THE STATE OF THE TRANSITION TO COMPETITIVE MARKETS IN NATURAL GAS AND ELECTRICITY

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This article describes the advanced state of the transition to a competitive natural gas market and attempts to predict the manner in which the transition to a competitive electricity market will unfold over the next few years. The Federal Energy Regulatory Commission (FERC) was able to control the pace of the gas transition. It could take one major step and then pause for a year or two to observe the results of that step before it decided on the next logical step.[1] The FERC has much less ability to control the pace of the electricity transition. The pace of the electricity transition will be determined primarily by the combined effects of thousands of uncoordinated actions taken by hundreds of public and private actors—state and local consumer groups, municipally-owned distribution systems, state and local governments, and regulated and unregulated generating companies. As a result, the FERC is likely to discover that it needs to sprint to catch up with the rapidly evolving and largely unplanned electricity transition. The FERC has very little time in which to resolve many difficult issues with respect to the shape of the post-transition electricity market in order to realize the full social benefits potentially available as a result of the transition to a competitive electricity market.

I. THE TRANSITION TO A COMPETITIVE GAS MARKET

FERC's characterization[2] of the effect of Order 636 is bold, but it is only slightly and excusably hyperbolic. The transition to a competitive gas market is nearing completion. The FERC can take pride in an extraordinary accomplishment. In most respects, the beneficial effects of the transi-

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1. *See generally* Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1 (1988); Richard J. Pierce, Jr., *Update of Reconstituting the Natural Gas Industry, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993).

2. "This rule [Order No. 636] will . . . complete the evolution to competition in the natural gas industry . . . ." Pipeline Service Obligations and Revisions to Regulations Governing Self-Implementing Transportation; and Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol, 57 Fed. Reg. 13,267, at 13,268 (1992) (to be codified at 18 C.F.R. pt. 284) [hereinafter Pipeline Service Obligations].

tion have exceeded even initial optimistic expectations.[3] The effects of the transition have included significant rationalization of the gas transportation and storage functions,[4] in addition to the expected beneficial effects on the gas sales market. The gas transition has enhanced consumer welfare by billions of dollars per year.[5] Moreover, the participants in the post-transition market, including many who originally opposed the transition, have discovered that the post-transition market can produce good results for service providers as well as for consumers.

The gas industry's performance during the unusually cold winter of 1993-94 was also a pleasant surprise. It would have been nice to have had a few mild winters immediately following implementation of the service unbundling mandate contained in Order 636. There was reason for concern that market participants would need a few years to make the major changes required to operate efficiently and reliably in the new environment of competition to provide unbundled services. Yet, the industry provided high quality service in extreme operating conditions almost immediately after the FERC mandated provision of unbundled services.[6]

Two reference points provide useful comparative contexts in which to evaluate the gas industry's performance during the winter of 1993-94. The gas industry's performance during the last unusually cold winter was abominable. In the winter of 1976-77, the gas market was so distorted by regulation that curtailments of gas service forced the closure of over 4,000 manufacturing plants and thousands of schools, as well as layoffs of over a million employees.[7] The gas industry's performance during the period in which it was crippled by regulation reduced significantly the value of natural gas by giving gas a reputation as an unreliable fuel. The industry's performance last winter has increased the value of gas by changing that reputation. That reputational change will benefit all gas market participants.

The performance of the still-regulated electricity industry during the 1993-94 winter was almost as disappointing as the gas industry's performance during the winter of 1976-77. The P-J-M pool, serving the middle Atlantic states, avoided a catastrophic regional blackout only by implementing brownouts and rolling blackouts, and by convincing the federal

3. *See, e.g.*, Richard J. Pierce, Jr., *Reconsidering the Roles of Regulation and Competition in the Natural Gas Industry*, 97 HARV. L. REV. 345 (1983); Richard J. Pierce, Jr., *Natural Gas Regulation, Deregulation, and Contracts*, 68 VA. L. REV. 63 (1982).

4. Virtually every issue of NATURAL GAS WEEK reports new innovations in the transportation and storage functions. *E.g.*, *Storage Benefits from Technology, Competition*, NAT. GAS WK., Apr. 18, 1994, at 6; *Evolution of Gas Services Changes Definition of 'Hubs,'* NAT. GAS WK., Apr. 4, 1994, at 1.

5. *See* Richard J. Pierce, Jr., *Reconstituting the National Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1 (1988); Richard J. Pierce, Jr., *Update of Reconstituting the Natural Gas Industry*, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993). *See also* Robert W. Hahn & John A. Hird, *The Costs and Benefits of Regulation: Review and Synthesis*, 8 YALE J. ON REG. 233, 250 (1991).

6. *See* John Simpson, *Restructured Gas Industry Weathers First Test*, FORT., Apr. 1, 1994, at 34.

