Pools have complex arrangements and hence will be given adequate time³⁸ for filing their voluntary modifications as well as guidance about what changes need to be made. Tight pools are identified as New York Power Pool (NYPP), New England Power Pool (NEPOOL), Pennsylvania-New Jersey-Maryland Interconnection (PJM), and Michigan Electric Coordinated Systems (MECS). A loose pool is a multilateral arrangement. Many loose pools contain discounted and/or special transmission arrangements. Examples include Mid-Continent Area Power Pool (MAPP), Inland Power Pool, and the Missouri-Kansas Power Pool (MOKAN). Public utility members of a pool (tight or loose) must either file an individual final rule *pro forma* tariff³⁹ within sixty

³⁸ Alabama Electric Cooperative (AEC) argued that wheeling should start under sec. 211 even before the pools publish the open access tariff. American Public Power Association (APPA) argued that the treatment of pools is integral to the rule and not a "follow-on" activity. Independent Power Producers (IPPs), power marketers and Electricity Generation Association (EGA) argued for an immediate application of unbundling and transmission tariffs for new transactions. The pools requested more time and got it.

³⁹ Pennsylvania Electric Company (PECO) and Baltimore Gas and Electric Company (BG&E) of PJM argued that transactions within the pool are not "wholesale purchases" as they are not firm point-to-point services and hence exempt from the *pro forma* tariff.

days of publication of the Final Rule in the Federal Register or file a joint pool-wide *pro forma* tariff⁴⁰ no later than December 31, 1996. Reformed power pool (tight or loose) arrangements must be filed before December 31, 1996 and must have provisions that (with or without) an independent transmission system operator [ISO]) allow open, nondiscriminatory membership⁴¹ to bulk power market participants regardless of the type of entity, affiliation or geographical location. Access fees or higher charges⁴² (nonpancaked) to new members or nonowners can be used to subsidize discounts to transmission-owning utilities (TOUs) but the charges must be justified solely on transmission-related costs (excluding other agreements like generation reserve sharing) borne by TOUs. Loose pools are encouraged to explore the ISO option although operational unbundling through an ISO may not be possible immediately due to the lack of a single control area.

Public Utility Holding Companies

There are three kinds of requirements, which depend on the type of Holding Company:

1. Those (registered or exempt) that are members of tight or loose pools are subject to the pool requirements.

⁴⁰ The U.S. Department of Energy felt that the pools should file a single pool-wide tariff. Electricity Consumers Resource Council (ELCON) and Coalition for a Competitive Electric Market (CCEM) argued that this was especially desirable in tight pools to avoid pancaking of rates.

⁴¹ Edison Electric Institute suggests that new members be left to negotiate into existing pools and share the pool burdens in return for the benefits. MidAmerican asked that members of pools be allowed to exit unilaterally if the new rates are unacceptable to them.

⁴² Most commenters recognize regional differences among power pools and urge flexible treatment that would induce innovation in ratemaking. Public Utility Commissions (PUCs) (Delaware, D.C., New Jersey, Maryland) feel that regional flexibility would benefit retail customers. ELCON and power marketers, however, argue for uniform application of *pro forma* tariffs to create a national standard.

2. Central and South West Corporation (CSW)⁴³ presents special circumstances. The Southwestern Electric Power Co. (SWEPCO) and the Public Service Company of Oklahoma (PSO), which are part of the Southwest Power Pool, Inc. (SPP), exchange power with the Central Power & Light Co. (CP&L) and the West Texas Utilities Co., which are part of the Electric Reliability Council of Texas (ERCOT), through the north and east high voltage direct current (HVDC) interconnections. Their "to or from and over" tariffs are not comparable by the standards of both the *pro forma* rule and the Texas Commission open access rules. The CSW system is given the opportunity to propose their own solution and file a tariff by December 31, 1996 for unbundled transmission within and between ERCOT and SPP.
3. The remaining must file a single system-wide final rule *pro forma* tariff⁴⁴ for unbundled transmission service across the system within sixty days of publication of the Final Rule in the Federal Register. The members of the holding companies have an extension until December 31, 1996, to take service under the system-wide tariff for wholesale trades *among* themselves.

It may also be necessary for registered holding companies to reform their equalization agreements to recognize the nondiscriminatory terms and conditions of transmission service required under the final rule *pro forma* tariff.

Bilateral Coordination Agreements

Agreements after the effective date of the rule will be subject to functional unbundling and open access requirements. All economy energy coordination contracts

⁴³ CSW has proposed a region-wide pricing model based on power flows.

⁴⁴ Allegheny, Southern, and other holding companies argue that coordination agreements among subsidiaries do not constitute a power pool and should hence be exempt from pool/pricing obligations.

executed before the effective date need to be modified to unbundle economy energy transactions after December 31, 1996. All other coordination contracts⁴⁵ will be subject to complaints filed under sec. 206 of the Federal Power Act [FPA] (i.e., the rates, terms, and conditions can be challenged as unduly discriminatory or unlawful). The unbundled coordination compliance rate⁴⁶ is computed as the difference between the existing coordination rate ceiling and the corresponding transmission unit charge. The compliance filing will be limited to removing the current transmission tariff price from the coordination price. Transmission rates for the coordination agreements can be below the tariff rate but the discounts, if offered, should be comparable and not unduly discriminatory.

ISO Principles

ISOs or control area operators may be an effective means for accomplishing comparable access, but pools are not required to form ISOs to remedy undue discrimination. Guidelines are provided for minimum ISO characteristics. The ISO principles are:

1. ISO governance should be structured in a fair and nondiscriminatory manner to prevent control and appearance of control of decisionmaking by any class of participants.

⁴⁵ Many commenters argue that existing coordination contracts must not be abrogated because they were negotiated in an environment not envisioned by the Notice of Proposed Rulemaking (NOPR), they are beneficial to customers and because they were tailored to peculiar regional circumstances which will be jeopardized.

⁴⁶ Nebraska Public Power District argues that mandating coordination pricing methods must be avoided as that may impede establishing regional transmission groups (RTGs) where such pricing is by mutual agreement and subject to alternative dispute resolution (ADR) procedures. Several commenters argue that current coordination pricing may be inappropriate in an open access regime that favors market based rates.

2. An ISO and its employees should have no financial interest in the economic performance of any power market participant. A transition period of six months is proposed for this purpose. An ISO should adopt and enforce strict conflict of interest standards to ensure independence from participants.
3. An ISO should provide open access to the transmission system and all services under its control should be priced at nonpancaked rates pursuant to a single, unbundled, grid-wide tariff that applies to all eligible users in a nondiscriminatory manner.
4. An ISO should have the primary responsibility in ensuring short-term reliability of grid operations. Its role in this responsibility should be well-defined and comply with applicable standards set by the North American Electric Reliability Council (NERC) and the regional reliability council.
5. An ISO should have control over the operation⁴⁷ of interconnected transmission facilities within its region.
6. An ISO should identify constraints on the system and be able to take operational actions to relieve those constraints within the trading rules established by the governing body⁴⁸ to promote efficient trading. An ISO would provide balancing and ancillary services.
7. The ISO should have appropriate incentives for efficient management and administrative activities like system expansion, transmission maintenance and contracts, and operation of a settlement system and an energy auction. The ISO should procure the services needed for such management and

⁴⁷ The rules do not apply to independent administrators or coordinators that lack full operational control of the grid, although such arrangements might be useful.

⁴⁸ The order is unclear about who would be on the governing body. It does say that ISOs would be public utilities subject to commission (presumably FERC) jurisdiction and its operating standards and procedures must be approved by the FERC. The NERC would set the applicable reliability standards.

administration in an open competitive market and make all protocols publicly available.

8. An ISO's transmission and ancillary services pricing policies should promote the efficient use of and investment in generation, transmission, and consumption. Pricing policies should address issues such as nondiscriminatory open access, efficiency, cost recovery, and system reliability and stability. An ISO or an RTG of which the ISO is a member should conduct such studies as may be necessary to identify operational problems (like loop flow impacts of neighboring systems) or appropriate expansions.
9. An ISO should make transmission system information publicly available on a timely basis via an electronic information network or OASIS (Open Access Same Time System, described in Section 8) operated by the ISO, consistent with the Commission's requirements.
10. An ISO should develop mechanisms⁴⁹ to coordinate with neighboring control areas to ensure the reliability and stability of systems.
11. An ISO should establish an ADR process to resolve technical, financial, and other disputes in the first instance without resorting to filing complaints at the Commission.

3. COMPARABILITY

Eligibility to Receive Nondiscriminatory Open Access Transmission

Eligibility to receive nondiscriminatory open access transmission (NDOAT) or *pro forma* tariff for unbundled transmission service is available to any entity that engages in

⁴⁹ The mechanisms of coordination are again left to the parties to determine.

wholesale purchases or sales of energy not violating section 212h of the F.P.A. (mandated retail wheeling and sham wholesale transactions). This includes:

- a. Applicants under section 211 of F.P.A. (i.e., any entity that generates power for sale or resale).
- b. Foreign utilities that are eligible and meet the reciprocal service requirement.
- c. Retail customers in circumstances not violating section 212h of the F.P.A.
- d. Municipals, Investor-Owned Utilities (IOUs), Independent Power Producers (IPPs), Associated/Affiliated Power Producers (APPs), Qualifying Facilities (QFs), Coops, marketers — anybody who sells electricity and takes title to it. Brokers who do not take title can access OASIS to arrange deals but are not subject to the tariff.

Service That Must Be Provided by the Transmission Provider

The NOPR requires jurisdictional TOUs to provide firm or nonfirm point to point transmission service and firm network transmission service on a nondiscriminatory open access basis (even if it does not use the service itself). TOUs should provide services that they are “reasonably capable” of providing whether or not:

- a. they are providing them now (to themselves or others),
- b. they find such provision “undesirable,”
- c. other utilities may be able to offer the same service, and
- d. such services are generally provided in the region.

Smaller utilities have a waiver, and customers demanding customized service not offered in the *pro forma* tariff may negotiate or file a section 211 application.

Who Must Provide Nondiscriminatory Open Access Transmission?

- a. All “public utilities” owning and or controlling facilities used for transmitting electric energy in interstate commerce, over which the FERC has jurisdiction by sections 205 and 206 of F.P.A.
- b. Under section 211 of the F.P.A., eligible entities can seek transmission service even from nonjurisdictional “transmitting utilities.” The FERC is authorized to require them to provide the same quality of transmission service as the reciprocity requirement is designed to give comparable access to the national grid to all TOUs.
- c. All members of RTGs are required to offer comparable transmission services to other members.
- d. Public utilities that own interstate transmission facilities jointly with nonjurisdictional entities must revise exclusionary contracts, if any, and offer open access to third parties over their portion of the grid.

Reservation of Transmission Capacity by Transmission Customers

A use-it-or-lose-it approach may pressure customers to demonstrate need and reveal details of individual transactions. The incentives favor the release of unused capacity. Any anticompetitive practice can be addressed under section 206; thus, a generic remedy is unnecessary.

Reservation of Capacity for Future Use by the Utility

Reservations for future use must be posted on OASIS and made available to others through the “capacity reassignment requirements.” Existing requirements

customers will have future *rights to first refusal*, beyond the terms of their contracts, to capacity they previously used.

