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Comments in Response to FERC Rulemaking on Regional Transmission Organizations

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J O I N T C E N T E R

In response to growing concerns about understanding the impact of regulation on consumers, business, and government, the American Enterprise Institute and the Brookings Institution have established the new AEI-Brookings Joint Center for Regulatory Studies. The primary purpose of the center is to hold lawmakers and regulators more accountable by providing thoughtful, objective analysis of existing regulatory programs and new regulatory proposals. The Joint Center will build on AEI's and Brookings's impressive body of work over the past three decades that has evaluated the economic impact of regulation and offered constructive suggestions for implementing reforms to enhance productivity and consumer welfare. The views in Joint Center publications are those of the authors and do not necessarily reflect the views of the staff, council of academic advisers, or fellows.

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Executive Summary

On May 13, 1999 the Federal Energy Regulatory Commission (FERC) issued a Notice of Proposed Rulemaking (NOPR) on Regional Transmission Organizations (RTO). The purpose of the NOPR is to seek comments on proposed regulatory rules that would encourage transmission system owners to participate in regional transmission organizations. Such organizations would manage various aspects of the operation and expansion of the nation's high voltage electric transmission system to support developing competitive wholesale and retail electric generation service markets that rely on these transmission networks. Regional integration of transmission systems is thought to be required to manage more effectively transmission network operations, to internalize various network externalities, and to facilitate the development of competitive electricity markets. Four non-profit Independent System Operators (ISOs) have already been created from the three existing tight power pools covering the Northeastern states and in California. However, the development of similar RTOs in other parts of the country has been slow. The FERC initiative aims at speeding up the development of such regional organizations.

My comments focus primarily on the future structure of the regulatory framework that governs how transmission owners and operators will be compensated for providing transmission service. I also present a framework for evaluating the benefits and costs of not-for-profit ISOs that operate transmission facilities owned and maintained by others vs. for-profit Independent Transmission Companies (Transcos) that own, maintain, *and* operate their own transmission facilities.

The success of the ongoing restructuring of the nation's electricity sector and its reliance on decentralized competitive generation service markets depends heavily on the existence of a robust transmission network that operates efficiently. Indeed, the new decentralized industry structure with a large number of economic agents pursuing their own self interests requires a *more robust* transmission network and *enhanced operating capabilities* than was the case during the era of vertically integrated regulated monopolies. Recent historical evidence suggests, however, that resources devoted to maintaining, operating, and expanding the nation's transmission networks are *declining* rather than increasing in relative terms.

Continuing to rely on FERC's historical transmission regulatory framework is not likely to foster the kind of robust transmission networks that are required to support efficient competitive electricity markets. Traditional transmission regulatory procedures pay too much attention to the direct costs of transmission (capital and operating costs) and too little attention to the indirect costs of transmission (congestion, ancillary services, and local market power mitigation costs). It is very important for the FERC to adopt new regulatory mechanisms that provide transmission owners and operators with powerful economic incentives to operate transmission networks efficiently and to invest the resources necessary to expand their capabilities efficiently. These incentives should be an integral component of a performance-based regulatory (PBR) framework for the regulation of transmission rates that rewards transmission owners for achieving these

objectives and penalizes them for failing to do so.

There is a growing debate over whether RTOs should be non-profit ISOs or for-profit Transcos or some combination of the two organizational forms. This debate raises important issues, though the signal to noise ratio that has characterized this debate has not been very high. There are potentially significant costs resulting from the separation of ownership and maintenance decisions from transmission operating decisions, as is the case with ISOs. On the other hand, there are potential benefits associated with independence of the transmission operator from generation and marketing activities and the internalization of significant regional loop flow and related network externalities within a single organization. There are significant incentive issues that must be addressed both for non-profit ISOs and for-profit Transco monopolies. Viewed properly, it is not so much a choice between a not-for-profit ISO and a for-profit Transco, as it is a choice about the distribution of responsibilities between them.

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INTRODUCTION

Pursuant to the Notice of Proposed Rulemaking (NOPR), 64 Fed. Reg. 31390 (May 13, 1999), I am pleased to have the opportunity to offer my comments on issues and proposed policies regarding Regional Transmission Organizations (RTOs). It is important that the Commission implement policies that break down the remaining barriers to the continued evolution of efficient competitive wholesale electricity markets. Such policies are essential so that the ongoing restructuring of the US electricity sector can be successful in bringing long term economic benefits to consumers. I support policies that stimulate the creation of additional RTOs in the regions where they do not already exist (in the form of Independent System Operators (ISOs)) and which meet the general objectives and criteria discussed in the NOPR.

The NOPR addresses a large number of important interrelated issues and policy proposals regarding the organizational structure and regulatory framework that should govern transmission networks that support decentralized competitive markets for electric generation services. My comments will focus primarily on the future structure of the regulatory framework that governs how transmission owners and operators will be compensated for providing transmission service and those portions of the NOPR that relate to these issues.[1] Specifically, I believe that it is very important for the Commission to adopt regulatory mechanisms that provide transmission owners and operators with powerful economic incentives to operate transmission networks efficiently and to invest the resources necessary to expand their capabilities efficiently. These incentives should be an integral component of a performance-based regulatory (PBR) framework for the regulation of transmission rates that rewards transmission owners for achieving these objectives and penalizes them for failing to do so.[2] While I believe that my suggestions are fully consistent with the Commission's earlier Transmission Policy Statement (FERC

[1] Primarily NOPR (Slip. Op. at 198-203).