7. SUBCOMMITTEE ON INTERGOVERNMENTAL RELATIONS OF THE COMM. ON GOVERNMENTAL AFFAIRS, 95TH CONG., 1ST SESS., THE STATUS OF THE NATION'S PREPAREDNESS FOR THE WINTER OF 1977-78, at 3 (1977).

government, the governments of several states, and virtually all private businesses in the region to cease all operations for a day. It is interesting to speculate about the manner in which a market-driven electricity industry would have performed during the winter of 1993-94. Investments in the precautions necessary to assure that generating plants have sufficient access to fuel during extreme winter weather conditions are expensive, e.g., heaters for coal conveyors and snow plows for access roads. Given enough economic incentive, however, firms will make those investments. A competitive market creates powerful economic incentives to make the investments required to provide reliable service. A participant in a competitive market knows that its inability to provide service in all reasonably foreseeable conditions will cost it many millions of dollars in immediately foregone revenues and many millions more in foregone future revenues attributable to the diminution of its reputation for reliability. A monopolist subject to cost-of-service regulation has more attenuated incentives to operate efficiently and reliably.[8] Politicians and regulators are more forgiving of errors than are markets.[9]

However, the transition in the gas industry did provide one unpleasant surprise. The prospect of having to absorb a portion of the costs of the transition induced many market participants to make large investments in litigation intended either to stall the transition process or to convince agencies and courts to reallocate transition costs to other parties. Pipelines and producers spent untold millions of dollars litigating thousands of contract disputes throughout the 1980's.[10] The judicial challenges to FERC's changes in regulatory policy focused almost entirely on the transition cost issue.[11] Through application of the open-ended duty to engage in reasoned decision-making, courts were remarkably sympathetic to arguments that the FERC could not make a change in regulatory policy—no matter how socially beneficial it might be—without simultaneously taking unspecified actions to insure that the costs of the transition are allocated equitably among market participants.[12] Yet, courts applied the filed rate doctrine and the prohibition on retroactive rate-making in ways that precluded the

8. *See* ERNEST GELLHORN & RICHARD J. PIERCE, JR., REGULATED INDUSTRIES 218-26 (3d ed. 1994).

9. *See* Richard J. Pierce, Jr., *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. PA. L. REV. 497, 525-32 (1984).

10. *See* Richard J. Pierce, Jr., *Gas Industry Transition Costs and Their Allocation*, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993).

11. *See* Richard J. Pierce, Jr., *The Unintended Effects of Judicial Review of Agency Rules: How Federal Courts Have Contributed to the Electricity Crisis of the 1990's*, 43 ADMIN. L. REV. 7 (1991).

12. *See, e.g.*, American Gas Ass'n v. FERC, 888 F.2d 136 (D.C. Cir. 1989) (reversing equal access regime adopted in Order 500 on the basis that the FERC did not adequately consider an alternative method of allocating transition costs between pipelines and producers); Mobil Oil Exploration and Producing Southeast, Inc. v. FERC, 885 F.2d 209 (5th Cir. 1989) (reversing Order 451 on several grounds, including inadequate consideration of transition costs), *rev'd sub nom.* Mobil Oil Exploration and Producing Southeast, Inc. v. United Distribution Cos., 111 S. Ct. 615 (1991); Associated Gas Distribs. v. FERC, 824 F.2d 981 (D.C. Cir. 1987) (reversing equal access policy adopted in Order 436 on basis that the FERC did not adequately consider potential reallocation of transition costs from pipelines to producers); Consolidated Edison Co. v. FERC, 823 F.2d 630 (D.C. Cir. 1987) (reversing

FERC from using many of the most promising methods of allocating transition costs.[13]

In retrospect, it now seems clear that the FERC underestimated the potential significance of transition costs as an obstacle to a socially beneficial change in policy, and that courts underestimated the difficulty of devising and implementing regulatory mechanisms that would achieve an equitable allocation of transition costs. After reversing and remanding about a dozen FERC attempts to deal with transition cost issues over a five-year period, courts finally seemed to recognize the intractable nature of FERC's task.[14] They began to acquiesce in the necessarily imperfect mechanisms the FERC chose to implement. By then, however, the FERC had gotten a clear message from a combination of its regulatees and reviewing courts: the reluctance of regulatees to absorb transition costs, combined with the sympathetic response of judges to the plight of FERC's regulatees, posed a major threat to the viability of any FERC attempt to implement a major change in policy. FERC's receipt of that message seems apparent in its otherwise questionable commitment to allow its regulatees to reallocate to their customers 100% of the cost of the transition to the unbundled service regime implemented in Order 636.[15]

There is a lively and complicated debate concerning the merits of allowing regulatees to recover the costs of a transition in legal regimes.[16] Only two points emerge clearly from that debate. First, the transactions costs of implementing a meritocratically perfect allocation of transition costs are prohibitively high.[17] We will have to be content instead with some crude measure of "rough justice." Second, in our search for rough justice, we can rule out both requiring regulatees to absorb 100% of transition costs and allowing regulatees to reallocate 100% of transition costs.[18] Rough justice lies somewhere between these polar extremes. As discussed

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relaxation of barriers to market exit on basis that the FERC did not adequately consider potential reallocation of transition costs).

13. *See, e.g.*, Associated Gas Distribs. v. FERC, 893 F.2d 349 (D.C. Cir. 1989) (reversing FERC's method of allocating transition costs from pipelines to distributors).

14. *Compare* KN Energy, Inc. v. FERC, 968 F.2d 1295 (D.C. Cir. 1992) *with* Associated Gas Distribs. v. FERC, 893 F.2d 349 (D.C. Cir. 1989); *compare* American Gas Ass'n v. FERC, 912 F.2d 149 (D.C. Cir. 1990) *with* Associated Gas Distribs. v. FERC, 824 F.2d 981 (D.C. Cir. 1987); *see also* Mobil Oil Exploration and Producing v. United Distribution Cos., 111 S. Ct. 615 (1991) (reversing Mobil Oil Exploration and Producing v. FERC, 885 F.2d 209 (5th Cir. 1989)).