Capacity Reassignment

A public utility's tariff must explicitly permit the voluntary reassignment of all or part of a holder's firm transmission capacity rights.

Information Provided to Transmission Customers

Information needed to verify the opportunity/ redispatch costs is in Order 889 (establishing OASIS). This is discussed in detail in section 8 of this report.

Consequences of Functional Unbundling

Functional unbundling of distribution from transmission is unnecessary at this time to ensure nondiscriminatory open access transmission. The alternative solution involves two institutions: (1) unbundling of transmission and generation/ancillary services, and (2) setting up a transmission provider that takes service under its own tariff (except for bundled retail service).

4. FUNCTIONAL UNBUNDLING AND ANCILLARY SERVICES

Order 888 requires that wholesale generation and wholesale transmission be functionally unbundled, that is, wholesale generation service must be offered separately from wholesale transmission service. Further, when there is either direct retail access or retail wheeling, transmission service and generation service must also be unbundled.

However, traditional bundled retail services under state regulation are not subject to the functional unbundling requirement. Requiring unbundling of direct access or retail wheeling service has the effect of transferring jurisdiction over unbundled transmission service to the FERC. All unbundled transmission service must be offered to third parties on a comparable basis to the service that the utility provides itself.

Functional unbundling is something short of corporate unbundling, which is also known as divestiture. There is no requirement in Order 888 to divest generation assets. Indeed, EPAct provides that divestiture of generation assets requires the approval of the state public service commission after a finding that such divestiture would be in the public interest. The details of how to implement real-time information networks that are required for functional unbundling are mainly fleshed out in Order 889, which is dealt with elsewhere in this report. The FERC has also issued a code of conduct that is applicable to all transmission-providing utilities. The code of conduct is designed to ensure that preferential access to information about wholesale transmission prices and availability is not attainable either by employees of the public utility who are engaged in wholesale marketing functions or by employees of affiliates engaged in similar functions.

In addition to the unbundled basic transmission service, each transmission-owning utility must have unbundled ancillary services offered in its open-access transmission service. The following six ancillary services must be included in any open-access transmission tariff: (1) scheduling, system control, and dispatch service; (2) reactive supply and voltage control from generation source service; (3) regulation and frequency response service; (4) energy imbalance service; (5) operating reserve-spinning reserve service; and (6) operating reserve-supplemental reserve service. In addition, transmission providers may provide loss compensation service as an ancillary service to transmission customers. Reactive power supply and voltage support from transmission resources are considered to be part of the basic transmission service.

The transmission service provider must supply and the transmission customer must purchase from the transmission provider both (1) scheduling, system control, and dispatch service, and (2) reactive supply and voltage control from generation source service. In addition, the transmission provider must provide the remaining four of the six ancillary services listed above only to customers servicing load in the transmission provider's control area. The customer can purchase these services from either the transmission provider or a third party. Alternatively, the transmission customer may choose to provide these services itself. Transmission providers must offer each of these services separately and cannot tie the purchase of one service to another.

The basic concerns that state regulators might have about unbundling are twofold. First, unbundling inherently leads to a transfer of jurisdiction. So long as the FERC requires that direct access and/or retail wheeling will be provided on an unbundled basis, some transmission service will be under the jurisdiction of the FERC. Having a proportion of transmission facilities under the FERC's jurisdiction means that state commissions must design cost allocation or revenue imputation methods to make certain that the cost of nonjurisdictional transmission plant or facilities is not recovered from state-jurisdictional retail ratepayers. The second concern is more subtle. If transmission customers are free not to buy ancillary services from the transmission provider and can instead buy them from third parties or provide them themselves, wholesale or FERC-jurisdictional retail transmission customers may become free riders by not buying or providing ancillary services.⁵⁰ Without an independent transmission system operator to detect, police, and coordinate the provision of ancillary services, the reliability of the grid could potentially be compromised by wholesale transmission customers. Currently under Order 888 the formation of ISOs is optional.

⁵⁰ This would be particularly true in the absence of any mechanism to detect or police against such conduct.

5. THE FERC'S POLICY ON "STRANDED COSTS"

The FERC expects that there may be some "stranded costs" that will result as its open access rule increases competition between wholesale power providers. The FERC believes that recovery of "legitimate, prudent, and verifiable stranded costs" should be allowed since, in the Commission's view, the utilities may have incurred expenses and made investments to meet long-term wholesale obligation and may have expected to continue to supply that customer, perhaps beyond the term of the current wholesale contract. As a result, the utility should be able to recover its "legitimate, prudent, and verifiable" costs that it may have incurred on that customer's behalf.

These provisions in the rule dealing with stranded costs only apply to wholesale requirements customers and not to nonrequirements customers. The Commission's reasoning is that the utilities may have expected to continue to serve wholesale requirements customers and may have made significant investments based on long-term expectations. Utilities generally do not make investments for short-term "economy-type transactions."

The FERC recognizes that the level of wholesale stranded costs will probably be small relative to retail stranded costs. The rule does not apply to "normal risks of competition, such as self-generation, cogeneration, or industrial plant closure." These risks, the Commission reasons, are not the result of open access to transmission.

The FERC's Justification for Allowing Stranded Cost Recovery

The Commission's justification for allowing recovery is based on two main arguments. First, that utilities entered into contracts to make wholesale requirements sales under an "entirely different regulatory regime." The Commission does "not

believe that utilities that made large capital expenditures or long-term contractual commitments to buy power years ago should now be held responsible for failing to foresee the actions th[e] Commission would take to alter the use of their transmission system in response to the fundamental changes that are taking place in the industry.” Here the Commission is stating that it believes that its actions are in response to “fundamental changes. . .taking place in the industry.” However, in the next sentence it draws a connection between its own action and stranded costs. The Commission states that it “will not ignore the effects of recent significant statutory and regulatory changes on the past investment decisions of utilities.” This suggests that the Commission and Congress are directly responsible for what later turn out to be uneconomic investments.

Second, the Commission believes that its experience with natural gas suggests that the policy to deal with these costs should be developed and set simultaneously with the open access rule. The Commission believes that because it failed to deal with the take-or-pay situation in the reform of the natural gas industry, the U.S. Court of Appeals for the District of Columbia Circuit invalidated the Commission’s first open access rule for gas pipelines (Order 436).

In addition to two these two main arguments, the Commission also notes that if the utilities are not able to recover their stranded costs, then a utility’s ability to attract capital may be impaired and that it would be detrimental to utility shareholders. It is therefore, in the Commission’s view, their responsibility to allow recovery of these costs.

Later in the order (in the section dealing with the Commission’s policy on existing wholesale requirements contracts) the FERC elaborates on this argument. This second line of argument centers on the “public interest standard” from the *Mobile-Sierra* doctrine. The FERC believes that this standard implies that the Commission should consider the possible adverse effects on third parties. This means, in the Commission’s opinion, that unilateral contract modification for recovery of stranded cost should be allowed. The Commission cites the initial stranded cost NOPR regarding how a failure

to allow contract modification may harm the public interest in two ways. First, a failure to recover stranded cost could impair the financial ability of a utility to provide reliable service by “erod[ing] a utility’s access to capital markets, or could drive the utility’s cost of capital to unprecedented levels. This high cost of capital could precipitate other customers to leave the system which, in turn, could cause yet others to leave. Such a spiral could be difficult to stop once begun.” And second, nonrecovery of stranded cost could cause an “excessive burden” to be placed on the remaining customers that do not have the ability to leave the utility’s system if they are required to pay costs once supported by the exiting customer. As will be explained below, this applies to wholesale requirements contracts executed on or before July 11, 1994, that do not contain an exit fee or other explicit stranded cost provision.

Summary of the Mechanics of the FERC Decision on Stranded Costs

Figure 1 depicts a summary of the conditions for recovery of wholesale stranded costs under the FERC policy. For “existing” wholesale power contracts before July 11, 1994 (when the FERC’s first stranded cost NOPR was issued) that do not contain an explicit contract provision for stranded costs, a “reasonable expectations” standard applies that may extend the contract beyond its expiration. If there is an explicit contract provision dealing with stranded cost, then the terms of that agreement are to be followed. “New” requirements contracts (after July 11, 1994) must contain a stranded cost provision. Utilities will be allowed stranded cost recovery with “new” wholesale requirements contracts executed after July 11, 1994, *only* if explicit stranded cost provisions are contained in the contract.

Existing wholesale customers must pay an exit fee or a surcharge on transmission when they leave the former supplier. However, there is no regulatory obligation on wholesale requirements *suppliers* to continue to serve their existing requirements customers beyond the end of the contract term. The supplying utility will

be obligated to offer continuing service to the requirements customer for the period the utility reasonably expected to continue serving the customer. Details of the Commission's policy are discussed below.

Direct Assignment of Wholesale Stranded Costs to Departing Customers

The FERC intends to have stranded costs directly assigned to the departing wholesale customer through either an exit fee or a surcharge on transmission. The FERC does not want the remaining generation or transmission customers or shareholders to bear any of these costs. The basis for the Commission's decision is the "cost causation" principle. The Commission states that "the party who has caused a cost to be incurred should pay it." Direct assignment is appropriate since the stranded cost recovery mechanism links stranded costs to the

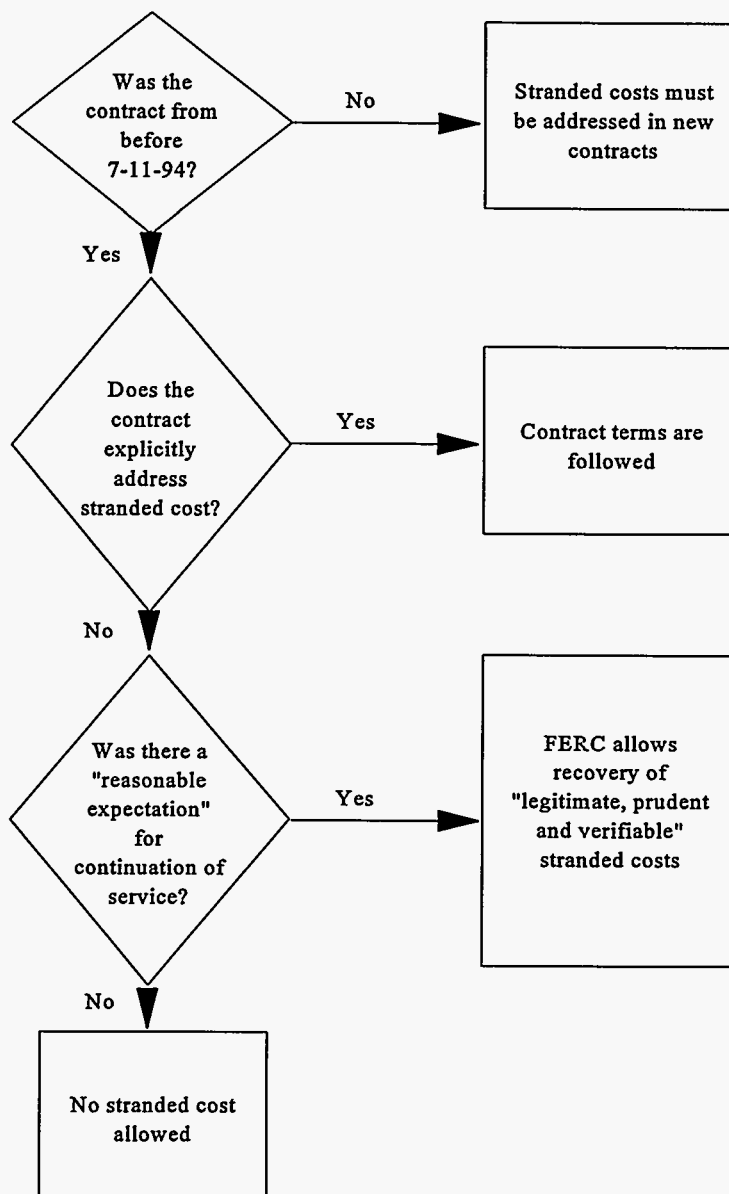


Figure 1. FERC procedure for determining "stranded cost" for wholesale requirements customers. (Source: authors' construct based on FERC Order 888.)

decision of a particular generation customer to use open access transmission to leave the utility's generation system and shop for power. In contrast, in the Commission's view, a "broad-based approach" that collected stranded costs from customers that were not "responsible" for the costs would violate the cost causation principle. The Commission also prefers a mechanism that can be determined when a customer actually leaves a utility and stranded costs are actually incurred.