[2] My comments will use the phrases "performance-based regulation," "incentive regulation," and "incentive pricing," interchangeably.

Stats. & Regs. at 31,145, 31,148.), transmission rate regulatory practice continues to reflect primarily the cost-of-service model that evolved during what is rapidly becoming a bygone era.

Most of my comments will focus on incentive regulatory mechanisms that would be applied to transmission owners, including to independent transmission companies ("Transcos") which may perform the operating functions that are now performed by the existing ISOs in California, New England and PJM. However, I will also provide some comments related to the debate about the benefits and costs of not-for-profit ISOs that operate transmission facilities owned and maintained by others vs. for-profit Transcos that own, maintain, *and* operate their own transmission facilities. In my view, the signal to noise ratio associated with this debate has not been particularly favorable. My comments will discuss the appropriate analytical framework for the Commission to apply in evaluating proposals for alternative RTO organizational and ownership proposals rather than attempting to come to a definitive conclusion regarding "the best" organizational form for an RTO.

THE NEED FOR INCENTIVE REGULATION FOR TRANSMISSION

The success of the ongoing restructuring of the nation's electricity sector and its reliance on decentralized competitive generation service markets depends heavily on the existence of a robust transmission network that operates efficiently. Indeed, the separation of generation from transmission (via divestiture and new entry of independent generators); the unbundling of generation services into multiple financial and physical energy, capacity, and ancillary service products; the entry of many new independent generation suppliers; the growing role of unregulated energy marketers; the rapid expansion of retail competition; and other changes in the structure of the industry, requires a *more robust* transmission network and *enhanced operating capabilities* than was the case during the era of vertically integrated regulated monopolies.[3]

Vertical and horizontal disaggregation, combined with the increased freedom that individual market participants have to respond to market opportunities in their own self-interest, makes the efficient operation of the transmission network much more

challenging than it was under the old paradigm. As a result, the transition to a competitive electricity market with many economic agents pursuing their individual self-interests requires a *more* robust and flexible transmission network to yield the best feasible performance. Accordingly, the failure to adopt policies that stimulate the development of a robust transmission network with enhanced operating capabilities will seriously threaten the ability of the competitive electricity markets that the Commission has done so much to encourage to bring sustained benefits to consumers. The performance deficiencies resulting from poor operating and investment incentives will appear as higher congestion and "out-of-merit" dispatch costs, higher ancillary services costs, increased local market power problems and the need for regulatory intervention to mitigate them, increased costs and delays in connecting new generators, reduced reliability, and continued pollution from old inefficient generating stations that must be operated for reliability purposes as a consequence of transmission congestion and related network constraints.

Continuing to apply the Commission's historical transmission regulatory framework to an industry where the provision of transmission service has or will become a stand-alone business unit for many utilities is not likely to foster the kind of robust transmission networks that are required to support efficient competitive electricity markets. The recent historical evidence suggests that resources devoted to maintaining, operating, and expanding the nation's transmission networks are *declining* rather than increasing in relative terms.[4] This should not be surprising. Historically, major transmission enhancements generally accompanied the development of new generating resources by vertically integrated utilities (individually or cooperatively with their neighbors). Similarly, the maintenance and operation of transmission and generation were closely coordinated within individual vertically integrated firms or joint ventures in the form of tight power pools. The operating and capital costs of transmission were and are small relative to the costs of generation,[5] and the lead-times for building new generating

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[3] Over ten years ago, the Commission's "Transmission Policy Task Force" recognized the desirability of developing a more robust transmission network to support competitive generation markets. Federal Energy Regulatory Commission (1989, 67 and 93).

[4] Hirst, Kirby, and Hadley (1999, 4-5).

[5] In 1996, transmission accounted for about 2% of the operating expenses and 11% of the capital stock of the typical vertically integrated utility. Transmission service accounted for about 6% of the average vertically integrated utility's revenues -- about 4.5 mills/Kwh.

plants were longer than the lead-times for transmission network enhancements necessary to support them. Moreover, for most utilities, the costs of transmission facilities were regulated by state commissions as part of the regulation of vertically integrated firms supplying their native load retail customers in defined service areas.

The industry is now well down the path toward a very different industry structure, where generation is structurally or functionally separated from transmission, utilities are required to operate transmission as a separate business, and a growing fraction of transmission costs are becoming subject to Commission rather than state regulation. With the new industry structure, the incentive properties of the Commission's transmission regulatory framework will play a far more important role in determining resource allocation associated with the supply of transmission services than has been the case historically. The Commission's traditional transmission regulatory mechanisms that may have been satisfactory in the old regime will be unsatisfactory in the new regime. Good regulatory mechanisms should provide financial incentives for regulated transmission suppliers to operate and expand their systems efficiently. The regulatory mechanisms should lead transmission owners to view the pursuit of public interest goals as a business opportunity not as a burden thrust upon them by regulatory command and control rules. Accordingly, transmission owners should be subject to regulatory mechanisms that make it financially attractive for them to operate there transmission networks in a way that minimizes the overall operating costs of the network, including both the direct operating and maintenance costs of the network as well as indirect transmission costs associated with congestion, related network operating constraints, thermal losses, and ancillary services. Good transmission regulatory mechanisms will make it financially attractive for transmission owners to connect new generators to the network as quickly and economically as possible. Good transmission regulatory mechanisms will provide transmission owners with powerful incentives to deepen and expand their transmission networks when economic and reliability considerations make such investments desirable.