15. Pipeline Service Obligations, *supra* note 2, at 13,307.

16. For detailed analyses of this complicated problem, see Theresa Flaim, *Methods of Handling Transition Costs for the Electric Utility Industry*, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993); John Graham, *Transition Costs in the Electricity Market: Cost History and Cost Recovery*, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993); Louis Kaplow, *An Ex Ante Perspective on Deregulation Viewed Ex Post*, 15 RESOURCE & ENERGY ECON. 153-73 (1993); A. Lawrence Kolbe & William B. Tye, *The Fair Allowed Rate of Return with Regulatory Risk*, 15 J. RESOURCE L. & ECON. 129-69 (1992).

17. *See* Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1, at 40-43 (1988); Richard J. Pierce, Jr., *Public Utility Regulatory Takings: Should the Judiciary Attempt to Police the Political Institutions?*, 77 GEO. L.J. 2031, 2066-70 (1989).

18. *See* sources cited *supra* notes 16-17.

in section II.*B.*,[19] the preoccupation with transition costs so apparent from the gas transition is one of four reasons why the electricity transition is likely to be difficult and painful.

Only three significant steps are necessary to complete the transition in the gas industry. First, the FERC should eliminate the embedded original cost price cap it previously imposed on secondary market transactions in pipeline capacity.[20] That price cap may not be a significant source of market distortions at present, because rationalization of the pipeline transportation function and FERC's reduction of the regulatory barriers to installation of new capacity and expansion of pre-existing capacity have produced conditions of excess capacity in most areas. Eventually, however, the gas market will grow to the extent that capacity constraints arise in many areas. At that point, the price cap on trade in capacity will begin to produce significant distortions by precluding parties from engaging in mutually beneficial sales or leases of capacity.[21]

Second, the FERC should continue to assist market participants in their efforts to devise compatible electronic bulletin boards and market hubs.[22] Once these steps have been completed, the transportation capacity market can be expected to perform efficiently with little regulatory oversight. Pipeline transportation of gas will no longer be a natural monopoly function once the many owners of transportation capacity rights have the freedom to resell or to lease those rights at prices determined solely by a competitive market.[23] Within a few years, the transportation capacity market should be performing as well as the sales market is performing today.[24]

The third step is more challenging. Many state Public Utility Commissions (PUCs) have made considerable progress in adapting their methods of regulating the Local Distribution Companies (LDCs) to the new environment created by the transition to market-based methods of governing the wholesale gas market. In particular, many have followed FERC's lead in unbundling LDC services and requiring the LDCs to provide third parties access to their facilities.[25] However, no PUC has completed the transition process.

The PUCs confront a more daunting task than the FERC. Once the FERC creates the conditions in which markets can perform the functions

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19. *See infra* text accompanying notes 54-64.

20. *See* Robert Michaels, *The New Age of Natural Gas: How the Regulators Brought Competition*, REG. 68 (1993); Carl Danner, *Where Telecommunications Regulation Has Been May Be Where Natural Gas Regulation Should Go*, FORT., May 1, 1993, at 28; RICHARD J. PIERCE, JR., REGULATION AND COMPETITION IN NATURAL GAS DISTRIBUTION 13-15 (1990).

21. *See* sources cited *supra* note 20.

22. *See* sources cited *supra* note 4.

23. For a detailed treatment of this subject, see Kevin A. McCabe et. al., *Experimental Research on Deregulated Markets for Natural Gas Pipeline and Electric Power Transmission Networks*, 13 J. RESOURCE L. & ECON. 161 (1991); Rodney T. Smith et. al., *Defining a Right of Access to Interstate Natural Gas Pipelines*, 8 CONTEMP. POL. ISSUES 142 (1990).

24. Carol Freedenthal, *The Gas Industry's Newest Commodity*, FORT., Apr. 1, 1994, at 30-31.

25. *See* Suedeen G. Kelly, *Intrastate Natural Gas Regulation: Finding Order in the Chaos*, 9 YALE J. ON REG. 355, 360-69 (1992).

of allocating and pricing gas and transportation capacity, it can simply step aside and allow those markets to function with little regulatory oversight. By contrast, the PUCs cannot realistically expect to create conditions in which competitive markets will yield acceptable results with respect to all LDC transactions. At a minimum, provision of distribution service to small volume consumers is likely to remain a classic natural monopoly function for the foreseeable future. The PUCs retain the important role of protecting small consumers from potential abuse by monopolistic LDCs. Yet, the PUCs cannot perform this role effectively through the use of traditional cost-of-service regulation with its reliance on inherently arbitrary allocations of common costs. The LDCs have limited market power with respect to most large consumers. Those consumers have access to competitive alternatives at varying and constantly changing prices. If a PUC insists that an LDC charge its large consumers rates determined through use of traditional cost-of-service methods, including some specified allocation of common costs, it will create a situation in which all affected parties lose—large consumers, small consumers, and the LDC.[26] Many large consumers will simply substitute competitive alternatives for purchases from the LDC whenever an alternative costs less than gas service from the LDC. That, in turn, will force the LDC to forego contributions to its common costs that would otherwise be available from its large customers.

An LDC must have the flexibility to negotiate contracts to serve large customers at any price in excess of its marginal cost of service. At the same time, however, the PUCs need to create incentives for the LDCs to minimize their total costs and to charge prices that maximize large consumers' contributions to common costs in order to minimize the costs that must be borne by small customers. It is not easy to devise a regulatory system that furthers all of these goals simultaneously. Academic literature on incentive rate-making is growing and improving,[27] but it is difficult to translate this literature into a set of easily implemented regulatory rules. This difficult step in the transition will not be completed for many years and will have to proceed primarily by trial and error.