New Wholesale Requirements Contracts

All future wholesale requirements contracts must explicitly address the mutual obligations of the seller to continue to serve and any buyer obligations if it changes suppliers. Recovery of wholesale stranded costs associated with any new requirements contract will only be allowed if explicit provisions for recovery are contained in the contract. "New" means executed after July 11, 1994, the date when the original stranded cost Notice of Proposed Rulemaking was issued by the Commission that contained a notice of the Commission intent. "Explicit stranded cost provision" means a contract provision that identifies the specific amount of stranded cost liability of the customer(s) and a specific method for calculating the stranded cost charge or rate.

Requirements customers will be responsible for planning to meet their power needs beyond the end of the contract term by either building their own generation, signing a new power sales contract with its existing supplier, or contracting with new suppliers. However, if a contract explicitly establishes an obligation to serve beyond the end of the contract term, then the terms of the contract will be enforced. If a wholesale customer switches suppliers and then later seeks to reestablish service with its former supplier, the parties will have to negotiate the terms of a new contract.

Consistent with this policy, the Commission will not impose a regulatory obligation on wholesale requirements suppliers to continue to serve their existing requirements customers beyond the end of the contract term. However, let us assume that the customer decides to remain a requirements customer for the period for which the Commission finds that the supplying *utility* reasonably expected to continue serving the customer; the supplying utility will then be obligated to offer continuing service to the requirements customers for the period the *utility* reasonably expected to continue serving the customer. A cancellation or termination of a power sales contract for reasons other than the contract's own terms will require prior notice.

Existing Wholesale Requirements Contracts

The Commission will permit recovery of stranded costs for "existing" wholesale requirements contracts, that is, executed on or before July 11, 1994, *that do not already contain exit fees or other explicit stranded cost provisions*. Again July 11, 1994 was the date of the initial stranded cost NOPR that put the industry on notice that recovery of stranded costs after that date would not be allowed unless specifically addressed in the contract. If an existing requirements contract includes an explicit provision for payment of stranded costs in the form of an exit fee, the Commission will assume that it was intended that the contract covers the contingency that a buyer may leave the system. Any contract amendment that addresses stranded cost must be mutually agreed to by the supplier and the customer.

The Commission encourages parties to renegotiate existing requirements contracts that do not contain exit fees or other explicit stranded cost provisions. If an existing requirements contract does not contain an exit fee or other stranded cost provision and such a provision is not added by renegotiation, (1) the utility or its customer may file a proposed stranded cost amendment to the contract under section 205 or 206, or (2) a utility in a section 205 proceeding or a transmitting utility in a

section 211 proceeding may file a proposal to recover stranded costs associated with any such existing contract through its transmission rates for a customer that uses the utility's transmission system to reach another generation supplier.

The FERC states that it will analyze existing contract modifications by considering both the selling utility's claim that it had a "reasonable expectation" to continue to serve *beyond the term of the contract* and the customer's claim that the contract is no longer just and reasonable. If a utility believes that it should be compensated for any stranded cost, it must argue this in a proceeding brought by a customer to shorten or terminate the contract. Conversely, if a customer intends to claim that the notice or termination provision of its existing requirements contract is unjust and unreasonable, it must present that claim in a proceeding brought by the selling utility to seek recovery of stranded costs.

Public utilities and their customers can file a proposed stranded cost amendment at any time prior to the expiration of requirements contract executed on or before July 11, 1994.

Recovery of Stranded Costs Caused by Retail-Turned-Wholesale Customers

The Commission believes that it should be the primary forum for addressing the recovery of stranded costs caused by retail-turned-wholesale customers. The Commission believes that there is a "clear nexus" between FERC-jurisdictional transmission access requirements and the exposure to nonrecovery of possible stranded costs. In short, customers will now be able to reach new generation suppliers because of open access. The Commission believes that any costs stranded because of wholesale transmission open access should be viewed as "wholesale stranded costs." According to FERC, these stranded costs "would not be stranded *but for* the action of this Commission" (emphasis in original). The Commission declined to be the

“primary forum” for stranded cost recovery where an existing municipal utility annexes territory served by another utility or otherwise expands its service territory. The risk that an existing municipal utility will expand its territory, the Commission states, existed prior to the Energy Policy Act and any open access requirement.

Recovery of Stranded Costs Caused by Retail Wheeling

The Commission believes that *both* the FERC and the state commissions have the legal authority to address stranded costs that result from retail wheeling. The FERC has authority, in its view, based on its authority over rates, terms, and conditions of unbundled retail transmission in interstate commerce; states have authority based on their jurisdiction over local distribution facilities and the services of delivering electric energy to end users. However, because states decide whether to allow retail wheeling (that, in the Commission’s view, “cause” retail stranded costs to occur), the Commission will leave any retail stranded costs to state regulatory authorities. Only when a state regulatory authority does not have power under state law to address retail stranded costs will the FERC consider requests for recovery of these retail costs. The rule does not prevent a state authority from instituting its own stranded cost or stranded benefits charge on exiting retail customers.

The Commission is concerned that for holding companies or multistate utilities, a denial of retail stranded cost recovery by a state could shift these costs to affiliated operating companies in other states. This could occur through the operation of a reserve equalization formula in a FERC-jurisdictional intrasystem agreement. The Commission intends, on a case-by-case basis, to amend when necessary jurisdictional agreements to prevent retail stranded costs from being shifted to customers in other states. The Commission also encourages state commissions in such situations to seek a mutually agreeable approach to this situation. If a consensus solution to modify a jurisdictional agreement can be reached by a group of affected states and other

interested parties, the Commission will “accord such a proposal deference” in a filing with the Commission. If no consensus can be reached, then the Commission would apply the “appropriate” treatment.

Reasonable Expectation Standard — Evidentiary Demonstration Necessary

A utility that is seeking stranded cost recovery must demonstrate that it had a “reasonable expectation” of continuing to serve a wholesale customer. The Commission will determine this on a case-by-case basis. This will apply as well to utilities supplying wholesale requirements sales to a customer in a noncontiguous service territory where transmission service is provided by an intermediate utility. The existence of a notice provision in a contract creates a rebuttable presumption that the utility had *no* reasonable expectation of serving the customer beyond the specified period. The fact that a contract does or does not contain an “evergreen” or other automatic renewal provision will also be a factor considered by the Commission when determining whether a presumption of no reasonable expectation is rebutted in a particular case. The Commission did not adopt a minimum notice period for applying the reasonable expectation rebuttable presumption.

The Commission will also apply the reasonable expectation standard to cases involving retail-turned-wholesale customers. In determining whether a utility should recover stranded costs, the utility must demonstrate that it incurred such costs based on a reasonable expectation that the retail-turned-wholesale customer would continue to receive bundled retail service. Whether a state awards exclusive service territories and imposes a mandatory obligation to serve will be among the factors considered by the Commission.

The Commission notes that it is not addressing who will bear the stranded costs “caused” by a departing generation customer if it is found that the utility had no reasonable expectation of continuing to serve that customer. The FERC expects that in

such a case, a utility will seek in subsequent requirements rate cases to have the costs reallocated among the remaining customers on its system.

Calculation of Recoverable Stranded Costs

The Commission intends to determine recoverable stranded cost based on a "revenues lost" approach. The Commission states that it believes "that the revenues lost approach is the fairest and most efficient way to balance the competing interests of those involved."

Using a revenues lost approach, a departing generation customer's stranded cost "obligation" (SCO), on a present value basis, is

$$\text{SCO} = (\text{RSE} - \text{CMVE}) \times L$$

where:

RSE = Revenue Stream Estimate — average annual revenues from the departing generation customer over the three years prior to the customer's departure (with the variable cost component of the revenues clearly identified), less the average transmission-related revenues that the host utility would have recovered from the departing generation customer over the same three years under its new wholesale transmission tariff. (In the case of a retail-turned-wholesale customer, subtraction of distribution system-related costs may also be appropriate.)

CMVE = Competitive Market Value Estimate — determined in one of two ways, at the customer's option: Option (1) the utility's estimate of the average

annual revenues (over the “reasonable expectation” period “L” discussed below) that it can receive by selling the released capacity and associated energy, based on a market analysis performed by the utility; or Option (2) the average annual cost to the customer of replacement capacity and associated energy, based on the customer’s contractual commitment with its new supplier(s).

L = Length of Obligation (“reasonable expectation” period) — the period of time the utility could have reasonably expected to continue to serve the departing generation customer. If the parties cannot reach agreement on the length of the customer’s obligation, it will be determined through litigation.

Application is subject to the following conditions:

1. **Cap on SCO** — The quantity (RSE - CMVE) cannot exceed the average annual contribution to fixed power supply costs (defined as RSE less variable costs) that would have been made by the departing generation customer had it remained a customer.
2. **Changes in Customer Revenues** — If the customer’s rates (or contract demand amounts, if relevant) changed during the three-year period prior to the termination of its existing requirements contract, then the RSE should be calculated using the customer’s most recent twelve months of revenue.
3. **CMVE Option 2 Conditions** — Option 2 (a CMVE equal to the average cost to the customer of replacement capacity and associated energy) would be available to a customer whose alternative purchase(s) runs concurrent with L, or, if longer than L, contains rates that do not fluctuate over the duration of the contract. The customer would be required to demonstrate (at the time it chooses this option) that the

replacement capacity contract(s) is for service equivalent to the released capacity (that is, firm power for a period at least equal to L), and must also clearly identify the rates to be paid for the replacement service.

