

Transmission Development & Electric Market Efficiency: Are RTOs the Answer?

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I. Introduction

As part of its continued oversight of transmission planning and energy market regulation, the Federal Energy Regulatory Commission (FERC) has concluded that significant issues remain with “the effectiveness of transmission planning generally and regional and interregional planning specifically, the treatment of certain types of electricity resources in the planning process (such as renewable power), and cost allocation for new transmission projects.”¹ In particular, in the area of cost allocation for new transmission projects, few rate structures, other than participant financing, provide complete cost allocation and recovery for all inter-system processes. This creates a significant risk for developers that they will have no identified group of customers from which to recover the cost of their investment and has led to slowing in transmission growth relative to energy demand.²

Thus far, FERC has focused on encouraging regional transmission planning and cost allocation through the structure of regional transmission organizations and independent system operators (RTOs and ISOs). RTOs are different from ISOs in that they may utilize more flexible governance and business structures, while all ISOs approved by FERC thus far have been not-for-profit entities.³ However, RTOs and ISOs share their main function as gatekeepers; they monitor and regulate the queue of new generation plants waiting for access to transmission lines.⁴ For this reason, at times this paper will refer to RTOs and ISOs collectively as RTOs. In

¹ Stan Mark Kaplan and Adam Vann, *Electricity Transmission Cost Allocation*, CONGRESSIONAL RESEARCH SERVICE, at 13 (April 19, 2010).

² *Id.*

³ *Id.*

⁴ Regional Transmission Organizations, Notice of Proposed Rulemaking, 64 Fed. Reg. 31,390 (June 10, 1999), FERC Statutes and Regulations ¶ 32,541 (1999) [hereinafter Order 2000].

addition to acting as “gatekeepers,” monitoring and regulating the queue of new generation plants waiting for access to transmission lines, RTOs operate regional electricity grids, which administer the region’s wholesale electricity markets and provide reliability planning for the bulk electricity system.⁵ To do this, RTOs design transmission tariffs that are responsive to the transmission needs of their regions.⁶ FERC evaluates these tariffs to ensure they promote nondiscriminatory access to transmission and support just and reasonable rates for energy in their markets.⁷

Yet, one-third of American consumers are not served by RTOs.⁸ It is unclear whether RTOs and ISOs have succeeded in providing regional collaboration to achieve transmission benefits, including reliability, increased transmission to new generation sources, and coordinated demand-response.⁹ With the current dearth of transmission growth, it is worth questioning which of their intended functions RTOs are performing most effectively. This paper will analyze the evolution of RTOs and their endogenous characteristics to show which market functions RTOs can most efficiently provide and to determine whether FERC should continue to focus its regulatory efforts on the RTO structure.

In Part II, this paper details the background and history of federal regulatory authority regarding transmission planning and the development of RTOs. Part III then evaluates the effectiveness of RTOs in fulfilling transmission construction and cost allocation needs. Part IV concludes that FERC’s policies in support of RTOs could be more narrowly tailored to

⁵ IRC Council, *Increasing Renewable Resources*, at 24 (Oct. 16, 2007), http://www.isorto.org/atf/cf/%7B5B4E85C6-7EAC-40A0-8DC3-003829518EBD%7D/IRC_Renewables_Report_101607_final.pdf, Regional Transmission Organizations, Notice of Proposed Rulemaking, 64 Fed. Reg. 31,390 (June 10, 1999), FERC Statutes and Regulations ¶ 32,541 (1999) [hereinafter Order 2000].

⁶ *Id.*

⁷ *Id.*

⁸ Federal Energy Regulatory Commission, *Congressional Performance Budget Request: Fiscal Year 2011*, at 18, <http://www.ferc.gov/about/strat-docs/FY11-budg.pdf>.

⁹ *Id.*

encourage RTO infrastructure to focus on delivering those services which are most effective, and to otherwise leave regional transmission planning to utilities and transmission owners.

II. **Background**

A. **Regulation of the Transmission Grid**

RTOs act as an intermediary between government and industry, intended to ensure equal access to the transmission network as they centrally dispatch electricity over member utilities' transmission systems.¹⁰ RTOs also organize competitive wholesale markets, coordinate the complex operating decisions of member utilities, monitor wholesale market performance, and coordinate long term investment planning.¹¹ RTOs' benefits are intended to include a consolidation of control leading to a more orderly transmission system, increased efficiency, management of congested electricity traffic, reduced costs, and benefits accruing to the States and to the environment.¹² At the time that FERC first addressed the concept of RTOs, FERC estimated that the formation of RTOs would result in cost savings for consumers of \$2.4 billion annually.¹³ Today, RTOs serve roughly two-thirds of all electricity consumers in the United States by providing transmission services, including interconnecting new resources to the transmission grid and operating markets for the sale of electricity at wholesale.¹⁴ In the regions of the country that have RTOs, these entities engage in transmission planning, involving the prediction of expected electricity supply and demand in the near and longer-term and an

¹⁰ *Id.*

¹¹ *Id.* at 10.