If the Commission does not act rapidly to develop and apply a transmission regulatory framework that is compatible with the changing structure of the electricity sector, recent trends in transmission investment are likely to worsen and the cost consequences of more constrained transmission networks will become a growing burden on consumers. The lead-times for major expansions of transmission capacity are getting

longer relative to the lead-times for new generating capacity while the demand for transmission interconnections from new competitive generators is growing rapidly. Out-of-merit dispatch and ancillary service costs are higher than anyone imagined would be the case in some of the operating ISOs. Large sums of money have been spent in California to deal with real or imagined local market power problems. Concerns have been expressed by some about overinvestment in transmission. I believe that the Commission should be much more concerned about underinvestment and should recognize that the societal costs of underinvestment in transmission are much larger than the societal costs of overinvestment. External factors such as licensing requirements, the need for rights of way, and NIMBY opposition to transmission infrastructure already places significant constraints on overinvestment in major new transmission projects. There is no crisis yet, but it is important for the Commission to act now to develop a better regulatory framework that will increase the capacity and improve the ability of transmission networks to support competitive electricity generation markets.

A new regulatory framework for compensating transmission owners is needed to support the development of competitive wholesale electricity markets and the *efficient* operation and expansion of the transmission networks upon which these markets depend. *Transmission regulatory reform should not be viewed primarily as a "carrot" that is desirable only as a way to entice reluctant utilities to form and participate in RTOs meeting the Commission's criteria*. Whether or not the Commission were considering new RTO rules at this time, it would be highly desirable for the Commission to develop and apply new regulatory mechanisms to transmission owners that provide them with positive financial incentives to operate and expand their transmission networks efficiently. Nevertheless, good transmission regulatory mechanisms are likely to be more effective if they are applied to transmission owners in the context of an organizational framework that satisfies the NOPR's proposed RTO criteria and the application of good transmission PBR mechanisms can help to ensure that the RTOs that are formed meet the Commission's performance expectations. It should also be obvious that if the Commission adopts a regulatory framework that is perceived by transmission owners as being less profitable than are the state regulatory frameworks which apply to the bulk of transmission assets today, whether by providing lower returns or resulting in costs getting "trapped" between regulatory jurisdictions, utilities will not be enthusiastic about creating

and joining RTOs when this involves moving transmission assets from state to Commission regulation.[6] Accordingly, developing and applying a good performance-based regulatory framework for transmission service that takes all of these considerations into account should be viewed as a high priority output from this proceeding.

Designing and implementing regulatory mechanisms that make good performance profitable and poor performance unprofitable is not easy and all regulatory mechanisms require tradeoffs between conflicting goals. However, there is a large body of theoretical research and a growing body of practical experience to draw on that can serve as a very useful model for the Commission to build upon. I will discuss some of this new learning and how it might be applied by the Commission in the following sections of my comments.

INCENTIVE REGULATION DESIGN CONSIDERATIONS

There is now a large theoretical and empirical literature that has identified the properties of good incentive-based regulatory mechanisms that can be applied to regulated monopolies.[7] Of course, all regulatory schemes provide incentives to the firms to which they apply. The issues are (a) whether these incentives promote or discourage behavior that is consistent with public interest goals and (b) how existing regulatory mechanisms can be reformed so that they better achieve these public interest goals. Even the much maligned institution of cost-of-service regulation provided some incentives for regulated firms to control their costs as a consequence of regulatory lag (a form on implicit "price cap" regulation) and administrative performance reviews.[8]

The primary basic goals and constraints that should guide the design of good incentive-based regulatory mechanisms include:

[6] I suspect that the Commissions has already heard more than enough on this point in the context of the Initial Decision in *Southern California Edison Company* 86 FERC ¶ 63,014 (1999). I will not dwell on it further except to observe that the Initial Decision's recommended allowed rate of return and treatment of various cost allocation issues certainly received a lot of attention from the folks who we depend on to make additional transmission investments.

[7] Laffont and Tirole (1994) and Armstrong, Cowan, and Vickers. (1994).

[8] Joskow and Schmalensee (1986).

1. Inducing the regulated transmission owner to provide its services efficiently taking both cost and quality dimensions of service into account (*the supply-side efficiency goal).*

2. Providing financial incentives to attract additional capital to the sector to expand capacity efficiently and to invest in maintaining the existing capital stock (*the capital attraction goal* or *firm viability constraint*).