II. The Transition to a Competitive Electricity Market

There are many parallels between the nearly complete transition in the gas industry and the transition that is in its early stages in the electricity industry.[28] In both cases, economies of scale and natural barriers to entry in the production process are sufficiently low that the sales market can become structurally competitive in most areas. Furthermore, the major impediment to creation of a competitive sales market is the existence of

26. Pierce, *supra* note 20, at 42-46.

27. *E.g.*, Richard P. O'Neill & Charles Whitmore, Network Oligopoly Regulation 20-22 (1994); William J. Baumol & J. Gregory Sidak, Toward Competition in Local Telephony 3-116 (1994); Pierce, *supra* note 20, at 46-54; Paul L. Joskow & Richard Schmallensee, *Incentive Regulation for Electric Utilities*, 4 Yale J. on Reg. 1 (1986).

28. *See* Richard J. Pierce, Jr., *Using the Gas Industry as a Guide to Reconstituting the Electricity Industry*, 13 Resource L. & Econ. 7 (1991).

large sunk cost. High economy of scale "transportation" facilities—transmission and distribution lines—have the potential to distort trade between the numerous potential producers and millions of consumers. As a result, the basic steps required to make the transition are similar—mandate equal access to sunk cost facilities, rely on market forces to determine the wholesale price of electricity, and unbundle services. In three respects, the transition in the electricity industry should be even easier than was the transition in the gas industry. First, Congress has already made the decision to mandate equal access to transmission lines and to create a competitive wholesale market.[29] Second, most state PUCs have already made the decision to rely on competitive contracting as the primary vehicle for adding new generating capacity.[30] Finally, the FERC has already authorized firms to charge market-based wholesale electricity prices when it finds that the firms confront sufficient competition.[31]

Notwithstanding these similarities and comparative advantages, the transition to a competitive market in electricity will be more difficult, painful, complicated, and unpredictable than the transition to a competitive market for gas. However, the electricity transition will not necessarily proceed more slowly than the gas transition. Indeed, it is likely to be more rapid than the gas transition. The FERC largely determined the path of the gas transition and the rate of progress along that path. However, the FERC has less ability to control the electricity transition. Instead, its path and pace will depend on the interactions of hundreds of private and public entities.[32] As a result, both the path and the rate of progress along the path are highly indeterminate.

Reasons for predicting a painful, complicated, and contentious electricity transition fall in four categories: (1) allocation of jurisdictional powers; (2) magnitude of transition costs; (3) nature of electricity transmission; and, (4) industry structure. Significant obstacles to a smooth transition lie in each of these areas. Moreover, the obstacles in each area are likely to have synergistic effects—they will interact with each other geometrically to create aggregate obstacles larger than the sum of the individual obstacles.

A. Allocation of Jurisdictional Power

Justice Brennan once described the statutory allocation of regulatory power over the telecommunications industry as having created the "unsat-

29. Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776, 2905 (1992) (containing §§ 711-26 of the EPAct). *See generally* Jeffrey D. Watkiss & Douglas W. Smith, *The Energy Policy Act of 1992: A Watershed for Competition in the Wholesale Power Market*, 10 YALE J. ON REG. 447 (1993); Bernard S. Black & Richard J. Pierce, Jr., *The Choice Between Markets and Central Planning in Regulating the U.S. Electricity Industry*, 93 COLUM. L. REV. 1339, 1346-50 (1993).

30. *See* Paul L. Joskow, *Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry*, *in* BROOKINGS PAPERS ON ECON. ACTIVITY, MICROECONOMICS 125 (1989).

31. Bernard W. Tenenbaum & J. Stephen Henderson, *Market-Based Pricing of Wholesale Electric Services*, ELECTRICITY J. 30-45 (1991). Moreover, courts have upheld FERC decisions authorizing market-based rates. *See* Environmental Action v. FERC, 996 F.2d 401 (D.C. Cir. 1993); Town of Norwood v. FERC, 962 F.2d 20 (D.C. Cir. 1992).

32. *See infra* text accompanying notes 76-83.

isfactory" situation in which "two different persons seek to drive one car."[33] That characterization applies a fortiori to the complicated statutory allocation of regulatory power over the electricity industry. The FERC cannot control the path and rate of progress of the electricity transition to the extent it exercised control over the gas transition because it lacks many of the regulatory tools it applied to the gas industry. The differences lie in three principal areas: (1) retail wheeling; (2) transmission rates and conditions; and, (3) construction and expansion of transmission lines.

When Congress authorized the FERC to mandate third party access to transmission lines for wholesale transactions in the Energy Policy Act of 1992 (EPAct),[34] it specifically denied the FERC the power necessary to mandate access for retail transactions.[35] No such jurisdictional dichotomy exists in the gas industry. The FERC has the power to authorize an interstate pipeline to bypass a local distribution company, a power broadly analogous to the power to authorize retail wheeling of electricity.[36] Early in the gas transition, the FERC indicated its willingness to authorize LDC bypasses expeditiously in virtually all cases.[37] FERC's power and willingness to authorize LDC bypasses had a major impact on the policies and practices of the LDCs and PUCs. The LDCs had to begin to behave as participants in a competitive market in order to avoid losing sales to many of their large customers.[38] The LDCs began to reduce their costs and rates, to set their rates closer to marginal cost, and to make available a much wider range of services. Because of the credible threat of bypass, the PUCs had little choice but to acquiesce in these dramatic changes in LDC practices. That choice was then consistent with their regulatory goal of protecting small customers from excessive rates. The FERC cannot initiate an analogous sequence of actions and reactions in the electricity industry because it is prohibited from ordering retail wheeling.