4. **Payment Options** — The method and term of payment should be negotiated, but is ultimately left to the customer's discretion. Possible payment options include a lump-sum payment, an amortization of a lump-sum payment over a reasonable period of time, or a surcharge on the customer's transmission rate.
5. **Applicability** — The formula is designed for determining stranded costs associated with departing wholesale generation customers and for retail-turned-wholesale customers. (The formula is not to be used for recovering stranded costs associated with retail wheeling. The Commission believes that the formula is unworkable in this scenario because one of its key elements — the option for a customer to market or broker the utility's power — may not be practicable for retail customers. Therefore, stranded costs associated with retail wheeling will be determined on a case-by-case basis.)
6. **Marketing/Brokering Option** — The customer, at its sole discretion, will have a choice to either market or broker the released capacity and associated energy or contract with a marketer or broker for such service. (Alternatively, the customer may decide to remain a requirements customer for L. If the customer does, the utility will be obligated to continue service to the customer for the duration of L.)
7. **Released Capacity and Associated Energy** — A utility requesting stranded cost recovery must indicate the amount of system capacity and associated energy released by the departing generation customer

and used in the revenues lost calculation. This will allow, the Commission contends, the departing generation customer to choose whether to market or broker the released capacity and associated energy.

The Commission believes that this method of calculation encourages mitigation of stranded cost by the utility since the formula encompasses reducing the departing generation customer's stranded cost obligation by the competitive market value of the released capacity and associated energy. In addition, the Commission contends, the option that allows customers to market or broker the released capacity and energy protects the customers from a utility that tries to over-recover stranded costs by estimating a low value for the released capacity and energy. The Commission believes this provides the customer some assurance that stranded costs will be minimized. If a customer believes the utility's CMVE is too low, it can market or broker the released capacity and energy and reduce its stranded cost obligation. By exercising the marketing or brokering option, the customer does not relinquish its right to contest any aspect of the utility's stranded cost estimate, including whether the utility is entitled to recover stranded costs.

The Commission does not plan to impose a separate mitigation obligation on the utility beyond what is assumed to be in the revenues lost approach. The Commission notes that utilities will continue to be subject to ongoing prudence obligations to sell excess capacity and dispose of uneconomic assets. The Commission expects that the formula provides incentive to not understate the market value of its power by the utility. If the customer chooses the marketing option, the customer would buy the released capacity from the utility at the utility's market value estimate and energy at the utility's average system variable cost. If the customer can resell the released capacity and energy for a price greater than the utility's market value estimate, the customer can use the resulting revenues to reduce its stranded cost obligation.

If the customer chooses Option 2, then CMVE will be set at the average price that the customer pays its new supplier. The Commission states that the price the customer pays its alternative supplier is arguably a more accurate measure of the competitive market value of the capacity and energy not taken from the utility. The Commission also notes that the sale of all or part of a utility's generation assets could be used as a method to determine competitive market value.

The Commission prefers this "snapshot" approach to calculating stranded cost to one with true-ups because it "creates certainty and will produce reasonably accurate results." Conversely, in the Commission's view, true-ups require periodic recalculation, "which creates ongoing uncertainty and disputes."

6. JURISDICTIONAL MATTERS ON FERC ORDERS 888 AND 889

Order 888 requires all utilities that are subject to the FERC's jurisdiction and own, operate, or control wholesale transmission facilities to file nondiscriminatory open-access transmission tariffs that offer service to third parties that is comparable to the utilities' own uses of their transmission facilities. Order 888 also establishes procedures under which these utilities may seek recovery of legitimate, prudent, and verifiable stranded costs resulting from the provision of open-access services. The FERC also includes reciprocity provisions to bring utilities that own, operate, or control wholesale transmission facilities that are not subject to its jurisdiction under the open-access rules. While the FERC can provide open access rules for wholesale transmission and can also provide for wholesale stranded cost recovery on its own authority, thorny issues arise as to where is the state/federal jurisdictional boundary in the situation of retail wheeling or direct retail access and the municipalization or retail turned wholesale customer situation. Order 888 provides a thorough discussion of these issues but refuses to draw any bright jurisdictional lines. The FERC continues to have jurisdiction

over wholesale sales and wholesale transmission service. And the FERC will decide whether a particular transaction is truly wholesale in nature, or whether it is a sham transaction.⁵¹

On the issue of whether the FERC has jurisdictional authority over retail transmission, the FERC concluded that it has clear authority under the Federal Power Act and case law to assert jurisdiction over unbundled retail transmission service. The FERC noted that the Federal Power Act's section 201, on its face, gives the FERC jurisdiction over transmission service in interstate commerce, without qualification. However, the Federal Power Act also provides that the FERC's jurisdiction does not reach to distribution facilities. Specifically, Order 888 affirms that the FERC has exclusive jurisdiction to set the rates, terms, and conditions of the unbundled retail transmission component in interstate commerce. Given the case law, the FERC contends that any unbundled retail transmission transaction is interstate in nature if it takes place on the interstate grid; that is, all such transactions except those taking place in Alaska, Hawaii, and the ERCOT portion of Texas. And, once transmission facilities come under FERC jurisdiction, they are subject to the FERC's open-access requirements. Thus, even though the FERC emphasized that it strongly supports efforts by the state commissions to pursue procompetitive policies, once states have unbundled retail transmission service, those services become FERC jurisdictional.

The FERC contends, however, that it is in no way asserting jurisdiction over retail transmission directly to an ultimate customer, which, according to the FERC, by its very nature must be a bundled retail transmission service. Specifically, the FERC explained that when transmission is sold at retail as part and parcel of the delivered product called electric energy, the transaction is a sale of electric energy at retail. Under the Federal Power Act, the FERC's jurisdiction over sales of electric energy

⁵¹ According to the Energy Policy Act of 1992 (EPAct), a sham wholesale transaction is defined as the transmission of electricity to, or for the benefit of, an entity if the electricity would then be sold by the entity directly to an ultimate (retail) customer.

extends only to wholesale sales. But, when a retail transaction is broken into two products that are sold separately (perhaps by two suppliers: an electric energy supplier and a transmission supplier), the jurisdictional lines change. By unbundling retail transmission, the transmission service then involves only the provision of transmission in interstate commerce, which under the Federal Power Act is exclusively the jurisdiction of the FERC.

The FERC also asserts jurisdiction over buy-sell or so-called buy-through arrangements, stating that those arrangements are actually deals with two separate products, unbundled retail transmission and generation. The FERC asserts jurisdiction over the interstate transmission component of any transaction in which an end user arranges for the purchase of generation from a third party. The FERC will address on a case-by-case basis whether the programs and transactions fit within its buy-sell category.

The FERC allows a state commission to refuse to provide open retail access to one or more or all of the customer groups. Indeed, the FERC makes it clear that it cannot order retail transmission directly to an ultimate customer and that it in no way seeks to change state franchise areas or interfere with state laws governing retail marketing areas of electric utilities. Thus, it is up to state commissions and/or state legislatures to make the determination of whether and how to open the retail electric market to retail competition.

When retail transmission becomes unbundled, the FERC will make a case-by-case determination of where the line is between transmission and distribution facilities. Even so, state commissions can propose where to draw the line, based on seven local distribution indicators; and the FERC will give the state commission's proposal deference. The seven local distribution indicators are: (1) local distribution facilities are normally close to retail customers; (2) local distribution facilities are primarily radial in character; (3) power usually flows into local distribution facilities and rarely flows out; (4) power entering a local facility does not get reconciled or transported to another market;

(5) power entering a local distribution system is consumed in a restricted geographical area; (6) meters are based at the transmission/local distribution interface; and (7) local distribution systems are of reduced voltage.

The rates, terms, and conditions of unbundled retail transmission must be filed at the FERC. The FERC states that it will defer to state commission recommendations regarding retail transmission and local distribution matters, provided that the state recommendations are consistent with the final rule. When states make such recommendations, the FERC expects the state commissions to specifically evaluate the seven local indicators mentioned above as well as other relevant facts that the state commissions believe are appropriate in light of the historical use of the particular facilities. The FERC will also entertain a utility's proposals concerning separations, that is the classification and/or cost allocation for transmission and local distribution facilities, provided that the utility consulted with state regulators before making its filing. The FERC expects that generally unbundled retail wheeling customers will take retail transmission service under the same FERC tariff as the wholesale transmission customers. However, if the unbundled retail transmission service occurs as a part of a state retail access program, the FERC will allow a separate tariff that can accommodate the design and special needs of the state program in order to meet local needs, so long as the separate tariff is consistent with the FERC's open-access and comparability policies.

The FERC again reiterates that nothing in its claim of authority over unbundled retail transmission or how to separate distribution and transmission facilities and costs is inconsistent with traditional state regulatory authority. The FERC believes that state commissions will still have authority over distribution and over what the FERC calls "the service of delivering electric energy to end users." State commissions are still intended to have authority over (1) reliability of local service; (2) administration of integrated resource planning, including utility supply-side and demand-side (including DSM) decisions; (3) utility generation and resource portfolios (including purchased power

portfolios); (4) generation and transmission siting; and (5) nonbypassable distribution or retail stranded cost charges. As a part of this "service of delivering electric energy to end users" that the FERC creates for state commissions, the FERC contends that in the rare instance where there are no identifiable local distribution facilities, states will have jurisdiction in all circumstances over the service of delivering energy to end users. The purpose of creating such a "delivery service" is to assure that customers will have no incentive to structure a purchase so as to avoid using identifiable local distribution facilities in order to bypass state-imposed charges for stranded costs or social benefits.

The FERC maintains jurisdiction over wholesale stranded costs. On the matter of retail stranded costs, the FERC determined that the states should assume sole responsibility for any costs stranded by retail wheeling or state direct access programs. The FERC would only be available to provide stranded cost relief for retail stranded cost if the state commission has no authority to address stranded costs at the time retail wheeling is required. And, when state commissions order retail stranded cost recovery, the FERC expects the recovery to be through a retail charge or mechanism, but not through FERC-jurisdictional unbundled retail transmission. However, if a state commission does not have authority, as determined by legislation, the commission's own declaration, or subsequent court decision, under state law to resolve retail stranded costs as of the date of the retail customer's departure, the FERC will address the issue and provide for retail stranded cost recovery through an unbundled transmission rate. Further in holding company and other multistate utility situations, the FERC reserves the right to deal with cost shifting of disallowed stranded costs from one jurisdiction to another. While the FERC would defer to consensus solutions by affected state commissions, if such a consensus cannot be reached, the FERC will resolve the appropriate treatment of retail stranded cost. Given the presence of a regional holding company affiliate in a particular state, that state's commission may need to work with other area state commissions on the stranded cost issue.

Concerning the recovery of stranded costs caused by retail customers becoming wholesale customers (whether by municipalization or some other legal means), the FERC holds that (as noted in section 5), while both state commissions and the FERC have jurisdiction to address these costs, the FERC should be the primary forum for addressing the recovery of these stranded costs. The FERC views these stranded costs as being primarily wholesale in nature, because they are a result of wholesale transmission access. If not for the ability of the new wholesale entity to reach another generation supplier through the FERC-filed open access transmission tariff, such costs would not be stranded. To the extent that any state permits recovery from a departing customer, the FERC proposes to deduct that stranded cost recovery from what it will allow.