3. Passing along a large share of the benefits of controlling the direct and indirect costs of transmission to consumers in the form of lower prices (*the rent extraction goal*)

4. Providing agents on the supply and demand sides with incentives, through the level and structure of prices, to make efficient utilization decisions regarding their use of the transmission network (*the utilization efficiency goal*).[9]

These goals and constraints cannot all be satisfied simultaneously, pragmatic tradeoffs are necessary to develop good practical regulatory mechanisms, and no incentive regulatory mechanism can fully replace continuing regulatory oversight. For example, a regulatory process that focuses primarily on ensuring that every last cent of potential direct transmission cost reduction is passed along instantly in lower prices to purchasers of the services, so that returns on transmission assets are always kept at the lowest plausible level within a zone of reasonableness, may do well at "extracting rents" from the regulated firm. However, such a regulatory process is likely to do poorly at promoting supply-side efficiency and attracting capital investment to the sector. Thus, while under such a regulatory regime consumers only pay the bare bones direct cost of the transmission services provided to them, the overall costs associated with operating and expanding the transmission network which consumers end up paying may be much too high and the quality of service too low because the transmission owner/operator has

[9] I will not discuss this goal further in these comments. However, I want to note that the Commission's recent efforts to work with the industry to develop better congestion management mechanisms and the criteria for efficient congestion management discussed in the NOPR (Slip. Op. at 162-166, 197-198) are consistent with this goal.

been given poor incentives to control costs and enhance the network. At the other extreme, a regulatory mechanism could set a very high fixed price for transmission services which would never be adjusted in the future, making the regulated supplier the residual claimant on all cost increases or decreases over time. This type of "fixed price regulatory contract" provides powerful incentives for the firm to reduce its costs, but may provide disincentives to providing high quality service and perform very poorly in achieving the rent extraction goal.[10] And if cost conditions change and the fixed price does not cover even the efficient level of direct transmission costs, the mechanism would fail to achieve the capital attraction goal as well.[11]

Most good practical incentive-based regulatory mechanisms are hybrid schemes that involve tradeoffs between these goals and constraints in light of the importance of specific performance goals in specific industry contexts. For example, a typical hybrid incentive regulation mechanism often takes the following general form:

$$R_t = C_t^* + g(C_t - C_t^*) + d(M_t - M_t^*)$$

where:

R_t = The revenues that the regulated firm is allowed to recover in the prices it charges

C_t^* = A cost target established by regulators for providing service efficiently, including return on investment

C_t = The regulated firm's realized costs of providing service

M_t^* = A target level for a service quality index (e.g. network availability) established by regulators. The higher is M the better is service quality.

M_t = The regulated firm's realized value for the service quality index

$$0 \leq g \leq 1$$

$$0 \leq d \leq 1$$

This generic linear regulatory mechanism rewards the regulated firm if it can

[10] Laffont and Tirole (1993, 40).
[11] See Schmalensee (1989, 417-36) for a useful set of numerical simulations that illustrate these tradeoffs.

reduce its costs below the target C_t*. The smaller is g, the higher is the power of the incentive scheme to reduce costs.[12] It also rewards the regulated firm if it can achieve service quality levels that exceed the target M_t*. The larger is d, the more powerful is the incentive to improve service quality. One can add to this generic mechanism a cost and service quality performance review every few years that could lead to the base revenue level and incentive parameters of the regulatory mechanism being adjusted to reflect realized performance. Such an adjustment is referred to as a "ratchet." Ratchets necessarily soften incentives for cost reduction and service quality enhancement, but they are generally necessary to take into account both the firm viability constraint (e.g. if the cost target turns out to be too low) and the rent extraction goal (e.g. if the cost target turns out to be far to high) discussed above. Floors and caps on profits can also be included for the same reasons.

INCENTIVE (or PBR) REGULATION FOR TRANSMISSION

At this point in the evolution of the US electric power sector, it is important for the Commission to give more weight to the supply side efficiency, capital attraction, and utilization efficiency goals enumerated above. The Commission also should redefine the way it looks at transmission costs to include both the direct costs of transmission (transmission capital and O&M costs) and the indirect costs of transmission (congestion, losses, costs of local market power problems, ancillary service costs, etc.). Reforms in all of these dimensions are necessary to provide a regulatory framework that will lead to a robust transmission network that operates to facilitate efficient competition in the supply of generation services and to convey the benefits of competition to consumers.

Let me focus first on the way prevailing regulatory procedures deal with transmission costs. The traditional approach to regulating transmission rates is to focus on the transmission owner's direct transmission operating and maintenance costs, the appropriate rate of return on the transmission rate base, and the allocation of these and other costs between retail and wholesale customers. As I have already indicated, the

[12] If C_t* where determined each year by adjusting the current level of costs by an inflation index and a productivity index and g and d were set equal to zero we would have the standard "price cap" regulatory mechanism. However, it is important to understand that a pure price cap is one of many possible incentive regulatory mechanisms and that if d is zero it will provide poor incentives in the quality of service dimension.

direct costs of transmission service are a small fraction of the total costs of electricity supply, representing about 6% of the average customer's bill or about 4.5 mills/Kwh on average. The return on equity (including income taxes) associated with transmission investment amounts to less than 1 mill/kWh. As a result, the great efforts the regulatory process goes to in order to "fine tune" the allowed rate of return on transmission investments is unlikely to be greatly appreciated by consumers. If the Commission were to increase the allowed rate of return on transmission investments by a whopping 50% (e.g. from 11% to 16%) it is unlikely even to be noticed by retail consumers since it would lead to an increase in the average retail price of less than 1% (about one-half mill/Kwh).[13] Moreover, regulators will not be doing consumers any favor at all if the small price reduction they receive in the short run as a result of regulator's cutting a couple of points off of the expected rate of return on transmission investment destroys the transmission owner's incentives to invest. If the result of inadequate investment incentives is to increase congestion costs, increase the incidence of local market power problems, increase ancillary services costs, increase the frequency and magnitude of huge energy-price spikes, etc., consumers will be harmed in the long run.