¹² Samuel R. Brumberg, Note, *Getting the Camel Out of the Tent: Behind the Federal Energy Regulatory Commission's Rise to Power and the Importance of States' Continued Regulatory Oversight*, 30 WM. & MARY ENVTL. L. & POL'Y REV. 691, 704 (2006).

¹³ Order No. 2000, *supra* note 16.

¹⁴ Federal Energy Regulatory Commission, *Congressional Performance Budget Request: Fiscal Year 2011*, at 18, <http://www.ferc.gov/about/strat-docs/FY11-budg.pdf>.

assessment of the reliability needs and congestion issues related to this prediction.¹⁵ In the Western and Southeastern regions of the United States, where utilities don't participate in RTOs, each utility takes care of its own transmission planning with varying degrees of transparency.¹⁶ To understand how the federal energy regulatory framework impacts RTO functioning and subsequently transmission development, it is important to understand the evolution of RTOs and FERC's attempts to encourage and regulate their growth.

B. Evolution of Regional Transmission Organizations

Over the last 15 years, FERC has exercised its authority to promote competitive energy markets and reliability through a series of orders aimed at encouraging regional transmission planning and cost allocation. FERC Order No. 888 provided the electricity industry with guidance on ISO formation in the form of eleven principles intended to be used to assess ISO proposals submitted to FERC.¹⁷ These principles address the ISO's (i) governance, (ii) independent structure, (iii) reliability and operations, (iv) efficiency of management, (v) fostering of economic efficiency in use of and investment in generation, transmission, and consumption, (vi) provision of electronic information systems, regional coordination and dispute resolution process.¹⁸ According to FERC, Order No. 888 "fostered a rapid growth in dependence on wholesale markets for acquisition of generation resources." Following several years of experience under Order No. 888, FERC perceived that the continued balkanization of the United

¹⁵ Allison Clement, *FERC's Order 1000: Outside of Congress, Hope for a Clean Energy Future Abounds*, Switchboard.nrdc.org/blogs/aclements/fercs_order_1000_there_is_hope.html (Jul. 26, 2011).

¹⁶ *Id.*

¹⁷ Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities, 62 Fed. Reg. 12274, 12316 (Mar. 14, 1997) [hereinafter Order 888].

¹⁸ 75 FERC 61,080, PROMOTING WHOLESALE COMPETITION THROUGH OPEN ACCESS NON-DISCRIMINATORY TRANSMISSION SERVICES BY PUBLIC UTILITIES, DOCKET NO. RM95-8-000, RECOVERY OF STRANDED COSTS BY PUBLIC UTILITIES AND TRANSMITTING UTILITIES, DOCKET NO. RM94-7-001. [HTTP://WWW.FERC.GOV/LEGAL/MAJ-ORD-REG/LAND-DOCS/RM95-8-00W.TXT](http://www.ferc.gov/legal/major-reg/land-docs/rm95-8-00w.txt)

States grid under different transmission operators—along with concerns about the interpretation, or possibly the manipulation, of open access rules—was creating market inefficiency.¹⁹

Hence, FERC designed Order No. 2000 to formalize the formation of RTOs and ISOs.²⁰ Order No. 2000 stated that before FERC will approve any RTO, the RTO must prove that it has four prescribed characteristics: (i) independence from market participants; (ii) regional scope of operations; (iii) authority to plan and expand; and (iv) an “open architecture” policy to allow structural modifications.²¹ Order No. 2000 also set out the minimum functions that an RTO must perform, including (i) tariff administration and design; (ii) congestion management; (iii) participation in Open Access Same-time Information System; (iv) market monitoring; (v) planning and expansion; and (vi) interregional coordination.²² In 2001, the Midwest ISO (MISO) became the first FERC-approved RTO.²³ Today, MISO has operations in twelve states and one Canadian province and provides over forty million consumers with regional grid management in an area exceeding 200,000 square miles.²⁴

Even with the passage of Order Nos. 888 and 2000, transmission congestion persisted in causing unreliable and more expensive service because such congestion prevented utilities from using lower cost generation to meet the load.²⁵ Under the Order No. 888 regime, congestion was not priced, but rather allocated on a cost-basis to firm users of the system on a first-come, first-

¹⁹ Fereidoon P. Sioshansi. (2008). *Competitive Electricity Markets - Design, Implementation, Performance*, Elsevier. Online version available at: http://www.knovel.com/web/portal/browse/display?_EXT_KNOVEL_DISPLAY_bookid=2263&VerticalID=0, at 147.

²⁰ CLINTON A. VINCE, ET AL., *What Is Happening And Where In The World Of RTOs And ISOs?*, 27 ENERGY L. J. 65, 67.

²¹ Order 2000, *supra* note 16, at 31413-31414.

²² *Id.*

²³ John Catlin, *Evolution of the Midwest ISO* (Aug. 28, 2002), <http://www2.econ.iastate.edu/tesfatsi/EvolutionofMISO.2002.pdf>.