If states choose to allow direct retail access, the major jurisdictional problem that they will face under the FERC's Order 888 will be the loss of state jurisdiction over retail transmission. By narrowly defining the savings provisions of the Energy Policy Act as merely prohibiting the FERC from ordering transmission access, the FERC provides that state commissions will necessarily lose jurisdiction over unbundled retail transmission facilities. The FERC has also closed the door to buy-sell and buy-through programs that might have allowed the state commission to retain jurisdiction over retail transmission while allowing the benefits of competition to ultimate customers.

Although the FERC will show deference to the state commissions concerning where the state-federal jurisdictional lines will be concerning state direct access programs, how far that deference will go has yet to be tested. A good test will be the California Electric Industry Restructuring Plan, which was filed by the California Public Utilities Commission and California utilities with the FERC. It not only involves the division of transmission and distribution services, but it also involves the establishment of a Power Exchange that all California-jurisdictional utilities must sell into and buy from, the collection of a stranded cost charge (called a competitive transition charge)

from the power exchange, and collection of social goal costs, as well as the establishment of a statewide independent transmission system operator.

To the extent that the FERC does show deference to the state commissions on where to draw the line between transmission and distribution, the state commissions will find difficulties with the seven indicators. The origin of the seven indicators was a joint meeting between state commission and FERC staff that was conducted in conjunction with a NARUC (National Association of Regulatory Utility Commissioners) meeting. What became the seven indicators were seven alternative methods that could be used to draw the line between transmission and distribution. Even a casual review of the seven indicators shows that several of them are conflicting. For example, the indicator that local distribution facilities are primarily radial in character might set the transmission-distribution boundary at the customer line extension, while the meter based indicator would place the transmission-distribution boundary at the customer meter. The reduced voltage indicator might place the boundary at some voltage level, while the two indicators (1) that power flows into local distribution systems and rarely out, and (2) power is not reconsigned or transported on to some other market might set the boundary at an identifiable load center that is as large as a Standard Metropolitan Statistical Area. The state commission might wish to decide which indicators to emphasize, perhaps with the goal of maintaining jurisdiction over as many facilities as possible.

The FERC statement that in every transaction there is a "delivery service" that is subject to state jurisdiction, might seem comforting; however, it is without statutory basis in the Federal Power Act, and might not be supported by the enabling statutes in many states. Each state commission will need to reexamine its own enabling statute to determine whether it can take advantage and make use of this jurisdiction concession.

Order 889, which provides for an Open Access Same Time Information Network, falls entirely under the FERC's jurisdiction. State commissions, however, might affect the Available Transmission Capacity figure that is posted depending upon how retail

load growth is calculated. The Capacity Reservation Transmission Notice of Proposed Rulemaking, which is discussed elsewhere in this report, might affect state-federal jurisdiction in the future.

7. PERSPECTIVE ON PROPERTY RIGHTS

Property rights are defined in the economic literature as rules that authorize, require, or forbid specific actions (e.g., use, exclusion, partition, or sale of a physical asset). In other words, a property right allows an entity to act in particular ways.⁵² For example, if generators hold the right of transmission access, they are able to use transmission facilities under specified conditions (i.e., conditions for exercising their right of access, such as the availability of transmission capacity).

Property rights can be viewed as a bundle of rights. Table 1 lists and defines the five major components of property rights in the context of the U.S. transmission network.⁵³ Currently, four entities possess one or more of these rights: the FERC, regional transmission customers, transmission facilities owners, and the RTG-ISO. Following Order 888, the FERC determines who has access rights and how they may be transferred, in addition to providing guidelines for the formation of an ISO. Regional transmission customers have access rights, the right to withdraw services from transmission facilities and, possibly, some management authority over the operation of transmission facilities. Owners of transmission facilities (who may also be users) have collective rights of management and individual residual rights.⁵⁴

⁵² See Harold Demsetz, "Toward a Theory of Property Rights," *American Economic Review* 57 (May 1967): 347-59.

⁵³ These elements as applied to natural resources are discussed in Edella Schlager and Elinor Ostrom, "Property-Rights Regimes and Natural Resources: A Conceptual Analysis," presented at the Political Economy Research Center's Political Economy Forum, Bozeman, Montana, June 14, 1991.

⁵⁴ Later, when we say that the FERC's rules diminish the rights of transmission facilities owners, we mean that other market players now have rights that were previously held by these owners.

TABLE 1
 COMPONENTS OF RIGHTS TO A TRANSMISSION NETWORK
 UNDER FERC ORDERS 888 AND 889

Components	Rights	Holders
Access	Use of transmission facilities	Regional transmission customers
Withdrawal	Obtain "products" of transmission facilities (e.g., move electrons between two points)	Regional transmission customers
Management	Regulate internal use and make investments	RTG-ISO/regional transmission customers/FERC
Exclusion	Determine who will have access rights and how those rights may be transferred	FERC
Transfer	Sell or lease any or all of the other rights	Transmission facilities owners

As a form of property, transmission facilities can be viewed as a common-pool resource or shared assets where electric currents flowing on behalf of one user deduct from the ability to transmit electric currents for other users.⁵⁵ Consequently, transmission facilities fall outside the category of a pure public good,⁵⁶ with the pricing of their services becoming crucial in efficiently allocating the services to different users.

A major policy issue revolves around identifying the most efficient institutional arrangement for giving third parties nondiscriminatory access to electric transmission networks. "Efficient" here refers to investments in new capacity, based on market parameters, allocation of capacity to the highest-valued users, and the operation of the existing system at the lowest possible cost. These outcomes depend on correct incentives being established for pricing, planning, and operation activities. In an ideal situation, the allocated property rights would prioritize capacity rights on the basis of economic value, minimize transaction costs, avoid complex (e.g., hard to understand) access and pricing rules, and minimize the ambiguity of ownership rights and governance.

In the context of Order 888, the FERC has redistributed the property rights of transmission facilities away from current owners and toward users. By itself, this reallocation, while benefiting third parties, does not necessarily improve the state of affairs. For example, one such reallocation, forced wheeling, may increase the external costs from the operation of a transmission network.⁵⁷ Conceivably, it can lead to a deterioration of reliability of electric service to users of interconnected systems. Unless

⁵⁵ Other common-pool resources include fishing areas, open grazing land, land owned by the Indians in the Southwest, and buffalo roaming the Great Plains during the last century.

⁵⁶ Public goods have the inherent problem of people benefiting without having to incur a cost.

⁵⁷ Such costs arise from what is commonly called the "loop flow problem." From an economics perspective, this problem would go away when the transaction cost of internalization is less than the gains from internalization. We should expect that the increase in transmission transactions (and, in turn, external costs) induced by the FERC rule will ultimately lead to better-defined property rights in loop flows.

prices are adjusted to reflect these additional costs, the transmission network will tend to be overutilized. The concept of "open access" conveys the absence of well-defined rights, whether for access, withdrawal, management, exclusion, or transfer. It is generally the case that when property rights are unclear and poorly enforced overexploitation of a resource occurs.

The FERC's rule gives transmission facilities users access and withdrawal rights, the right to resell access rights under FERC-determined conditions,⁵⁸ and recommends that they have rights in the management of transmission facilities. The rule retains the right of ownership for existing holders but diminishes their right of management (recommended to be shared with users). When forming an ISO, transmission facilities owners must abide by the eleven guidelines established by the FERC.⁵⁹ These guidelines, in effect, can be viewed as constraining the governance and operating rights of existing owners. Presumably, broadening the governance of a regional transmission network will lessen the chances of anticompetitive behavior. (Table 2 links a party to an individual component of a property right, applying the case of the post-888 transmission network.)

Under Order 888, users acquire two basic rights: (1) the right to access transmission facilities, and (2) the right to receive transmission services. When users become members of a RTG, they gain additional rights in participating in the governance of transmission facilities.⁶⁰ Governance encompasses specifying permitted and forbidden activities, changing operational rules, and designating conditions for changing these rules, and establishing a new institutional arrangement.

⁵⁸ For example, the FERC disallows the reassignment of network transmission service. The FERC also establishes a price cap for reassigned capacity.

⁵⁹ See elsewhere in this report.

⁶⁰ As shown below, these rights are gained under an inclusive joint ownership arrangement where users become owners.

TABLE 2
PARTIES TO PROPERTY RIGHTS — THE EXAMPLE OF TRANSMISSION

Parties	Rights
Authorized Users (regional transmission customers)	Access and withdrawal
Claimants (regional transmission customers)	Access and withdrawal, plus management
Proprietors (FERC, RTG-ISO)	Management and exclusion (i.e., determine who may access transmission facilities and how these facilities may be utilized)
Owners (electric utilities)	Management, withdrawal, and transfer (e.g., transfer of rights to manage property)

The FERC gives itself, transmission owners, and transmission users a shared governing role in the management and operation of transmission facilities. Users in effect become claimants.⁶¹

The transferability of property rights, as established by the FERC's capacity reassignment program, requires owners to consider the value that others are willing to pay for those rights. Economic theory tells us that when transaction costs are nonexistent or minimal, economic efficiency is not affected by the initial allocation of the

⁶¹ In the property-rights literature, claimants have user and some management rights.

property rights.⁶² When transferability is prohibited, efficiency suffers by roughly the difference between the market value of property less the value placed on the property by the current owner. Transferability would consequently achieve the same efficiency gains as would auctioning off all available property to the highest bidder in a world where no one currently owns the rights to the property.

The property-rights literature suggests two major principles underlying any governmental action. First, and most important, good policy attempts to define and clarify property rights. Obscuring these rights would have the adverse effect of discouraging future investments. Second, rules and laws should seek to lower transaction costs that prevent otherwise economical transactions. This could give support to vertical integration or joint ownership of transmission facilities. For example, when it is highly costly to write a complete contract between a generator and a transmission owner, thereby creating room for opportunistic behavior, a vertically-integrated industry structure may be economical.⁶³

The underlying premise of the FERC is that by taking away some of the rights of transmission facilities owners the wholesale power market will become more competitive, as well as more responsive to the demands of those who want transmission access. In other words, the FERC argues that removing some of the property rights held by utilities with regard to transmission facilities will be in the public interest. Most observers (with the exception of some current transmission facilities owners) would agree that this reallocation of property rights will improve the economic state of affairs in the U.S. electric power industry. FERC Orders 888 and 889 will likely

⁶² See Ronald Coase, "The Problem of Social Cost," *Journal of Law and Economics* 3 (October 1960): 1-44.

⁶³ See, for example, Oliver E. Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (New York: Free Press, 1985).

lead to a more efficient operation of the nation's transmission facilities if only because they make more explicit the rights of the various market players.⁶⁴

An unresolved issue is whether the FERC's rulings will produce the best possible results. Such results hinge largely on whether correct incentives are given to those who possess property rights to transmission facilities. We can say that changes in the property rights in transmission facilities reflect the desire of certain market players to reap additional benefits in an industry where new technology allows for more competition.