The transmission rate regulatory process presently is focusing on too narrow a definition of costs and does not reflect an appreciation of the social costs of failing to provide appropriate incentives to transmission suppliers. In the vertically and horizontally decentralized electricity sector that is rapidly emerging, the Commission must consider both the direct *and* indirect costs associated with the operation of and investments in the transmission network in the design and application of transmission rate regulatory policies. The indirect costs associated with the operation and capabilities of the transmission network include: the costs of out-of-merit dispatch of generating plants to manage congestion and to maintain network frequency, stability, and voltage criteria; some of the costs of ancillary services; thermal losses; the societal costs of local market power and the costs of regulatory mechanisms aimed at mitigating these costs; the costs associated with poor generator location decisions; and excessive costs and delays in connecting new generators to the system. The magnitude of these indirect transmission costs in turn will depend on the incentives transmission owners and operators have to

[13] This calculation includes the additional income taxes that would be due as a result of a higher allowed net return on equity investment.

mitigate them through the choices they make about the operation and maintenance of the network as well as when, how, and where they make investments to enhance the transmission network's capabilities.

The magnitude of these indirect costs can be affected significantly by relatively straightforward low-cost transmission operating decisions. For example, the decision to de-energize a transmission line for maintenance affects the ability of some generators to supply energy to the network. The direct maintenance costs of the line may be independent of exactly when the maintenance is accomplished.[14] But the indirect costs of constraints on generation supplies are likely to be much higher during some time periods than others. Efficiency considerations would imply that the latter costs should play a role in maintenance decisions. When we relied on vertically integrated utilities, these kinds of tradeoffs were naturally internalized. In a decentralized system they are not naturally internalized. In a decentralized system a more efficient outcome would result if the transmission owner and operator were given incentives to take the costs of constraining off generators into account when it makes maintenance decisions. Moreover, absent such an incentive mechanism, regulators will get drawn into micromanaging maintenance decisions and refereeing disputes between transmission owners and generators.

Similar opportunities to reduce the indirect costs of transmission exist with regard to expanding the capabilities of the transmission network. Future cost-effective transmission investment opportunities will not be dominated by major new transmission lines spanning hundreds of miles or traversing pristine areas. Indeed, the difficulty of developing major new transmission corridors in many regions of the country will make it necessary for transmission owners to focus on deepening the capabilities of the existing network. There are many potential opportunities to increase the capacity of transmission networks, capacity that is often defined by security constraints (e.g. N-2) rather than thermal or stability limits. They vary from no- or low-cost upgrades of the reliability of breakers and other components on the network, better monitoring, communication and control capabilities, to much more costly investments in static var compensators, capacitors, substation enhancements, FACTS technology, and reconductoring of existing transmission lines. In the past, vertically integrated utilities would have (or at least should

[14] Alternatively, the line might be returned to service more quickly if maintenance workers are asked to work overtime, at added expense.

have) naturally internalized the consideration of these opportunities in the context of planning to meet growing loads with new generating capacity that they owned. In the new world, where transmission is operated and increasingly owned separately from generation, the transmission owner requires incentives to take both the direct costs of these opportunities and their indirect costs enumerated above into account and to proceed with economical changes in operating procedures and enhancements to the network that reflect both the direct and indirect costs of transmission.

How can the Commission proceed to create a better incentive or performance based regulatory environment? First, the adoption of good PBR mechanisms for transmission owners should be viewed as something that the Commission expects and will eventually require, not something that is a privilege. Second, there is no reason for us to reinvent the wheel. The electricity sector in England and Wales now has nearly a decade of experience with incentive-based transmission regulatory mechanisms governing the revenues that the National Grid Company (NGC) receives for providing services.[15] There is much to learn from this experience. Of particular interest is the Transmission Services Scheme (TSS)[16] that provides NGC with financial incentives to reduce "transmission uplift" costs (these are costs associated with out-of-merit dispatch to manage congestion, thermal losses, and ancillary services costs).[17] This regulatory mechanism, whose structure has evolved over time, has led to a large reduction in uplift costs in the last few years. Before it was implemented uplift costs increased significantly over time. The TSS has created a regulatory environment in which NGC has found it profitable to find ways to reduce these costs. At the same time, those who use the network have received the bulk of the benefits in the form of lower uplift charges.

The important analytical insight embodied in this regulatory mechanism is that it gives NGC a financial stake in *reducing* what I previously referred to as the indirect costs

[15] Green (1997, 185-93). The details of the current regulatory mechanisms that apply to NGC can be found in the "Transmission License for the National Grid Company PLC" which can be downloaded from Offer's web site http://www.open.gov.uk/offer/.

[16] This transmission incentive scheme has been referred to by various names as it has evolved over time. It was initially called the Uplift Management Incentive Scheme and is also referred to in Offer documents as the Transmission Services Incentives Scheme."