²⁴ Matthew Cordaro, *Time for SPP to Join MISO?*, THEENERGYDAILY.COM (July 26, 2011), http://www.theenergydaily.com/guest_column/6477.html.

²⁵ The Northeast electricity blackout of 2003 brought light once again to the challenges faced by regional and interregional electricity transmission. William Hogan, *Shedding Light*, April 19, 2004, COMMENTARY, WALL STREET JOURNAL, p. 2, available at <http://www.hks.harvard.edu/fs/whogan/hogan.shed.light.WSJ.0404.pdf>.

serve basis.²⁶ RTOs and ISOs were instructed to manage congestion through Transmission Loading Relief procedures, which curtailed service based on priority.²⁷ FERC concluded that transmission providers actually had a disincentive to remedy increasing transmission congestion on a nondiscriminatory basis and that the open access transmission tariff did not adequately address this problem.²⁸ Thus, FERC Order No. 890 strengthened the transmission planning framework by requiring RTOs and ISOs to meet nine principles of transmission planning.²⁹

Despite varying implementation timelines and market functions, some broad trends emerged in the evolution of RTOs and ISOs. The RTOs and ISOs in the Northeast (New England ISO, or ISO-NE; New York ISO, or NYISO; and PJM) each evolved from power pools and now operate wholesale day-ahead and real-time markets for energy and ancillary services with nodal prices³⁰ and financial transmission rights.³¹ The California ISO (CAISO) and ERCOT (the Texas RTO), on the other hand, relied on a single energy market with zonal pricing.³² The development of MISO was characterized by lengthy negotiations among potential stakeholders and it did not begin administering market functions until 2005.³³ The Southwest Power Pool (SPP) was the slowest developing RTO, implementing its first market function in 2007 when it

²⁶ Assef Zebian and Narasimha Rao, *Congestion Pricing Mechanisms From Nodal to Zonal and Beyond*, at 8 (June 21, 2000) <http://www.ces-us.com/download/june%2021-23%20chicago.pdf>.

²⁷ *Id.*

²⁸ Preventing Undue Discrimination and Preference in Transmission Service, Order No. 890, 72 Fed. Reg. 12,266, 12,318 (Mar. 15, 2007), FERC Stats. & Regs. ¶ 31,241 (2007) [hereinafter Order 890].

²⁹ The nine principles set out in Order 890 are: coordination, openness, transparency, information exchange, comparability, dispute resolution, regional coordination, economic planning studies, and cost allocation. *Id.* at 12,268.

³⁰ Nodal Pricing is a method of determining prices in which market clearing prices are calculated for a number of locations on the transmission grid called nodes, where each node represents the physical location on the transmission system where energy is injected by generators or withdrawn by loads. Drew Phillips, *Nodal Pricing Basics*, Market Evolution Program, at 3, (2004)

http://www.iemo.com/imoweb/pubs/consult/mep/LMP_NodalBasics_2004jan14.pdf.

³¹ Greenfield and Kwoka, *supra* note 6, at 6. Financial transmission rights guarantee the holder the financial equivalent of using the transmission right, but not the physical certainty, independent of actual power flow. Zebian and Rao, *supra* note 42.

³² Greenfield and Kwoka, *supra* note 6, at 6. Zonal pricing involves aggregating electricity nodes into zones in order to allow for advance price-setting by market players, with no payments by the RTO to rights holders. Zebian and Rao, *supra* note 42, at 35.

³³ Greenfield and Kwoka, *supra* note 6, at 6.

launched its real-time energy market.³⁴ FERC has been hesitant to impose uniform system design mandates upon RTOs,³⁵ and has insisted that, “nothing in this rulemaking is intended to upset the market designs used by existing ISOs and RTOs.”³⁶

FERC Order No. 1000 went further, however, than just encouraging the formation of RTOs by requiring all transmission providers to engage in regional transmission planning and cost-allocation.³⁷ Order No. 1000’s cost allocation reforms require that each public utility transmission provider participate in a regional transmission planning process that has a regional cost allocation method for new transmission facilities and the method must satisfy six regional cost allocation principles.³⁸ Costs of transmission must be allocated (i) in a way that is roughly commensurate with benefits;³⁹ (ii) with no involuntary allocation of costs to non-beneficiaries; (iii) with a benefit-to-cost ratio of at least 1.0; (iv) where allocation is solely within the transmission planning region(s) unless those outside voluntarily assume costs; (v) with a transparent method for determining benefits and identifying beneficiaries; and (vi) with different

³⁴ *Id.* at 7.

³⁵ FERC had previously proposed a “Standard Market Design” rule, but withdrew after receiving political backlash from the energy industry and legislators. Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity Market Design, Notice of Proposed Rulemaking, 67 Fed. Reg. 55,452, 55471 (Aug. 29, 2002), FERC Stats. & Regs. ¶ 32,563 (2002) [hereinafter Standard Market Design Rule].