Statutory distinctions between wholesale and retail transmission services also will give rise to many related jurisdictional disputes. When is a putatively wholesale transmission service actually a prohibited sham retail service? This issue arises in many contexts. When a group of formerly retail customers of Utility A become wholesale customers of Utility B, what institution has the power, and arguably the responsibility, to authorize Utility A to collect a portion of its stranded investment from that group

33. Louisiana Pub. Serv. Co. v. FCC, 476 U.S. 355, 364 (1986).

34. Pub. L. No. 102-486, 106 Stat. 2776 (1992).

35. Federal Power Act, 16 U.S.C.A. § 824k(h) (West Supp. 1993).

36. *See, e.g.*, Cascade Natural Gas Corp. v. FERC, 955 F.2d 1412 (10th Cir. 1992). The analogy is functional rather than literal. The threat to allow pipelines to bypass LDCs induced LDCs to reduce their costs, to develop competitive pricing policies, and to permit third parties to transport gas through their distribution lines. Thus, the threat of bypass brought competition in the gas market to the retail level.

37. Order No. 636, *Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol*, 50 Fed. Reg. 42,408 (1985) (to be codified at 18 C.F.R. pts. 2, 157, 250, 284, 375, 381).

38. *See* Kelly, *supra* note 25; Harry G. Broadman & Joseph P. Kalt, *How Natural Is Monopoly? The Case of Bypass in Natural Gas Distribution Markets*, 6 YALE J. ON REG. 181 (1989). *But see* PIERCE, *supra* note 20, at 16-17 (arguing that the role of bypass has been exaggerated).

of customers? The institutional candidates include the FERC, the PUC, the state legislature, a state court, all of the above, and none of the above. This issue will arise in many contexts. Examples include the recent conversion of the Massachusetts Bay Transportation Authority from a retail customer of one utility to a wholesale customer of another utility,[39] and the plethora of future municipalizations that are likely to be spawned by the quest for reduced rates through use of competitive contracting.[40] We will not have clear answers to these questions for many years.

The distinction between wholesale and retail wheeling also will exacerbate the pre-existing uncertainty with respect to the allocation of rate jurisdiction over transmission services. By the time the FERC began the gas transition, courts had already held that it had plenary power over all "interstate" transportation of gas, whether for retail or wholesale, and that all high pressure pipelines that contained some gas destined for an "interstate" market were subject to FERC's regulatory control.[41] The caselaw with respect to FERC's power over transmission lines is not as clear. With most electricity traditionally transmitted as part of a bundled sales transaction, the FERC and reviewing courts have had little occasion to resolve disputes concerning jurisdiction to set transmission rates. For purposes of FERC's jurisdiction over electricity wholesales, courts have interpreted "interstate" broadly to include any transaction within a single state if the transaction makes use of interconnected transmission lines in which the potential exists for commingling with electricity from an out-of-state source.[42] As a practical matter, those holdings give the FERC plenary power over virtually all electricity wholesales in the continental United States. The FERC has asserted jurisdiction over pure transmission transactions in analogous conditions,[43] but no court has addressed this somewhat different issue.

Ultimately, courts are likely to establish a new "bright line" test that confers on the FERC plenary power over the rates and conditions of service for all transactions that use a high voltage transmission line in the continental United States, including retail wheeling transactions and transactions that purport to involve only transmission from one point to another in a single state.[44] Such a test would avoid one serious version of the "two drivers of one car" problem. The transmission grid would not

39. *See Massachusetts Elec. Co.*, 68 F.E.R.C. ¶ 61,101 (1994); *Massachusetts Elec. Co.*, 66 F.E.R.C. 61,036 (1994). *See generally* Floyd Norton & William Dudley, *Federal State Jurisdiction and Cost Recovery of Stranded Assets, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1994).

40. *See infra* notes 85-94 and accompanying text.

41. Louisiana Power & Light Co. v. FPC, 483 F.2d 623 (5th Cir. 1973), *reh'g denied*, 483 F.2d 1404 (5th Cir. 1973), *cert. denied*, 416 U.S. 974 (1974); FPC v. Louisiana Power & Light Co., 406 U.S. 621 (1972).

42. FPC v. Florida Power & Light Co., 404 U.S. 453 (1972); FPC v. Southern Cal. Edison Co., 376 U.S. 205 (1964).

43. *See, e.g.*, Florida Power & Light Co., 29 F.E.R.C. ¶ 61,140 (1984).

44. The Supreme Court consistently searches for such "bright line" jurisdictional tests. *See* cases cited *supra* note 42.

function effectively if it were subject to potentially conflicting rates and conditions of service imposed by the FERC and the PUCs. The existence of ubiquitous loop flows renders the PUCs poor candidates to exercise any power over high voltage transmission services. For instance, a transmission transaction that putatively involves use of a single line between Harrisburg and Philadelphia, PA, can effect the available capacity of lines in New York, New Jersey, Maryland, etc. Loop flows have much broader implications as discussed in section II.*C*.[45]

By avoiding one version of the "two drivers of one car" problem, however, courts will create another version of that problem. The FERC will have plenary power to determine the rates and conditions applicable to retail wheeling transactions to the extent those transactions require use of high voltage transmission lines, but states will have the exclusive power to require retail wheeling. However, this version of the problem is somewhat more manageable. A state PUC can order its utilities to apply to the FERC for authorization to provide retail wheeling service, subject to whatever rates and conditions of service the FERC approves.[46] Conflicts

45. *See infra* text accompanying notes 64-69.