The FERC took a major step in diminishing ambiguity over the property rights of owners and users of transmission facilities. As noted above, under an "ideal" institutional arrangement, electric power flows would be prioritized and allocated on the basis of economic value, transaction costs

***OUTCOMES FROM CORRECT
ALLOCATION OF PROPERTY RIGHTS***

- ***Market-based investment in new capacity***
 - ***Efficient allocation and use of transmission capacity***
 - ***Cost-efficient management of transmission facilities***
-

would be minimized, and access and pricing rules would be made understandable and known to all players. It remains to be seen whether the FERC rules will have to be further changed in the future to achieve these outcomes. At some point, the FERC may decide that additional reallocation of property rights will be required to achieve its comparable transmission-service objective. For example, the FERC may decide to encourage utilities to divest their transmission or other assets in order to assure financial independence between the different functional areas of electric power supply.

⁶⁴ The property-rights literature points to the problem of government excessively diluting the rights of ownership. For example, one adverse outcome would be to discourage further development of a resource.

(Most observers of the electric power industry concede the danger of a generation-facility owner controlling the region's transmission network.) For now at least, the FERC is counting on functional unbundling and the formation of ISOs to assure against anticompetitive behavior.

Under the FERC's vision of the world, users of a transmission network would have additional rights. As members of an RTG, users would play a managerial role in planning decisions and in establishing rules for the ISO. One important rule would specify the discretion given to operators to make decisions maintaining the technical integrity of the regional transmission network. One can question whether this arrangement will engender efficient results. For most economic activities, those who consume a good or service participate in the management decisions only when they are owners of the firm's producing that good or service.⁶⁵

As an alternative to an RTG, a more efficient arrangement may be joint ownership of transmission facilities.⁶⁶ Under joint ownership, current owners would share with other regional players (e.g., independent power producers, wholesale consumers) ownership rights in a regional transmission network.⁶⁷ Owners would have the right either to use their portion of the transmission network or to sell (or lease) it to others. Owners would have a strong incentive to expand their portion of the transmission network when demand increases and to sell access rights to those users who value it the most. Joint ownership would therefore tend to create incentives that stimulate economical investments in new capacity and efficient use of existing capacity.

⁶⁵ One important reason for this is that consumers have no special expertise in knowing how a firm can profit from selling a good or service that they purchase.

⁶⁶ A discussion of the merits of joint ownership of transmission facilities is contained in Vernon L. Smith, "Currents of Competition in Electricity Markets," *Regulation* 11, 2 (1987): 23-9.

⁶⁷ It is assumed that each party had previously agreed to an equitable sharing rule. If current owners are not willing to share ownership, it would have to be done mandatorily.

In contrast, the FERC's vision of an RTG where users would have some of the rights of ownership without being actually owners, may create both efficiency and practicable problems. Specifically, allowing regional players to participate in decisionmaking for which they are not fully held accountable may lead to undesirable results.⁶⁸ A preferred arrangement would seemingly assign to market players either user rights or owner rights or assign to them *both* kinds of rights as in the case of inclusive joint ownership or cooperatives.⁶⁹ Joint ownership would, relative to single ownership, increase the cost of negotiating actions in managing the operation of transmission facilities.

As noted in a previous section, the FERC specifies eleven guiding principles for the formation of ISOs. The FERC emphasizes that system operators should have no financial connections to any market player and that the governance of the ISO (e.g., policy setting) should include all classes of wholesale power customers.⁷⁰ The ISO should also have a management function to operate the transmission network so as to maintain short-run reliability of the grid and relieve constraints on the system. Finally, the ISO should have the right to identify components of the transmission network that require expansion and the obligation to disperse information to all parties on a timely basis.⁷¹

Overall, the FERC envisions the ISO to carry out the operation management of the transmission network within the rules established by the RTG. The FERC

⁶⁸ These results emanate from what economists call "moral hazard."

⁶⁹ For example, they may be pretty much indifferent to whether the long-term economic value of the regional transmission network declines, since they would have no equity shares in the network.

⁷⁰ Under a cooperative arrangement, which conceptually is similar to joint ownership, the producer and consumer of a good or service are one and the same party.

⁷¹ As stated elsewhere in this report, the FERC believes these actions are needed to prevent anticompetitive behavior on the part of vertically-integrated electric utilities.

recommends that the RTG include individual utilities who own specific pieces of the transmission grid in addition to other regional players who use the grid. The FERC reasons that broad representation “would help ensure the ISO formulate policies, operate the system, and resolve disputes in a fair and nondiscriminatory manner.” The FERC allows an RTG to set regional transmission tariffs as long as they satisfy the objectives of the final rule. The FERC also defers to an RTG the rights of transmission planning, dispute resolution, and decisionmaking in other areas. Consequently, the RTG will be largely self-regulating, with the FERC playing the role of a backstop for resolving disputes within an RTG. Self-regulation exemplifies an institutional arrangement that internalizes the costs of monitoring and exclusion among beneficiaries.

Finally, Order 888 fails to directly address the problem of existing property rights being in conflict with available transmission capacity. For example, when demand exceeds availability or when emergencies arise, what mechanism is used to correct this problem? The economist would immediately respond by espousing the merits of “congestion” pricing. Order 888 provides an unsatisfactory response to this problem.⁷² The FERC is expected to address this issue more explicitly in its proposed rulemaking on capacity reservation tariffs.

8. OPEN ACCESS SAME TIME SYSTEM (OASIS): FERC ORDER 889

Introduction

FERC Order No. 889 prescribes rules establishing and governing OASIS for the purposes of conducting open access power transmission transactions. OASIS is

⁷² The FERC ordered that curtailments shall be done on a *pro rata* basis.

designed to operate as an electronic network on the Internet system. Under Order 889, all jurisdictional public utilities (and their agents) that own, control or operate facilities used for the transmission of power in interstate commerce will be required to create or participate in OASIS.

An Overview of OASIS

OASIS is best visualized as an electronic mall or marketplace where a seller of transmission capacity can display the availability and the prices of its products, where a buyer can request chosen products, and finally, where both parties can close the transaction at agreed prices, terms and conditions. The process of transacting business on OASIS can be best understood by visualizing the sequence of steps in a typical transaction.

- ◆ A Transmission System Information Provider (TSIP), which may be a Transmission Provider (TP or Provider), or its agent, posts information on OASIS that specify the total transmission capacity (TTC), the available transmission capacity (ATC), the time of availability, the price of the capacity open for purchase, the points of delivery and receipt, and other related items.
- ◆ A potential Transmission Customer (TC or Customer), upon reviewing the information posted by various TSIPs, posts a Service Request that specifies the seller's (TP or reseller's) name, the desired capacity, the desired time of delivery, the chosen price, the points of delivery and receipt, and other related items.
- ◆ The TSIP posts the receipt of the Service Request to the Customer.
- ◆ The TP posts either acknowledgment or denial of the Service Request.
- ◆ If the TP acknowledges the Service Request, the Customer has the opportunity to either accept the response of the Provider or withdraw the Service Request.

- ◆ Acceptance by the Customer of the acknowledgment of the Provider closes the electronic transaction.
- ◆ The Provider has the responsibility of posting any change in the status of the Service Request during the entire process. The change of status may include: Received by the Provider, accepted by the seller, accepted by customer, confirmed for rescheduling, withdrawn, or refused/rejected.
- ◆ A Customer who wishes to resell transmission rights issues a request to the TSIP for product posting, and becomes a transmission seller, and follows OASIS procedures applicable to a seller.

OASIS Requirements

Order 889 prescribes standards of conduct and communication protocols for transactions conducted through OASIS. The intended purpose of the standards of conduct is to enable a functional separation of the transmission function and the wholesale merchant function of a transmission provider, and to enable open access nondiscriminatory transmission services to all transmission customers. The intended purpose of the communication protocols is to ensure reliability and security of the transactions conducted on OASIS.

Summary of the Standards of Conduct

A transmission provider subject to the order is required to do the following.

- ◆ A TP must provide for the operation of OASIS either individually or jointly with other Providers.
- ◆ OASIS must give access to relevant standardized information on the status of the transmission system, and also to the types and prices of services.

Information Provided on OASIS

The information to be provided on OASIS includes capacity, points of delivery and receipt, price, and time of availability. In addition, the information may include price discounts and ancillary service offerings. This would allow a potential customer to review the information posted on OASIS before making a service request. Section 37.6e of the Final Order (Order 888) requires that all service requests by customers for transmission service under the *pro forma* tariff (offered by the TP) must be made on OASIS. The Responsible Party (RP) is required to provide to others on OASIS the essential information relating to such requests, with the identities of the parties masked, if requested.

Summary explanations of the major items of information to be posted on OASIS follow. Additionally, section 37.6e requirements on steps to be followed in processing service requests such as posting of curtailments, interruptions, or denials of service are explained.

Available Transmission Capability

The final rule requires posting of the ATC and TTC along "posted paths." Posted paths include any path between two control areas and any path for which transmission has been denied, curtailed or interrupted during any hour or part of an hour for a total of twenty-four hours in the last twelve months. For purposes of counting to twenty-four, any part of an hour counts as an hour. Also, transmission customers can request that ATC and TTC be posted for any other transmission path. Customer requested postings can be dropped if no customer has taken service on the path in the last 180 days.

The posting requirements are different for "constrained" and "unconstrained" posted paths. A constrained posted path is one for which ATC has been less than or equal to 25 percent of TTC for at least one of the last 168 hours or is calculated to be 25 percent or less of its associated posted TTC during the next seven days. Any

posted path that does not meet the above definition of a constrained posted path is an unconstrained posted path.

For constrained posted paths, ATC and TTC for firm and nonfirm service would have to be posted for the next 168 hours and, thereafter, to the end of a thirty-day period. In addition, ATC and TTC must be posted for the current month and the next twelve months if requested by a customer. If the TP charges separately for on-peak and off-peak periods on its period, ATC and TTC must be posted daily for each period. The posting for a constrained posted path must be updated when transmission service on the path is reserved, or service ends, or when the path's TTC changes by more than 10 percent.

For unconstrained posted paths, ATC and TTC for firm transmission service and nonfirm transmission service must be posted for the next seven days, and for the current month and the next twelve months. If the TP charges separately for on-peak and off-peak periods in its tariff, ATC and TTC must be posted for the current day and the next six days following each period. The postings for an unconstrained posted path must be updated when the TTC changes by more than 20 percent.

The calculation of ATC and TTC is to be based on a methodology described in the TP's tariff, and on "current industry practices, standards and criteria."⁷³ The Final Rule requires that data and other information related to calculation of ATC and TTC be made available *off-line* and *after-the-fact* by the Responsible Party within one week of posting only upon request. Finally, the rule requires after-the-fact posting of long-term or planning studies of the transmission network by the TP, upon request. A list of available studies will be posted on the network.

⁷³ The Open Access Final Rule requires each TP to develop a method for calculating the ATC and the TTC, and to include a description of the method in its tariff.

Transmission Service Products and Prices

The Final Rule requires the following to be posted on OASIS.

- ◆ Prices, and a summary of terms and conditions of transmission products offered by a TP.
- ◆ A downloadable file of the TP's complete tariffs.
- ◆ Information on resale of capacity using the same OASIS and formats as the original sale. The same information also must be provided in downloadable files.
- ◆ Offers of discount as per the Open Access Final Rule.
- ◆ Ancillary service offerings as per the Open Access Final Rule.
- ◆ Service requests made by Transmission Customers.