³⁶ Explanation of Inapplicability of OASIS Posting Requirement Per Order No. 890 and 890-A, Rev. 2 - September 22, 2008,

http://www.oatioasis.com/ISNE/ISNEdocs/Transmission_Service_Metrics_Explanation_of_Inapplicability.pdf (citing that ISOs and RTOs might use bid-based locational markets and financial rights to address transmission congestion, rather than the first-come, first-served physical rights model set forth in the OATT).

³⁷ Nat’l Regulatory Research Institute, FERC’S ORDER 1000 SETS REGIONAL TRANSMISSION POLICY: LANDMARK, LAND MINE, OR BOTH?, available at http://nri.org/pubs/seminars/FERC_1000_Conference_Manual.pdf. *Contra* S. Fink, K. Porter, C. Mudd, and J. Rogers, *A Survey of Transmission Cost Allocation Methodologies for Regional Transmission Organizations*, at 12 (Feb. 2011),

http://www.nrel.gov/wind/systemsintegration/pdfs/2011/fink_transmission_cost_allocation.pdf (explaining that FERC’s intent in passing Order 1000 was not to interrupt the progress that had been made, but to address any remaining deficiencies).

³⁸ Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, 76 Fed. Reg. 49,842, (Aug. 11, 2011) [hereinafter Order 1000].

³⁹ As to the definition of “benefits,” the Order stated that these can arise where facilities (separately or in the aggregate) “maintain reliability,” “share reserves,” provide “production cost savings and congestion relief” and/or “meet Public Policy Requirements.” Order 1000, *supra* note 34, at 49,932.

methods for different types of facilities.⁴⁰ Furthermore, the Order requires that public utility transmission providers in neighboring transmission planning regions have a common interregional cost allocation method for new interregional transmission facilities that the regions determine to be efficient or cost-effective which must satisfy six analogous interregional cost allocation principles.⁴¹ The Order clarified that participant-funding of new transmission facilities would be permitted, but that such funding could not replace the regional or interregional cost allocation method.⁴²

Order No. 1000 purports to strike a regulatory compromise by mandating regional transmission planning without requiring transmission owners' participation in RTOs. Yet, it is unclear whether this requirement will be sufficient to encourage new transmission construction and whether, after this order, RTOs must necessarily provide the backbone for the regional transmission planning structure. The case for RTOs remaining a critical part of the transmission planning structure is that they provide an unbiased forum for regional transmission planning to occur. Part III will analyze whether RTOs have lived up to FERC's hope for them and which RTO functions and characteristics have been most effective in encouraging efficient energy markets.

C. Energy Markets and Ancillary Services Provided by RTOs

One approach for achieving the efficient electricity wholesale which energy scholars have advocated includes a coordinated spot market that has "bid-based, security-constrained, economic dispatch with nodal prices."⁴³ Nodal prices (also known as locational marginal prices or LMP) in day-ahead markets are, in principle, determined by matching offers from generators

⁴⁰ *Id.*, at 49,936-41

⁴¹ *Id.*, at 49,905-49,909, 49,932.

⁴² *Id.*, at 49,949.

⁴³ William Hogan, *Electricity Market Design and Structure: Working Paper on Standardized Transmission Service and Wholesale Electric Market Design*, at 2 (April 10, 2002).

to bids from consumers at each node to develop a classic supply and demand equilibrium price, usually on an hourly interval, and are calculated separately for subregions in which the system operator's load flow model indicates that constraints will bind transmission imports.⁴⁴ In LMP markets, where constraints exist on a transmission network, there is a need for generators to dispatch more electricity at increasingly high prices, giving rise to congestion pricing.⁴⁵

Besides fulfilling their required gatekeeper duties under FERC Order Nos. 2000 and 888 and pricing energy through zonal or nodal algorithms, RTOs provide ancillary services for energy markets. These services, mostly designed to ensure reliability, include different types of reserve energy supplies.⁴⁶ Financial transmission rights may also be used to transfer financial risks between participants. It is important to understand that ancillary services are capacity services, in that they provide reliable energy at capacity, but do not affect the quality or price of energy. Hence, the cost of energy will primarily be based on the generator's opportunity costs from capacity that must be withheld from the energy market.⁴⁷ This makes ancillary service prices volatile, and perhaps makes it more difficult to gauge their cost-effectiveness. The following section will evaluate which services RTOs are best at providing, and which ones are not as necessary or valuable.

⁴⁴ Standard Power of America, *Electricity Market*, <http://www.standardpower.com/understandingenergy/electricity-market> (last visited April 28, 2010).

⁴⁵ *Id.*

⁴⁶ These include as spinning reserve, non-spinning reserve, operating reserves, responsive reserve, regulation up, regulation down, and installed capacity. Brendan Kirby, *Ancillary Services: Technical and Commercial Insights*, at vi (Jul. 2007), http://consultkirby.com/files/Ancillary_Services_-_Technical_And_Commercial_Insights_EXT_.pdf.