46. Even this awkward approach is subject to some legal uncertainty attributable to Judge (now Justice) Breyer's opinion in Massachusetts v. U.S., 729 F.2d 886 (1st Cir. 1984). Justice Breyer upheld FERC's interpretations of the Federal Power Act (FPA) as precluding § 205 treatment of a rate filing made by a utility under compulsion of a state PUC order that required the utility to propose a particular change in rates that are subject to exclusive FERC jurisdiction. He relied on three lines of reasoning to support the holding. First, he recognized that courts owe deference to an agency's interpretation of a statute the agency administers. That reasoning has even greater force today, especially in light of the Court's subsequent opinion in Chevron, U.S.A., Inc. v. NRDC, 467 U.S. 837 (1984) (*Chevron*). Second, he concluded that FERC's interpretation was consistent with the general structure of the FPA, while Massachusetts' interpretation was inconsistent with the structure of the FPA. The FPA is designed to allow a utility to choose among "reasonable" rates by making a § 205 filing, subject to FERC's exclusive power to hold such a rate filing "unreasonable" after conducting a hearing. Massachusetts' interpretation would give a state the power to override the preference of a utility among "reasonable" rates applicable to services that are within FERC's exclusive jurisdiction. As a practical matter, Massachusetts' interpretation also would allow a state to override FERC's power to set rates for services within FERC's jurisdiction when the FERC is unable to complete a § 205 hearing to support a determination that a state-mandated, utility-filed rate is unreasonable before the end of the § 205 suspension period. Third, he concluded that FERC's interpretation would further the statutory goal of uniformity with respect to multistate rates, while Massachusetts' interpretation would interfere with that goal.

Justice Breyer's holding is correct and continues to be good law in the post EPAct environment in contexts to which his reasoning applies. For instance, if a state were to order a utility to file a retail wheeling tariff that applies to "interstate" transactions (as the Supreme Court has broadly defined "interstate" for FPA purposes), and the state purported to dictate the rates or terms of service the utility must propose applicable to FERC-regulated "interstate" transmission service, the FERC could decline to accept that filing as a § 205 filing. It is less certain that the FERC must reject the filing, though it seems that it should do so.

However, the FERC could, and should, accept as a § 205 filing a retail wheeling tariff filed pursuant to a state PUC order if and to the extent that the PUC leaves the utility (and the FERC) discretion with respect to the rates and terms of service applicable to FERC-regulated "interstate" transmission service. Such a filing would raise none of the concerns that Justice Breyer expressed in support of his holding in *Massachusetts*. The hypothetical PUC order and FERC acceptance of the resulting tariff filing would not interfere with the uniformity goal or threaten to usurp any FERC jurisdictional power. It would leave the FERC with exclusive, plenary power to determine the rates

will arise only if a PUC attempts to impose on a high voltage line rates or conditions of service that differ from those imposed by the FERC. The Supremacy Clause[47] will resolve all such conflicts in favor of the FERC.

There is no uncertainty with respect to one critical jurisdictional issue. The FERC has no power to authorize construction or expansion of transmission lines. States have exclusive jurisdiction over this aspect of the industry's activities, and many states have delegated all or part of this regulatory power to local governments. By contrast, the FERC has plenary and preemptive power to authorize construction or expansion of gas pipelines.[48] This difference in allocation of jurisdictional power over the two industries will prove to be the source of major problems when attempting to implement the electricity transition.

Many state and local government officials argue that they should have exclusive power to authorize construction or expansion of transmission lines because such projects primarily effect local communities. That argument is unpersuasive because the factual predicate is wrong. Local residents may bear a disproportionate share of the costs of a transmission project, but the benefits of such projects often accrue to millions of citizens in many states. If the decision whether to authorize construction or expansion of a transmission line remains at the state or local level, it is easy to predict that few such projects will be authorized in some regions and those few only after many years of regulatory delay. The powerful combination of NIMBY and cancerphobia will induce state and local politicians to veto, or to delay interminably, projects that have the potential to yield enormous benefits to millions of electricity consumers in an entire region of the country.[49]

FERC's plenary and preemptive power to authorize construction or expansion of gas pipelines was critical to the success of the gas transition. The Iroquois Pipeline project[50] illustrates the point well. The FERC authorized construction of a large new pipeline from Canada to the northeastern United States over the strenuous objections of market incumbents

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and terms of service applicable to FERC-regulated "interstate" transmission service. Also, it does not appear that the PUC order would interfere with any Congressional intent to allow utilities discretion in some areas. Pursuant to the EPAct and its legislative history, Congress intended to allow PUCs discretion to determine whether and to what extent utilities are required to engage in retail wheeling. To the extent that there is ambiguity with respect to that issue, the deference principle alluded to by Justice Breyer and reinforced in *Chevron* should at least allow the FERC to interpret the FPA and the EPAct to have this effect.

47. U.S. CONST. art. VI, cl. 2.

48. *See* Louisiana Ass'n of Indep. Producers & Royalty Owners v. FERC, 958 F.2d 1101 (D.C. Cir. 1992).

49. There is no evidence that electromagnetic forces from transmission lines pose health risks, but public anxiety about such potential risks is having significant effects on regulation of transmission lines. *See* Lisa M. Bogardus, *Recovery and Allocation of Electromagnetic Field Mitigation Costs in Electric Utility Rates*, 62 FORDHAM L. REV. 1705 (1994). For an excellent analysis of the irrational public attitudes toward health risks that produce this regulatory environment, see STEPHEN G. BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION (1993).