[17] Office of the Electricity Regulator (1997). See also Office of the Electricity Regulator (1998). These papers can be downloaded from Offer's web site http://www.open.gov.uk/offer/.

of transmission.[18] It does so by giving NGC an uplift cost target, rewarding it if it beats the target and penalizing it if uplift costs exceed the target. This approach is broadly consistent with theoretical work on optimal transmission regulatory mechanisms.[19] The experience in England and Wales, as well as economic theory, also makes it clear that a standard "price cap" (RPI- x) mechanism applied *only* to the direct costs of transmission service is not a sufficiently comprehensive regulatory mechanism. This is the case because focusing financial incentives only on reducing the direct costs of transmission service not only ignores the indirect costs of transmission service but may actually create incentives for the transmission owner/operator to behave in ways that lead to an increase in indirect costs. The current regulatory scheme in England and Wales integrates a conventional price cap mechanism covering the bulk of direct transmission system charges, with incentive schemes applicable to transmission uplift costs (costs of congestion management, losses, and ancillary services) and reactive power costs, and a separate regulatory mechanism governing cost recovery for connecting new generators to the system. Taken together, these regulatory mechanisms have encouraged substantial new investment in the network, facilitated generator interconnections, reduced transmission uplift costs, while increasing the reliability of the network.[20]

The experience in England and Wales strongly suggests that effective incentive regulatory mechanisms can be designed and applied to transmission companies in the context of competitive markets for generation services. This does not mean that the transmission regulatory mechanisms that have evolved in England and Wales are either the only regulatory mechanisms worth considering or necessarily the best regulatory mechanisms for application in the US. Especially in light of the diverse structure of the US industry and the varying paces of restructuring in different areas of the country, any good incentive regulation mechanism must reflect the structural and behavior attributes of the transmission and electricity market systems to which it will be applied. Clearly, however, the experience in England and Wales indicates that developing good incentive regulatory mechanisms is both feasible and desirable.

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[18] Conversely, any regulatory mechanism that allows the transmission owner to profit by *increasing* congestion and other network constraints would be very bad indeed.
[19] Nasser (1999) and Nasser (1997, chap. 6).
[20] National Grid Company (1998-99).

MARKET-BASED TRANSMISSION INITIATIVES

There has been considerable discussion in the last couple of years about the role of "market-based" private initiatives to build additional transmission capacity in return for physical or financial transmission rights. Some have argued that ISO should be structured to rely on "the market" to produce economically efficient levels and locations for new transmission investments. This discussion reflects the rational desire to move as much as possible of the resource allocation decisions in the electricity sector from regulated monopolies to competitive markets. However, the desirability of this shift in governance arrangements requires that reasonably efficient competitive markets can and will evolve for investments to supply the services involved. I have previously written that "[T]ransmission investment decisions do not immediately strike me as being ideally suited to relying entirely on the invisible hand. Transmission investments are lumpy, characterized by economies of scale and can have physical impacts throughout the network. The combination of imperfectly defined network property rights, economies of scale, long-lived sunk costs for transmission investments, and imperfect competition in the supply of generation services can lead to either underinvestment or overinvestment...."[21] However, I expressed optimism that the primary initiative for transmission network upgrades could be left to private parties responding to market incentives "... especially where a reasonably good allocation of capacity rights, whether physical or financial, is created."

My optimism about relying primarily on private market-based initiatives has waned with the experience with restructuring in the US and other countries over the past few years. *Indeed, proceeding under the assumption that at the present time "the market" will provide needed transmission network enhancements is the road to ruin.* There is abundant evidence that market forces are drawing tens of thousands of megawatts *of new generating capacity* into the system. There is no evidence that market forces are drawing significant entrepreneurial investments into new transmission capacity. While third parties should be given the opportunity to propose market-based private initiatives to expand transmission capacity, incumbent transmission owners, in the context of a sound RTO/ISO planning process, must be relied upon to play a central role in expanding the transmission system. Increases in transmission capacity that their

initiatives create, and the associated transmission rights that conform to the protocols being applied in their regions, could then be auctioned off to market participants with the proceeds used to help to defray the costs of the transmission network.[22]

In addition to the barriers to competitive provision of new transmission investments enumerated in the previous paragraphs, there are additional barriers to competitive market provision of transmission network upgrades that must be taken into account. Many of the opportunities to enhance the capabilities of the existing transmission networks involve a large number of individually relatively small enhancements to existing facilities that comprise an integrated network. These include new breakers and switches, better monitoring, communications and control capabilities, changes in operating procedures and security ratings, reinforcing existing lines, and combinations of all of these. The primary initiatives for these types of network enhancements are best left to the owners of the existing network in the context of good RTO/ISO planning processes since the enhancements are often physically and economically inseparable from the existing network and its operation. Moreover, the attributes of the electricity restructuring programs around the country, including the attributes of congestion management schemes and transmission rights, vary considerably from region to region and their future evolution remains controversial and very uncertain. In addition, the level and patterns of nodal or zonal prices upon which any market-based initiatives must rely are very sensitive to fairly small changes in the security criteria used by system operators[23] and these criteria and their application are likely to be in flux for some time. These uncertainties and market imperfections will discourage market-based transmission investments, at least until we move from a period of experimentation and rapid change in institutional arrangements to an era of relative stability. Failing to stimulate efficient network enhancements until such a period of stability is reached will be very costly to electricity consumers during what may be a very long transition period. As a result, the development and application of good incentive regulation mechanisms for transmission owners and operators, within the context of good RTO/ISO transmission

[21] Joskow (1996). See also, Federal Energy Regulatory Commission (1989, 164).
[22] It is important that the regulatory framework assure that the transmission owner does not profit directly by increasing the value of these rights so that it does not have an incentive to increase congestion.
[23] Boucher, Ghilain, and Smeers (1998, 59).

planning processes, becomes an even more important component of industry restructuring than would be the case if one believed that we could rely primarily on "the market" to produce efficient patterns of transmission investment.