⁴⁷ Capacity services are those used to preserve the market's ability to serve the scheduled loads as well as relieve loading on transmission lines that appear to be constrained upon a study of the submitted schedules. *ERCOT Market Guide*, at 17 (2005) http://www.hks.harvard.edu/hepg/Papers/ERCOT_Market_Guide.pdf.

III. Evaluating the Effectiveness of ISOs/RTOs

In the following section, this paper compares several metrics for measuring the effectiveness of RTOs and ISOs. The standards come from several sources, including a FERC Report to Congress and a report put out by the ISO/RTO Council.

A. Standards for Measuring Effectiveness of RTOs

There are a number of measures that can be used to assess the effectiveness of RTO services. FERC, in its April 2011 report to Congress on RTO performance, chose to report on three metrics: (1) market benefits; (2) organizational effectiveness; and (3) reliability.⁴⁸ The report acknowledged that some metrics, like administrative costs, might provide better comparisons across RTO markets than others, which would be best compared in terms of performance trends over the period.⁴⁹

1. Market Benefits

ISO and RTO markets provide benefits to energy producers and consumers to the extent their markets are competitive and their programs for making their markets operate more efficiently are successful in lowering customer costs.⁵⁰ Market competitiveness can be measured by the markup of energy price over cost and generator net revenue, where the closer the marginal price is to the marginal cost, the more competitive the market is.⁵¹ The FERC report found that the data regarding this metric supports the proposition that all ISOs/RTOs have competitive markets, as reflected by the close parity of marginal prices and marginal costs.⁵² Yet, there is disparity among the RTOs with regards to this metric—the PJM and CAISO price-cost markups

⁴⁸ Report to Congress: Performance Metrics for Independent System Operators and Regional Transmission Organizations, FERC, at 8 (April 2011), *available at* <http://www.ferc.gov/industries/electric/industryact/rto/metrics/report-to-congress.pdf>.

⁴⁹ *Id.* at 6.

⁵⁰ *Id.* at 8.

⁵¹ *Id.*

⁵² *Id.* at 8-9. (See Chart 1)

reflected less competitive conditions (See Chart 1).⁵³ The FERC report hypothesized, however, that the price-cost markup in these regions was significantly higher on high-load days, indicating that it was actually the lack of capacity services that led to the markup, rather than energy services.⁵⁴

The FERC report also suggested that market benefits of ISO/RTO can be measured by the generator availability, demand response availability, and congestion management metrics.⁵⁵ Although resource availability and congestion management are influenced by market factors, FERC stated that incentive programs for resource participation and effective transmission planning by RTOs to manage congestion can improve efficiency.⁵⁶ Demand response products also differ between RTOs.⁵⁷ The market benefits and demand-response benefits, however, may not be unique to RTOs because Order No.1000 requires that all transmission owners participate in regional transmission planning, whether or not they are a part of an RTO/ISO. Thus, the principle metric for market benefits comes from price-cost markup—a variable that might be volatile and strongly interrelated to high-load events and capacity service provisions.

2. Organizational Effectiveness

Organizational effectiveness is primarily measured by the administrative cost relative to the megawatt-hours (MWh) of energy transmitted. Overall, RTOs have significantly higher administrative costs than operational costs.⁵⁸ Between 2005 and 2009, FERC found that CAISO and PJM reduced administrative costs per MWh of load, while NYISO's costs per unit of load

⁵³ *Id.* at 9.

⁵⁴ *Id.* at 8.

⁵⁵ *Id.* at 9.

⁵⁶ *Id.*

⁵⁷ ISO/RTO Council, North American Wholesale Electricity Demand Response Program Comparison (2010), available at <http://www.isorto.org/site/apps/nlnet/content2.aspx?c=jhKQIZPBIe&b=2613997&ct=8400541>.

⁵⁸ GDS Associates, Electric Market Reform Initiative: Analysis of Operation and Administrative Costs of RTOs, at 4 (Feb. 5, 2007), <http://appanet.cms-plus.com/files/PDFs/AnalysisCostofRTOs020507GDS.pdf> (There was on average a 75/25 split between administrative and operational costs).

held steady and MISO's, SPP's, and ISO-NE's costs per unit of load increased.⁵⁹ The RTOs with the lowest administrative costs, however, were also those with the lowest cost per MWh of energy (See Chart 2). Analysts predict that as RTOs expand their services, and as their systems age and must be replaced, the administrative and operational costs are likely to increase.⁶⁰

Some analysts suggest that this decline in administrative costs indicate that RTOs have begun to experience some economies of scale and scope through growth in transactional volumes and through the expansion and integration of additional utilities.⁶¹ Yet, other studies have found no evidence of learning economies, either of an industry-wide or RTO-specific nature.⁶² The general question whether RTOs reap benefits from economies of scale or whether they actually decrease in efficiency with a broader spectrum has been addressed by the U.S. Government Accountability Office (GAO). The GAO found a general trend of economies of scale, but ISO-NE, MISO, and NYISO expenses increased from 2002 to 2006, while CAISO, PJM, and SPP's expenses decreased.⁶³

The RTOs' cost classifications have several commonalities. The common cost categories are: office supplies and expense, regulatory costs, consulting fees/outside services, depreciation expense, interest expense, employee pensions and benefits.⁶⁴ The only one of these services that could reasonably be expected to decrease due to the RTO's economy of scale would be consulting fees and outside services, if the RTO was paying a flat fee for consulting services and receiving a greater benefit due to increased production. However, research indicates that net energy transmitted to load is an imperfect measure of RTO size because economies of scale may

⁵⁹ Report to Congress, *supra* note 64 at 13.