50. *See Iroquois Gas Transmission Sys.*, 53 F.E.R.C. ¶ 61,194 (1990), *aff'd*, Louisiana Ass'n of Indep. Producers & Royalty Owners v. FERC, 958 F.2d 1101 (D.C. Cir 1992).

and a handful of rich and powerful citizens of Connecticut and New York. From FERC's perspective, that decision was easy. The project would produce hundreds of millions of dollars in benefits to millions of consumers by eliminating the effects of transportation capacity constraints and enhancing consumers' access to competitive sources of supply. The cost to affected local residents was trivial in comparison with the regional benefits. If the project had required approval by each state, it might never have been built. At least it would have been delayed for many years. The project would have had no chance of receiving approval if it required approval by each affected unit of local government.

The Iroquois Pipeline Project is a dramatic example of a widespread phenomenon in the gas transition. In addition to several other large projects, the FERC authorized hundreds of smaller pipeline construction and expansion projects, usually with little regulatory delay.[51] Many of those smaller projects produced large and widespread benefits by eliminating or reducing capacity constraints and enhancing access to competing sources of supply. If the FERC had not possessed and exercised the power to authorize expeditious construction and expansion of gas transportation capacity, gas service would be much more expensive and less reliable than it now is in many parts of the country. That is the unfortunate result we can expect in the electricity market, unless we change the present legal environment with respect to construction and expansion of transmission lines.

The best solution to the problem would be an amendment to the Federal Power Act (FPA) conferring on the FERC the same powers with respect to transmission projects that the Natural Gas Act (NGA) gives it for gas pipeline projects. Congress eventually will take that action, but probably not for many years. Only a federal agency is in a position to balance the costs of a project to a few local residents against the benefits of the project to millions of consumers in several states. Transmission capacity constraints are already producing unnecessarily high electricity prices in some areas, but the causal relationship is difficult to demonstrate in the present environment in which lack of effective competition produces widely varying electricity prices independent of capacity constraints. As competition begins to yield a convergence of electricity prices, the causal relationship between aberrantly high prices in some areas and capacity constraints will become more apparent.[52] Eventually, that phenomenon will become so obvious, so large, and so widespread that Congress will feel compelled to act. In the intervening years, however, millions of consumers will have borne billions of dollars in unnecessarily high electricity prices, and capacity constraints will have induced a geographically inappropriate

51. *See Natural Gas: Factors Affecting the Time it Takes to Approve Construction of Natural Gas Pipelines Before the Subcomm. on Environment, Energy, and Natural Resources of the Comm. on Government Operations*, 102d Cong., 1st Sess. 7 (1991) (testimony of Victor Rezendes, General Accounting Office) [hereinafter *Natural Gas*].

52. For an explanation of this phenomenon, see Charles M. Studness, *The Geography of Utility Rates*, FORT., Oct. 1, 1993, at 35.

pattern of investments in generating plants. Transmission capacity constraints can double the cost of electricity in a market by forcing the grid operator to substitute a high cost generating plant for a low cost generating plant.[53] Such congestion costs have the potential to dwarf all other components of the cost of transmission.

Absent congressional action, the only other potential solution is for the FERC to establish transmission access and pricing rules that are specifically designed to impose all of the congestion costs that result from a state's decision to decline to authorize a transmission project on consumers within that state. Such rules would internalize within the decision-making state all of the costs and benefits of a project. That, in turn, would force the state's political leaders and regulators to make a decision on the project based on consideration of its full costs and benefits. Instead of capitulating routinely to the local residents who protest such projects, state legislatures and PUCs would have to choose between the anti-EMF demonstrators and the pro-consumer demonstrators. Of course, state politicians and regulators do not want to be placed in a position in which they must balance the costs and benefits of controversial projects. That state opposition, in turn, causes the FERC to be reluctant to issue pricing and access rules that would internalize the costs of declining to authorize a transmission project in the state that has the power to approve the project. Moreover, it may not be possible for the FERC to devise transmission access and pricing rules that further simultaneously both this goal and the many other important goals the FERC is attempting to pursue. Unless some institution addresses this problem effectively, however, the present allocation of jurisdictional power to authorize transmission projects will impair the efficacy of the electricity transition and will distort the performance of the post-transition electricity market.[54]

B. Magnitude of Transition Costs

In the initial meetings of the Harvard Electricity Policy Group (Group) last year, the academic members of the Group were surprised to discover that many utility executives were far more interested in transition costs and their allocation than in the transition issues that the academic members of the Group considered most interesting and important. Once the Group solicited and received estimates of the magnitude of the transition costs, the utility executives' preoccupation with transition costs became easier to understand. Numerous estimates of transition costs were received, with each estimate based on a different methodology. While the range of the estimates was $20 billion to $300 billion, estimates of the cost

53. *See* William W. Hogan, *A Competitive Electricity Market Model* 23-24, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY PROJECT (1993).