Curtailments and Interruptions

The final rule provides that all curtailments and interruptions must be posted as soon as possible, must include identification of the service (with the identity of the customer masked), the reason for the curtailment or interruption, and the tariff-defined step in the curtailment or interruption process.

Denials of Service

The final rule treats denials of service differently from curtailments and interruptions. A requester is entitled to receiving a standardized reason for denial. However, denials *are not to be posted* on OASIS. Service can be denied for two basic reasons: (1) the customer requested more than the posted ATC, or (2) after the request was made, conditions changed due to preexisting requests or unforeseen events reducing capacity.

Transaction Anonymity

The final rule provides that the identities of the parties to an agreement are confidential during the ongoing negotiation process and thirty days after the ATC has been adjusted. After that, all transaction data would be available on OASIS.

Transmission Service Schedules

The final rule requires information on scheduled transmission service to be recorded by the entity scheduling the transmission service. The rule also requires that the information be made available for download on OASIS by interested parties within one week of the transmission service schedule agreed upon by the parties.

Other Transmission-Related Communications

The final rule requires that "other communications related to transmission services" (such as using OASIS as a transmission-related conference space or to provide transmission-related messaging services between OASIS users and "want ads") must be posted by the Responsible Party.

Concerns About the Functioning of OASIS

The move to a computer network-based system for conducting electric power transmission transactions is compatible with the current trend toward electronic commerce and an appropriate attempt to make fuller use of the "electronic superhighway." In this sense, the effort is commendable. The underlying intent of introducing a more open and transparent system for carrying out transmission transactions is certainly a worthy goal.

However, the general design, and the specifics of the program raise quite a few areas of legitimate concerns. The central problem with the general design of the

system, from which all the concerns follow, is that the system is based on *the Internet*, rather than a *private network*. Our concerns may be divided into the following broad categories.

Lack of Precedent

The proposed OASIS system will be the first one that allows electronic commerce for a large industry on the Internet. Electronic commerce has been going on for more than a decade in many small industries with well-established supplier chains, and in industries where all transactions are purely “paper” transactions such as banking and the stock market. But all these businesses are run on *private networks*. The Internet is also increasingly being used for electronic commerce but the transactions involved are essentially bilateral with no direct impact (of the transaction) on other transactions of related businesses or customers. The creation of the proposed OASIS, therefore, will introduce not one but two “firsts.”

The first unprecedented practice would be the use of electronic commerce for an industry that is neither as small as those that use electronic commerce nor uses purely paper transactions.⁷⁴ The second unprecedented practice would be, as earlier mentioned, the use of the *Internet* for conducting the business of an entire industry.

The lack of precedents raises legitimate questions about the viability of the proposed OASIS system. Because the technology of electronic commerce has been in existence for over a decade, one can wonder why such large industries such as

⁷⁴ Several private networks are being proposed or under development for trading of power and transmission capacity, and providing general information services. They include Continental Power Exchange (CPEX™), the Energy Information Resource System, the General Agreement on Parallel Paths (GAPP) Transmission Information System, Power PoolsSM, PowerTrader™, Automated Interchange Matching System (AIMS), TransACT™, and a joint proposal by Dominion Resources, Inc. and Power Technologies, Inc. See "Real Time Networks: A Peek at Tomorrow's Transmission Market," *Public Utilities Fortnightly* (October 1, 1995), 29.

automotive, retailing, pharmaceutical, and transportation opted not to use electronic commerce for either wholesale or retail transactions.⁷⁵ As these industries are not subject to economic regulation, one can speculate that the markets for the related products and services did not warrant the use of electronic commerce. It is possible that the concerns about security and reliability of transactions outweighed the expected benefits in terms of time and transparency of electronic commerce. If this is a plausible explanation of the nonexistence of electronic commerce in large industries, then one must be legitimately concerned about the general viability of electronic commerce for the wholesale transmission market.

The concern for the general viability of electronic commerce for the wholesale transmission market is further exacerbated by the lack of precedent of the use of the Internet for an entire industry. Industries that do use electronic commerce such as small manufacturers, banks, and the stock market use centralized private networks rather than the distributed public network. The most obvious explanation is the probable lack of confidence in the security and reliability of a public network. Given the sensitivity of transmission transactions, the security and the reliability of the Internet is definitely a significant concern for the viability of the proposed OASIS system.

Security

For processes or systems with a great deal of safety vulnerability or financial risk, the Internet may not be a secure place to conduct business. Electric transmission operations have all these characteristics. It is true that Order 889 makes significant provisions to ensure security of the OASIS network, including the multilayered security mechanism consisting of login and registration requirements, user id and password

⁷⁵ These industries do use electronic communication for exchanging information among sellers, suppliers, and customers. Electronic communication is also used for operations to support commercial transactions (e.g., daily supply schedules sent to suppliers within the scope of a purchase agreement).

protection, electronic firewalls, and use of sophisticated encryption technology. But all these security provisions do not guarantee unbreakability of security barriers; they just make the likelihood of a security breach small.

"Even its most zealous supporters know that the Internet is not yet a utility-grade system,"⁷⁶ observed one utility analyst. Netscape has developed browser software for the WWW with supposedly unbreakable algorithms, but by the company's own admission, the scope of this security is limited.⁷⁷ The U.S. National Research Council notes that, against a determined opponent, cryptography ". . . may lead that opponent to exploit some other vulnerability in the system."⁷⁸ In a recent study of Pentagon computers, as many as 250,000 attempts were made to penetrate military computers, of which 65 percent were successful. Only one in 150 intrusions was detected,⁷⁹ which is a nontrivial failure rate, particularly in view of the high level of security supposedly present in defense-related information systems.

Reliability

The general reliability of Internet-based systems is also suspect. The *New York Times* reported that during one week in June 1996, major Internet providers America Online (AOL), Microsoft, and Netcom systems were down for a total of nearly twenty-

⁷⁶ Richard Comerford, "Getting Ahead of the Internet," *IEEE Spectrum* (August 1996).

⁷⁷ Taher Elgamal, "Securing Communication on the Intranet and Over the Internet," Netscape Communications Corporation, White Paper, July 1996.

⁷⁸ National Research Council, "Cryptography's Role in Securing the Information Society, Committee to Study National Cryptography Policy, National Academy of Sciences and National Academy of Engineering, Prepublication Copy, May 1996.

⁷⁹ Lawrence Korb, *New York Times*, May 23, 1996 (citing a General Accounting Office report).

four hours, inconveniencing over seven million customers.⁸⁰ More recently, AOL was down for almost twenty-four hours on August 7, 1996, while upgrading its internal software.⁸¹

Consequences of Failure

As is explained in any undergraduate text on risk analysis, risk of failure of any system has two basic components: (1) probability of occurrence and (2) consequence.⁸² Even if it can be argued that OASIS will perform very well by ensuring a high level of security and reliability, and that the probability of occurrence of a failure will be negligible, the same is not true of the consequences. If a security breach or system malfunction causes a failure in OASIS, however unlikely, the consequence can be loss of power to thousands of homes, and businesses, and corresponding financial losses in millions of dollars. As the experience with nuclear power has shown, public perception of risk may be as important, if not more important, to industry and policymaking as any objective measure of risk. The public perceives systems with high-consequence failures more risky than systems with low-consequence failures, regardless of the probability of occurrence. Failed or misdispatched transmission transactions are high-consequence events and are likely to be perceived as more risky than they really are. This may exacerbate expected consequences of a failure, and may pose an additional threat to the functioning of the system.

⁸⁰ *New York Times*, June 24, 1996.

⁸¹ *The Wall Street Journal*, August 8, 1996.

⁸² Risk is defined mathematically as the product of probability of occurrence of an event and the consequence if the event occurs. For example, if the probability of an air crash is one per 100,000 flights and the consequence of one air crash is 200 deaths, then the measure of risk is 0.002 deaths per flight.

To further exacerbate the problem, the probability of occurrence of a failure on OASIS is *not a low probability event*, because the upper limit to this probability is not entirely governed by the quality of security and reliability protections included in the design and implementation of OASIS, but ultimately by the integrity of the Internet system. As discussed, the Internet is vulnerable to breaches of security (hacking), unintentional system malfunctions, and downtime caused by maintenance activities. Therefore, it is clear that a network supported by the Internet, such as OASIS, has a significant exposure to risk, both with respect to probability of occurrence of failure events and with respect to consequences of such events.

Dispatching, Power Flows and Other Beasts

Order 889 is not very clear about how the "back-end" portions of a power transaction are to be handled. For example, once a seller and a buyer agree to make a transaction, is the actual dispatching to be done manually? How about the subsequent tasks of billing and the processing of payments?

As is well known, unlike transmission of fluids like gas and water, electricity cannot be forced to travel exclusively between a delivery point and a receipt point. Electricity transmission is subject to reactive impedance and loop flows that cause electricity to flow in paths outside the intended path. To quote an engineer charged with designing his company's OASIS, who wishes to remain anonymous, "the power flows according to the laws of physics, not according to who is selling power to whom." The problems that can be caused by the dynamics of power flows can be illustrated by an incident in the Western States Coordinating Council (WSCC) system on July 2, 1996. A flashover between a tree and a 345-kilovolt transmission line created an outage covering fifteen states and affecting two million customers, all within thirty-five seconds. As WSCC notes, if this flashover had been the only incident, customer outages would not have occurred. They occurred because there was also

simultaneous occurrence of record high load, near record high generation, and significant power transfers. The incident underscores the sensitivity of the system to a single unanticipated event.

Therefore, there is a greater need for system control (compared to gas and water), which is generally done by simulating the power flows in the system before every dispatch. If all transactions are done electronically, there may be problems in maintaining such control with reduced opportunities for intervention to correct problems. These concerns exist even if OASIS works without significant security and reliability problems. The fact that security and reliability problems on OASIS may be significant further exacerbates these concerns.

However, the problems related to electronic dispatching may gradually get solved over time as real-time simulation technology makes advances.⁸³ (The security and reliability concerns about OASIS may still remain unless a private network, rather than the Internet is used.) In the mean time, it may be prudent to continue to handle the dispatching process manually.

Addressing the Concerns About OASIS

One rational way to utilize all the benefits of an open, transparent system through electronic commerce, and yet minimize the attendant pitfalls and risks, is to conduct all the communication and information-processing tasks preceding actual transactions on the Internet, and to conduct the actual transmission transactions on a private network. A private network will have stronger protections against security and reliability problems and risk consequences of system malfunctions will be also smaller.

⁸³ See John C. Hoag, "OASIS: A Mirage of Reliability," *Public Utilities Fortnightly* (forthcoming, November 1996).

At the same time, allowing pretransaction operations and other support operations (such as maintaining a common database) can continue to be done on the Internet.

With proper design and instrumentation, a central system could allocate capacity within engineering limits to try to meet the needs of buyers and sellers. A central system with a common database, modeled after the National Association of Securities Dealers Automated Quotation [System] (NASDAQ), the automated stock market, might also facilitate better financial reconciliation among parties. A distributed public network for support operations, a private centralized network for actual transactions, and manual processing of dispatching appear to be the optimal approach for using electronic commerce for transmission transactions.