⁶⁰ GDS Associates, *supra* note 73, at 5.

⁶¹ Laurence D. Kirsch and Matthew Morey, The Regional Transmission Organization Report Card: Wholesale Electricity Markets And Rto Performance Evaluation, at 13 (Oct. 24, 2006).

⁶² See Greenfield and Kwoka, *supra* note 6.

⁶³ Greenfield and Kwoka, *supra* note 6, at 11.

⁶⁴ GDS Associates, *supra* note 73, at 11.

arise from geographic expansion, rather than load growth, over a fixed network.⁶⁵ In this case, it seems even more unlikely that administrative costs would decrease, as increasing geographic scope necessitates a greater scope for employees and offices.

3. Reliability

The FERC report measured reliability by reliable dispatch of energy and the number of violations of national and regional reliability standards.⁶⁶ For the most part, reliability violations came from errors in load forecasting, which may eventually be allocated as uplift costs.⁶⁷ Two control performance metrics, Control Performance Standards 1 and 2 (CPS1 and CPS2), have been used to measure how well control area operators balance the supply and demand for power. In particular, these two metrics look at power system frequency, in the case of CPS1, and Area Control Error, in the case of CPS2.⁶⁸ In the case of PJM, these metrics indicate that the RTO's control performance has declined over time as it has expanded its scope.⁶⁹

FERC noted that congestion can also lead to reliability problems.⁷⁰ While congestion costs vary between the ISOs and RTOs due to differences in system topologies and shifts in loads over the evaluation period, FERC again suggested that ISO/RTO programs can have an impact on congestion through transmission planning initiatives.⁷¹ As an example, the report stated that PJM's Regional Transmission Expansion Plan includes increases in transmission system capacity that are expected to alleviate ninety percent of the current congestion costs in the

⁶⁵ Greenfield and Kwoka, *supra* note 6, at 25.

⁶⁶ Report to Congress, *supra* note 64, at 14.

⁶⁷ Sioshansi, *supra* note 35, at 151.

⁶⁸ Kirsch and Morey, *supra* note 76, at 13. Area control error is defined as net actual interchange less net scheduled interchange less frequency bias contribution and meter error. NERC Performance Standards Reference Document, available at http://www.nerc.com/docs/oc/rs/Item_4e-PSRD_revised_112607.pdf.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *Id.* at 11.

region.⁷² If FERC's orders achieve the desired effect of universal regional transmission planning, however, then RTOs and ISOs should not be the sole authority for this type of regional transmission expansion plan.

With regard to both the reliability and the market competitiveness metrics, FERC Order No. 1000 has the potential to strip RTOs and ISOs of a great deal of their weight as regional transmission planning becomes open to non-RTO and ISO members. The question, then, is whether RTOs and ISOs can still perform this function better than an aggregate of individual transmission owners. The answer may be that RTOs and ISOs are worse at regional transmission planning than a comprehensive group of transmission owners and utilities who can make universal decisions, rather than just the select group which spends the resources to join an RTO and, hence, gets a larger say in the transmission planning regime. As much as administrative costs detract from RTOs' efficiency, however, they have contributed to the organizations' ability to gather data and complete accurate long-term regional transmission plans. In particular, RTOs' data concerning generation facilities and load trends has been influential in encouraging additional renewable generation facilities.⁷³

B. Comparison of ISO/RTO characteristics: What makes a "good" RTO?

Operational RTOs fall into two market categories: Day 1 and Day 2. In the Day 1 stage, the RTO manages the administration of real-time energy markets as well as congestion management.⁷⁴ The final stage of RTO development, known as Day 2, offers a fully functioning market for day-ahead and real-time capacity, energy, ancillary services, and market-based congestion management. PJM, MISO, NYISO, CAISO, and ISO-NE are considered Day 2

⁷² *Id.*

⁷³ IRC Council, *supra* note 31, at 8.

⁷⁴ GDS Associates, *supra* note 73, at 7.