These observations do not mean that third-parties should be precluded from making proposals for transmission upgrades for consideration by transmission owners, RTOs, and regulators. I simply would not assume that we can depend on these market-based initiatives at the present time to produce the most cost-effective enhancements to transmission networks necessary to meet reasonable economic and reliability goals. The transmission owners operating through a sound RTO/ISO transmission planning process should be expected to be the primary, but not necessarily the exclusive, source of network enhancement initiatives.

THE ISO VS. FOR-PROFIT TRANSCO DEBATE

I expect that the Commission will receive numerous comments related to the growing debate about the relative costs and benefits of relying on not-for-profit ISOs vs. for-profit Transco's for scheduling and dispatching generators on transmission networks to provide energy, ancillary services, manage congestion, and to assure network reliability. This debate raises serious issues and I hope that the Commission will take these issues seriously. However, much of the public rhetoric that has characterized this debate confuses a number of different issues and considerations. Accordingly, I thought that I could be most helpful to the Commission by outlining what I believe is a useful framework for thinking about these issues.

The following considerations are relevant for evaluating alternative organizational and ownership arrangements to govern the operation of regional transmission networks:

1. *The independence of transmission owners from generators and other active market participants utilizing the transmission owner's facilities.* One of the primary rationales for ISOs has been the continued vertical integration between transmission and generation in many areas of the country and perceived problems associated with enforcing non-discrimination rules in the presence of vertical integration between

generation and transmission.[24] ISOs represent an organizational response to the perceived need for a network operator that is independent of generators and other active market participants in its region and which can accommodate continued vertical integration between generation and transmission. When vertically integrated utilities have divested either their generating or transmission assets or turned their control over to independent third parties, this rationale for an ISO that is responsible for transmission network operations vanishes.

2. *The benefits of integration of the ownership and maintenance of transmission assets with the operation of these assets to schedule and dispatch generators, manage congestion, and coordinate with neighboring control areas.* In most countries that have gone through electricity restructuring programs, transmission asset ownership and the operation of the network are (primarily) handled by the same organization. At the same time, in most of these countries, the transmission owner/operator is not involved in generating or trading electricity for its own account and its geographical expanse covers all or most of a single synchronized network. There are good reasons to believe that there are potential efficiency losses (i.e. higher costs) associated with separating ownership of transmission assets from the responsibility for operating these assets. Indeed, this kind of separation of ownership and control is extremely unusual in any other sector of the economy.[25] Moreover, the separation of ownership from operations makes it more difficult to develop and apply good incentive regulatory mechanisms to the transmission owner, since it divides decisions that affect the direct and indirect costs of transmission between two organizations. In light of the likely costs of separating ownership and maintenance from the operation of the transmission network for scheduling, dispatch, and reliability, it is necessary to examine whether other considerations create benefits from the separation of ownership of transmission assets from the operation of these assets and to evaluate whether the benefits exceed the costs.

[24] Another rationale was that ISOs made it possible to move restructuring along much more quickly than would have been the case if the Commission or state regulators had (somehow) pursued a policy that required the divestiture and horizontal consolidation of transmission assets.

3. *The extent to which horizontal integration of ownership and control of transmission assets internalizes loop flow and other network externalities in a region.* There are hundreds of utilities (including municipal, state, federal, and cooperative utilities) that own, maintain and operate transmission facilities in the US. Some control large networks and others control very small networks or own pieces of transmission networks operated by others. Because of the decentralized ownership of transmission facilities, loop flow and other network effects make it possible for an individual transmission owner to behave in ways that impacts some or all of the other owners of transmission facilities in its region. These "external" effects may be inconsistent with the overall efficiency of the operation of or enhancements to the transmission network. One of the rationales for separate ISOs, is that they provide a single regional organization that can help to internalize these network externalities, harmonize the behavior of multiple parties with control over portions of the same physical network, and facilitate one-stop shopping for transmission service by market participants that rely on facilities owned by many parties.[26] As the degree of horizontal integration of transmission assets serving adjacent geographic areas increases, and the associated potential network externalities are internalized within a larger transmission owner/operator, the rationale for a separate regional operating organization to deal with these externality problems declines. Accordingly, other things equal, the potential benefits of a separate ISO are inversely related to the degree to which transmission ownership in a region has consolidated enough to internalize loop flow and other network externalities.

4. *Incentives, hard budget constraints and ownership form*. The operation of a transmission network affects the direct and indirect costs of transmission service. Accordingly, we want transmission operators to take the costs and benefits of their behavior into account when they make operating and investment decisions. They will

[25] There are no ISOs for natural gas pipelines, telephone networks, or railroad networks. There has been some experience with separating ownership of cable television assets from their operation and the performance results have generally not been good.