State Commission Options

Since the final rule has already been issued, it is not feasible for state public utility commissions to pursue the suggested remedies to the potential problems of OASIS with any expectation of immediate response. However, the Order (Order 889) indicates that the rule is open to future reconsideration and revisions. State PUCs and utilities can bring the stated concerns and remedies to the attention of the FERC in future hearings and other forums for dialog so that they can be incorporated in the future changes to the rule.

While the current rule is in effect, state PUCs may wish to direct the utilities under their jurisdiction to make best possible utilization of OASIS and, at the same time, ensure that the attendant risks are minimized. State PUCs may wish to consider incentives, to be incorporated in ratemaking, that either allocate this risk away from the customers to the shareholders or implement a sharing scheme that allocates the risk in some equitable fashion between customers and shareholders.

APPENDIX

STANDARDS AND COMMUNICATION PROTOCOLS FOR OASIS

The Final Rule requires that all OASIS systems, sites, and nodes must be operated in compliance with certain standards and communication protocols. The Final Rule specifies standards and requirements to be followed for network architecture, information access, communication interfaces, and system performance.

Network Architecture Requirements

The OASIS network would consist of OASIS nodes and an Internet-based network. The network would support navigation and interconnectivity between OASIS nodes, and use a set of communication standards.

OASIS Nodes

The OASIS nodes must have the following features.

- ◆ TSIPs shall be permitted to use any computer system as an OASIS node if OASIS requirements are met.
- ◆ OASIS nodes should be accessible for use by any customer using any available computer system or network (including private networks) that support the required communication links to the Internet.
- ◆ In implementing OASIS, use of existing communication facilities shall be permitted.
- ◆ The use of OASIS communication facilities for the exchange of information *beyond* that required for open access transmission shall be *permitted*,

provided such exchange does not negatively impact the exchange of open access transmission data, and is consistent with the Standards of Conduct (discussed previously under "Standards of Conduct.")

- ◆ An OASIS Node may support a single Primary Provider (plus any Secondary Providers) or many Providers.

Internet-Based Network

OASIS links to the Internet must satisfy the following requirements.

- ◆ All OASIS nodes shall support the use of Internet tools, Internet directory services, and Internet communication protocols necessary to support the Information Access requirements (discussed subsequently).
- ◆ Connection of OASIS Nodes to the Internet is required to allow any user to access the nodes through Internet links. This connection shall be made through an electronic "firewall" to improve security.
- ◆ The OASIS Nodes shall support, on a cost recovery basis, private connections to any OASIS user who requests such a connection, and shall be provided to all users on a fair and nondiscriminatory basis. The same Internet tools shall be required for private networks as are required for the Internet.
- ◆ Each OASIS Node shall utilize a communication channel to the Internet that is adequate to support the performance requirements of all subscribers to the Node.
- ◆ Hypertext Markup Language (HTML), at least version 3, and optionally Secure Sockets Layer (SSL), shall be used by TSIPs as a standard tool for presenting information.
- ◆ TSIPs shall provide Customers with HTML forms to be used for making purchase requests. The activation of a form shall be time-stamped and logged for auditing purposes.

- ◆ TSIPs shall provide Domain Name Service (DNS) for the resolution of Internet Protocol (IP) addresses to allow easy navigation between OASIS Nodes.
- ◆ Simple Network Management Protocol (SNMP) shall be supported for operating and managing the network, if private interconnections between OASIS Nodes are established.
- ◆ E-mail shall be supported by each OASIS Node to allow exchanges between Providers and Customers, including sending of attachments. The protocols supported shall include, as a minimum, the Simple Mail Transport Protocol (SMTP), Post Office Protocol (POP), and Multi-Purpose Internet Mail Extension (MIME).

Navigation and Interconnectivity Between OASIS Nodes

- ◆ TSIPs shall permit Users to navigate using *World Wide Web (WWW) browsers* for accessing different sets of Transmission System (TS) information from a single Provider, or from different Providers on the same OASIS Node. These navigation tools shall not favor User access to any Provider over another Provider, including Secondary Providers.
- ◆ Navigation tools shall not only support navigation within TSIP's Node, but also across interconnected OASIS Nodes. As a minimum, navigation across Nodes shall be possible through the Internet.

Communication Standards

- ◆ Point-to-Point Protocol (PPP) and Internet Protocol Control Protocol (IPCP) shall be supported for private internet dial-up connections.
- ◆ Serial Line Internet Protocol (SLIP) shall be supported for private internet network connections.

- ◆ Transport Control Protocol and Internet Protocol (TCP/IP) shall be the protocol set used between OASIS Nodes whenever they are directly interconnected, or for private leased line Internet network connections.
- ◆ Hypertext Transfer Protocol (HTTP) shall be supported on the OASIS Node to allow viewing of displays, and for downloading and uploading of files electronically.
- ◆ All OASIS Nodes are required to use an IP address registered with the Internet Network Information Center (InterNIC), even if private connections are used.

Information Access Requirements

Registration and Login:

- ◆ Publicly available documentation or menus shall list the OASIS Node addresses of all Primary, Secondary, and Value-added Providers.
- ◆ TSIPs shall require Users to register with a Provider before they are permitted to access the Provider's TS information.
- ◆ Initial registration shall permit a User only the minimum Access privileges, to be mutually agreed upon by the User and the Provider.
- ◆ After registration, Users shall be required to login every time they establish a dial-up connection. If a direct, permanent connection has been established, Users shall be required to login initially or any time the connection is lost.
- ◆ Users shall be automatically logged out any time they are disconnected. Users may also logout voluntarily.

Access to Information and Information Handling

- ◆ For security reasons, Users shall have **read-only access** to the TS information, and will not be permitted to enter any information except where explicitly allowed (e.g., service request forms).
- ◆ Users **shall be able to download** from an OASIS Node the TS information as an electronic file.
- ◆ Customers shall be permitted to fill out Service Request forms **on-line** provided by TSIPs, post products for resale, and fill out and post Want-Ads.
- ◆ Customers **shall be able to upload** to OASIS Nodes filled-out forms. TSIPs shall ensure that uploaded forms are handled the same way as forms filled out on-line.
- ◆ User **shall be able to dynamically select** the TS information they want to view and/or download.

Provider Updating Requirements

To be completed by industry.

Access to Changed Information

- ◆ The TSIPs shall post a general message and a log (that provides updated information) that Users are able to read.
- ◆ The TSIP shall design notification features (including general message and log) in a way that avoids the necessity of frequent requests of information from many Customers, which may cause serious performance problems on the network.

Interface Requirements

Basic Information Model

- ◆ The information templates (both text and graphics) shall be American Standard Code for Information Interchange (ASCII)-based.
- ◆ The file structures shall be ASCII-based.
- ◆ All information elements shall be defined in a Data Element Dictionary which will be stored in the OASIS Node Directory.

General Rules for OASIS Templates

- ◆ Each OASIS information template will be identified with a unique name.
- ◆ Each OASIS information template shall identify the source of information (e.g. Primary Provider, Secondary Provider, Customer, and so forth).
- ◆ Each OASIS information template shall include a time stamp to indicate the time of creation and the time of last update.

Types of OASIS Templates

The following examples of information templates are to be used by OASIS.

- ◆ **Summary System Information** templates that include information on all providers on the system.
- ◆ **Provider System Information** templates that include information on individual providers.
- ◆ **Secondary Provider (Reseller)** templates that include information on resellers.
- ◆ **Service Request** templates that include information on service requests made by Customers.

- ◆ Templates that indicate **Provider Acknowledgment, Customer Response to Provider Acknowledgment, Service Request Status** (see a previous section entitled "Overview of the OASIS"), and **Provider Reassignment of Capacity Rights**.
- ◆ An **Informal Information** template for posting "want-ads" and other advertisements and a **Response** template for responding to advertisements.

Performance Requirements

Order 889 sets up performance requirements that address the issues of security and access protection, response times, availability, backup and recovery, information accuracy, performance auditing, and portability between successive upgrades.

Security and Access Protection

- ◆ Only Providers (including resellers) are allowed to update their own TS information.
- ◆ All inputs from Customers will be filtered to allow only ASCII text. A Provider shall be allowed to update its TS information through only ASCII or encrypted files if public facilities are involved in the connection between a Provider and the OASIS node.
- ◆ All Users must register and login to a Provider's account before accessing any Provider information.
- ◆ Every User must use a password for accessing the system beyond the lowest level of access privilege.
- ◆ The processing of a Service Request shall require both a Customer password and a Provider password.

- ◆ Available **sophisticated data encryption techniques** and **"secure id" mechanisms** shall be used to transfer sensitive data across the Internet and directly between OASIS Nodes.
- ◆ TSIPs shall be responsible for protecting OASIS Nodes from viruses.
- ◆ TSIPs can **disconnect any User** who may be responsible for **degrading the performance of the OASIS Node** through overuse.
- ◆ The TSIP log will be used to prevent any User from accessing TS information before it is publicly available.
- ◆ TSIPS shall employ security measures such as **electronic firewalls** to minimize the occurrence of unauthorized access to, or modification of, TS information.

Response Time

It is recognized that TSIPs can only be responsible for the response capabilities of two portions of the internet-based OASIS network: (1) the response capabilities of the OASIS Node server to process interactions with Customers, and (2) the bandwidth of the connection(s) between the OASIS Node server and the Internet. The response requirements are as follows.

- ◆ The OASIS Node server shall be capable of supporting its connection to every User with an aggregate data rate of at least "A" bits per second, where "A" is a function of the number of registered customers, and the modem speed, specified as 28,800 bits per second.
- ◆ The bandwidth shall be $2 \times A$ bits, where A is specified as above.
- ◆ The time response requirements shall be met **within one month** of User registration, and **within two months if more than ten new Users register** in a month.

Availability, Backup and Recovery

The availability of each OASIS Provider account on an OASIS Node shall be at least 98 percent (all but seven days in a year).

- ◆ Backup of TS information and equipment shall be provided within the OASIS nodes so that no data or transaction logs are lost or become inaccessible due to any single point of failure.
- ◆ After a spurious failure, all affected Users shall regain access to all TS information **within thirty minutes**.
- ◆ Permanent loss of critical data due to catastrophic failure shall be minimized through off-line storage on a **daily basis** and through off-site storage on a **periodic basis**.
- ◆ Recovery from a catastrophic failure may be provided through the use of alternate OASIS Nodes.

Information Accuracy

- ◆ Providers shall use their best efforts to provide accurate information.
- ◆ TS information posted and updated by the Provider shall be validated for reasonability and consistency through the use of limit checks and other validation methods.

Performance Auditing

- ◆ TSIPs shall provide a "Help Desk" that is available at least during normal business hours and normal work days.
- ◆ All postings of TS information, and all postings related to updates, logins, disconnects, Customer requests, and all other transactions shall be **time-stamped** and stored in an OASIS Performance Log.
- ◆ TSIPs shall use their best efforts to monitor the performance of OASIS.

Portability Between Successive Upgrades

Any upgraded version of OASIS must support the older version for at least three months, to allow Customers to make corresponding upgrades of their own systems.