RTOs.⁷⁵ The difference between the Day 1 and Day 2 RTOs is how many “extra” services they are providing in addition to what is fundamentally required by FERC Order No. 2000.⁷⁶

Performance incentives for RTOs/ISOs have been lauded as a way to increase their efficiency.⁷⁷ In order to implement this policy, however, decision makers must know which RTO characteristics ought to be encouraged and provide incentives for those. A 2007 study set out to analyze the marginal costs of each of the RTO services in order to determine which should be most encouraged.⁷⁸ Not surprisingly, this study found evidence that administering markets for energy, ancillary services, and financial transmission rights all increase RTO costs; however, it was unable to precisely estimate the contribution of each.⁷⁹ The study’s overarching conclusion was that RTO costs are directly related to the number of functions performed, and thus the least costly RTOs are those that perform only their essential and required services.⁸⁰ The only service to have a negative cost coefficient in this study was capacity services.⁸¹ Although the authors noted that capacity services may be highly correlated with energy services and other ancillary services, it is still worthwhile to consider this finding, which suggests that capacity services and reliability services are the most efficient RTO function.

Two major elements of organized power markets are the use of single price auctions and LMP-based congestion management.⁸² A principal benefit of an LMP market is that it provides a transparent means to price and allocate the use of the transmission system.⁸³ This provides operational benefits, as well as visible price signals, for new investment and demand response.

⁷⁵ *Id.*

⁷⁶ Order 2000, *supra* note 34, at 31413-31414.

⁷⁷ Sioshansi, *supra* note 35, at 150.

⁷⁸ *See* Greenfield and Kwoka, *supra* note 6.

⁷⁹ Greenfield and Kwoka, *supra* note 6, at 3.

⁸⁰ *Id.* at 25.

⁸¹ *Id.* at 21.

⁸² Sioshansi, *supra* note 35, at 158.

⁸³ *Id.*

The alternative to LMP is the adoption of a single price across a market “zone” with transmission congestion cost allocated as a separate uplift charge that is not reflected in the market price—otherwise known as a zonal pricing scheme.⁸⁴

A major drawback of this approach is that uplift costs can be unpredictable and are difficult to hedge through long-term contracts.⁸⁵ CAISO and ERCOT tried zonal approaches but faced problems with congestion causing significant uplift costs and the need to constantly redefine zonal boundaries.⁸⁶ Although the statistics indicate that LMP markets are more effective, it would still be dangerous for FERC to mandate that all RTOs use this market structure. As seen in the Standard Market Design debate, RTOs and industry participants have strong views regarding market structure and characteristics. Accordingly, it would be unwise for FERC to mandate any one structure. For this reason, incentives for efficient organization and low administrative costs may be a more politically and legally feasible alternative.

C. Critiques of the RTO/ISO system

Critics claim that the current structure of RTOs has not lived up to its vision. They say that, to date, RTOs have been primarily focused on developing and running energy markets and that, since their creation, RTOs have not built any truly regional transmission.⁸⁷ Advocates for more transmission development point to two fundamental problems with the current RTO configuration: voluntary membership and conflicts of purpose and market participation.⁸⁸

The RTO governance structure has come under scrutiny as a nonprofit that operates assets they do not own.⁸⁹ Because RTOs are voluntary organizations, utilities are free to

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ *Independent Planning, Modernize the Grid*, http://www.modernizethegrid.com/documents/TransLine2_Planning_0112.pdf (last visited April 28, 2012).

⁸⁸ *Id.*

⁸⁹ Greenfield and Kwoka, *supra* note 6, at 11-12.

determine their level of participation. Critics of RTOs claim this leads to conflicting interests, with many utilities threatening to opt out of RTOs if regional transmission plans go against their corporate or generation interests.⁹⁰ Furthermore, this bifurcation of transmission governance may present challenges for regulators, as well as complicate investment decisions for firms.⁹¹

RTOs' conflicts of purpose and market participation are derived from their responsibility for both planning transmission and running the energy market.⁹² Conflicting interests may result in RTOs relying on alternate transmission solutions (like re-dispatch) and relying on the current grid rather than taking steps to re-enforce and develop the transmission system through new generation facilities.⁹³ Finally, critics have suggested that, because RTO decisions are heavily influenced by market participants who pay for the RTOs, it is possible that they may also increase profits by perpetuating congestion on the transmission system and limiting access to potential competitors by thwarting transmission expansion.⁹⁴

The GAO study also found that FERC officials, industry participants, and experts disagreed on whether RTOs have brought benefits to their regions. The study reported concerns about increasing costs, a second-best governance structure, and an apparent inability of RTO run wholesale markets to stimulate adequate investment in transmission and generation capacity.⁹⁵ This indication of market participant dissatisfaction with RTOs is, perhaps, even a more relevant concern than the statistical evidence in their favor. Second-tier governance authorities, such as RTOs, run the risk of losing all influence if they lose public support.

⁹⁰ Modernize the Grid, *supra* note 103.