[26] Let me note that ISOs that include only investor-owned utilities may not fully accomplish this internalization. For example, the California ISO does not include parallel transmission facilities

do so if they are *responsible* for the economic consequences of their actions and their incentives and those of the users of the network are aligned. Any organization, whether public or private, for-profit or not-for-profit, that is not at least partially responsible for the costs of its actions is unlikely to perform well in the long run. In competitive markets, private for-profit firms are always fully responsible for their actions. They face "hard budget" constraints in the sense that the market determines the prices they can charge for the goods or services they provide and any cost increases or decreases that result from their individual actions accrue to their benefit or detriment (they are the "residual claimants" on actions that increase or decrease costs). However, the mere fact that an organization is a non-profit does not necessarily imply that it faces no incentives to control costs. Any not-for-profit firm that must "sing for its supper" to earn revenues to cover its expenses also faces budget constraints and has some incentives to control costs and satisfy its constituents.[27] Nevertheless, a not-for-profit firm's objectives may be different and more complex from those of a for-profit firm in the same business.[28] As a result, it is more difficult for third parties, including the non-profit's board of directors, to monitor managerial performance and to discipline poor performance than is generally the case for a private firm whose objective is to maximize profits, whose success can be judged by its profitability and its market value, and where the market for corporate control can be a powerful mechanism that discipline's managerial behavior.

Nor does the private for-profit status of a supplier necessarily lead to good performance. *Unregulated* private transmission monopolies would face hard budget constraints but they also have the incentive and ability to charge excessive prices and distort the quality of service. At the other extreme, regulated private transmission monopolies subject to pure cost-plus regulation are also unlikely to achieve good performance because they do not face hard budget constraints that reward good performance and penalize bad performance. However, following the earlier discussion, we can apply (necessarily imperfect) incentive regulatory mechanisms to

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owned by various public power entities (e.g. LADWP) in the region.

[27] For example, MIT is a private not-for-profit organization. However, it depends on tuition, research grants and contracts, and gifts to cover its expenses each year. If costs go up, MIT does not have the power to "tax" any of these revenue sources to fully cover the cost increases.

give regulated private transmission monopolies incentives to perform well while constraining monopoly behavior.

It is not at all obvious how similar incentive arrangements would be applied to a not-for-profit monopoly ISO. It's not so much that the ISO is not-for-profit as it is that it has the ultimate in soft budget constraints. It is impossible to make a not-for-profit ISO itself, as an organization, financially responsible for its actions since it has no equity at risk and must have the ability to pass along all of its costs to market participants in order to make credible commitments to pay those who provide it with services. The burden then must fall on the ISO's board of directors to establish clear performance goals, to monitor managerial performance in achieving these goals, and to reward managers for meeting or beating the goals and to penalize them when performance falls short. In theory, incentive compensation arrangements for ISO management could be applied to replicate the properties of an incentive regulation mechanism applied to a private firm with equity as risk. In practice, it is difficult to design and implement incentive compensation arrangements that are adequate. Accordingly, we must anticipate that getting non-profit ISOs to take the costs and benefits of their decisions properly into account will be a continuing challenge for their boards, market participants, and regulators.

5. *The desirability of independent regional organizations to monitor market and transmission network performance, review transmission upgrade plans and proposals, and serve as the initial forum for dispute resolution*. Any monopoly Transco that owns the transmission network and has the responsibility for operating, maintaining, and dispatching it must be subject to regulation. A good incentive regulation mechanism can go a long way toward making good performance profitable and bad performance unprofitable and reducing the need for regulatory micromanagement. However, no incentive regulation scheme is perfect or permanent. The Transco's performance must be reviewed from time to time and the regulatory mechanism adjusted. Disputes between market participants and the network operator will naturally arise and will have to be resolved. A forum for reviewing transmission

[28] Indeed, this is the typical rationale for creating non-profits in areas like education and health care.

upgrade plans and to entertain competing private initiative proposals will be necessary. Market performance must continue to be monitored, though hopefully the intensity of market monitoring and the need for adjustments in market rules will decline in the future as the kinks are worked out of the system. The issue is whether the Commission should be the regulatory agency that takes primary responsibility for these tasks or whether the "first responder" role should be devolved to regional transmission organizations, with the Commission playing the role of approving basic policies, market rules, and tariff provisions and serving as the ultimate board of appeals for disputes that cannot be resolved at the regional level. If the Commission desires to have regional organizations take on these roles, then this is a natural role for an RTO to take on even in the presence of regulated private regional Transcos that own, maintain and operate the transmission network.

These considerations suggest that the "ISO vs. Transco Debate" is not so much a choice between a not-for-profit ISO/RTO and a for-profit Transco, as it is a choice about the distribution of responsibilities between them. If the ownership of transmission assets in a region is highly balkanized and vertical integration between transmission and generation is extensive then it would appear that ISO/RTOs will need to play a significant operating role in the region to meet the Commission's objectives. Defining clear performance objectives for the ISO, implementing a good governance framework, monitoring ISO managerial performance in light of these objectives, rewarding management for good performance and disciplining management for poor performance will be a difficult but important challenge in this case. If transmission owners shed their control over generating assets and the ownership of transmission assets in a region is not highly balkanized so that loop flow and other network externalities are largely internalized, there is a strong case for shifting more operating responsibilities to the Transcos, in the context of a good PBR mechanism. The ISO/RTOs independent role would then shrink to deal with any remaining significant network externalities or boundary problems and to encompass the non-operational monitoring, review, and dispute resolution tasks enumerated above.

CONCLUSION

The RTO NOPR embodies a sound vision for the next stage in the development of an efficient and reliable U.S. electric power sector that relies as much as is reasonably possible on competitive markets. A robust transmission system that serves as an efficient platform to support wholesale and retail competition is essential if this vision is to be realized. I respectfully urge the Commission to take my Comments into account as it develops a Final Rule.

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