⁹¹ *Id.*

⁹² *Id.*

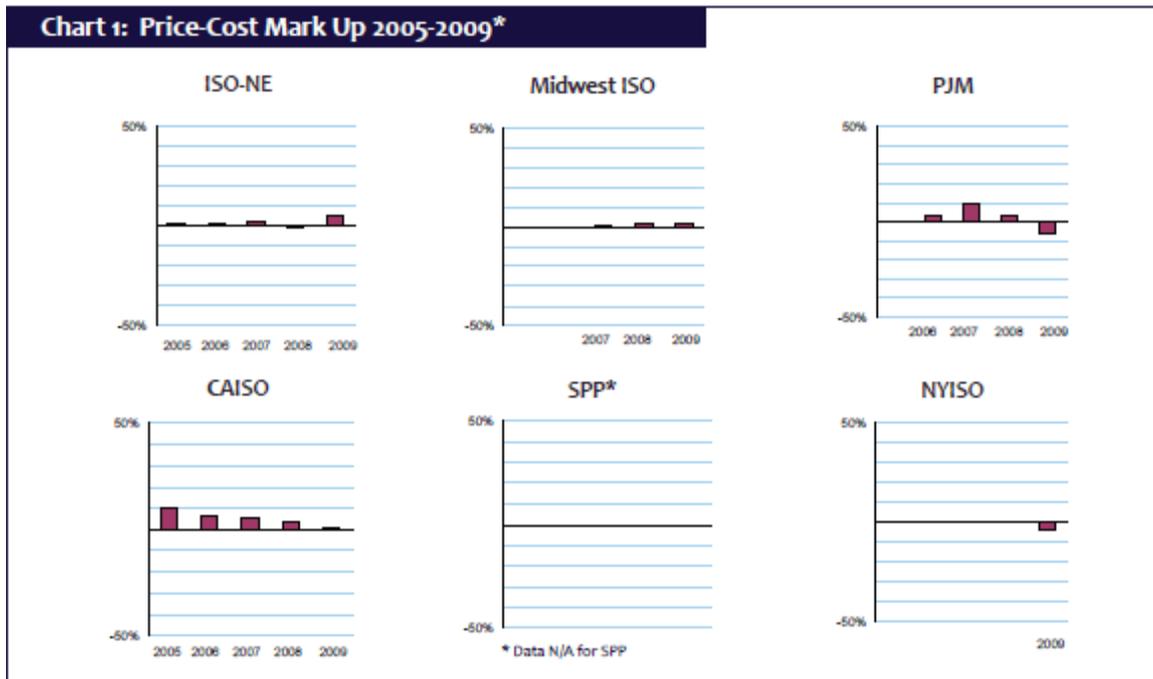
⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ Greenfield and Kwoka, *supra* note 6, at 11.

IV. **Conclusion**

FERC's rulemaking has failed to achieve comprehensive RTO participation largely because RTOs' administrative costs are prohibitively expensive for most utilities and transmission owners. Although RTOs' benefits are numerous, their costs are, perhaps, too high to be economically efficient. Studies have shown that RTOs are most efficient at providing capacity market services, which guarantee reliable transmission of electricity. On the other hand, there is much uncertainty in RTOs' regulation of energy prices and transmission planning. Furthermore, because FERC's most recent order makes regional transmission planning a requirement for all transmission owners, it seems to be no longer necessary for RTOs to be the backbone of the regional transmission planning scheme. Hence, RTOs should concentrate on what they are good at—collecting and analyzing load data to provide sufficient capacity services to ensure reliable energy transmission. This will not be difficult to implement if FERC is willing to back down on its hope for RTOs and realize that a voluntary non-profit organization without any real legal authority is unlikely to plan transmission construction better than the utilities and transmission owners themselves.



Source: Report to Congress: Performance Metrics for Independent System Operators and Regional Transmission Organizations, at 9, available at <http://www.ferc.gov/industries/electric/indus-act/rto/metrics/report-to-congress.pdf>

Chart 2: Study Group Costs

<u>RTO</u>	<u>Operational</u>	<u>Percent of Total</u>	<u>Administrative</u>	<u>Percent of Total</u>	<u>Total</u>	<u>\$/MWh</u>
Day 2 RTOs						
California ISO	\$ 63,719,381	37%	\$ 107,892,132	63%	\$ 171,611,513	\$ 0.724
ISO New England	\$ 25,379,347	20%	\$ 99,041,681	80%	\$ 124,421,028	\$ 0.912
Midwest ISO	\$ 2,544,847	1%	\$ 270,876,399	99%	\$ 273,421,246	\$ 0.419
New York ISO	\$ 12,246,311	8%	\$ 136,924,551	92%	\$ 149,170,862	\$ 0.892
PJM Interconnection	\$ 79,932,444	30%	\$ 187,926,950	70%	\$ 267,859,394	\$ 0.393
Day 2 RTO Total	\$ 183,822,330	19%	\$ 802,661,713	81%	\$ 986,484,043	\$ 0.526
Day 1 RTO						
Southwest Power Pool	\$ 1,942,496	4%	\$ 46,449,908	96%	\$ 48,392,404	\$ 0.240
Day 1 RTO Total	\$ 1,942,496	4%	\$ 46,449,908	96%	\$ 48,392,404	\$ 0.240
All RTOs	\$ 185,764,826	18%	\$ 849,111,621	82%	\$ 1,034,876,447	\$ 0.498

Source: GDS Associates 2007, p. 5