54. For a discussion of capacity constraints, congestion costs, and methods of implementing equal access to transmission lines, see *infra* text accompanying notes 64-84.

of an "actual" transition to a fully competitive electricity market were in the range of $200 billion to $300 billion.[55]

The lowest estimate, $20 billion, was provided by a financial analyst. He estimated the aggregate capital loss the industry could sustain consistent with each firm's retention of an investor-grade credit rating. He then used that number as his estimate of transition costs. He reasoned that the PUCs would not act in ways that would require utilities to absorb transition costs in excess of those consistent with retention of an investor-grade credit rating. There are two reasons to be skeptical about this estimate. First, while the PUCs undoubtedly prefer that their regulatees remain in good financial condition, ceteris paribus, that is not their only goal. The recent bankruptcy filings of several utilities and the financial distress of several others suggest that the PUCs are willing to acquiesce in their regulatees' financial distress in some circumstances. Second, the PUC's will have only limited ability to protect their regulatees from incurring large transition costs. The electricity transition process is likely to proceed down a path and at a pace that is beyond the control of any individual institution, including a PUC. As discussed in section II.*D.*,[56] that path and pace are likely to be determined by the largely unpredictable interactions of many public and private institutions. The $20 billion estimate relates to an estimate of the cost of transition to a fully competitive electricity market only through its implicit finding that many utilities are likely to experience financial difficulties if they must absorb more than ten percent of the cost of such a transition.

The next lowest estimate of transition costs was $29 billion. However, that estimate was based on a self-generation only scenario. In other words, it was an estimate of the utility investment that would be stranded if there were no transition to a competitive electricity market, and if all large consumers who could save money through self-generation took advantage of that opportunity. That estimate relates to an estimate of the cost of a transition to a competitive electricity market only because of its implications with respect to the cost of generating electricity in the relatively small, high efficiency gas turbines that many industrial consumers are now installing. If an industrial consumer can use new technology to generate electricity at a cost of three cents per kwh, any prospective competitor of a utility can do the same thing. Few utilities could compete with such a "green fields" competitor without reducing their rates substantially and incurring large transition costs.

The Group received several estimates of the cost of a transition to a fully competitive electricity market. Each relied on a different methodology, e.g., "top down" estimates, "bottom up" estimates, national estimates,

55. *See* Memorandum from William W. Hogan to Harvard Electricity Policy Group (Feb. 4, 1994). *See also* Pierce, *supra* note 9; John Graham, *Potential Financial Exposure During Transition to a Competitive Environment, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993); Steven Anderson et. al., *Electricity Transition Costs, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993).

56. *See infra* notes 67-94 and accompanying text.

and extrapolations from company, state, or regional data.[57] These estimates were in the $200 to $300 billion range. To put these estimates in context, the aggregate industry book value of equity is approximately $175 billion, and the market value of equity is approximately $300 billion.

These comparative figures help to explain why so many utility executives are obsessed by the transition cost issue and why so many utilities are resistant to a transition. Of course, the transition cost estimates also illustrate the magnitude of potential consumer gains attributable to a transition to a competitive electricity market. Such a transition would reduce the nation's total electricity bill by $20 to $30 billion per year.[58] Once consumers become aware of the magnitude of the stakes to them, they will apply extreme pressure on politicians to take the steps necessary to obtain those savings, e.g., financially strapped school districts, hospitals, and transit authorities will apply pressure to engage in retail wheeling. Most utilities, fearful of the transition costs they must bear, will exert countervailing efforts to avoid the transition. Simultaneously, utilities will devote extraordinary efforts to attempt to minimize the transition costs each must bear by, *inter alia*, attempting to reallocate those costs to consumers and to suppliers.

The transition costs can be divided into three categories: (1) contracts to purchase power from third parties at above market prices; (2) high cost utility-owned generating plants; and (3) regulatory assets. The third category includes a variety of IOUs issued by PUCs on behalf of consumers, e.g., promises to allow utilities to recover in their future rates negawatt investments,[59] deferred portions of investments in generating plants, decommissioning costs, taxes, and retiree healthcare costs. The magnitude and mix of the transition costs vary significantly among utilities. Some utilities probably will incur no transition costs. Indeed, some low cost suppliers may be major beneficiaries of the transition, as they take markets from their high cost neighbors. Other utilities will incur unreimbursed transition costs well in excess of their present net worth and will then file bankruptcy petitions.

The war over allocation of transition costs will be fought simultaneously on many battlefields. Some of the battles will be reminiscent of the litigation between gas pipelines and producers that kept many lawyers and consultants fully employed throughout the 1980's.[60] Utilities will refuse to comply with their high-priced contracts to purchase electricity from third parties, and also their high-priced contracts to purchase generating fuel. The resulting litigation will continue into the 21st century. Even if they achieve significant success in litigation with their contractual suppliers, however, electric utilities cannot realistically expect to match the success of gas pipelines in reallocating transition costs to their suppliers. Unfortu-

57. *See* sources cited *supra* note 55.

58. *See* Charles Studness, *Estimating the Financial Cost of Utility Regulation*, FORT., Nov. 1, 1993, at 48.

59. For a discussion of negawatt investments, see Black & Pierce, *supra* note 29.

60. Pierce, *supra* note 10.

nately for electric utilities, the extensive vertical integration of the industry will limit their ability to reallocate transition costs to their suppliers.[61] The reason is simple—each electric utility is also its largest supplier. Utilities can expect to be able to reallocate to suppliers only a small portion of the transition costs that take the form of high-cost company-owned generating plants and none of the transition costs that take the form of regulatory assets.

The obvious inability of vertically integrated utilities to reallocate a high proportion of their transition costs to suppliers will induce them to devote even more resources to efforts to stop or stall the transition and to reallocate transition costs to customers. However, utilities also will experience great difficulty reallocating transition costs to customers. The combination of market forces, the filed rate doctrine, and the prohibition on retroactive ratemaking will limit their ability to recover transition costs from large customers.[62] Many large customers will cease purchasing from a utility if it attempts to extract large transition costs from the customer. Political forces will limit utilities' ability to recover transition costs from small customers. The complicated allocation of regulatory jurisdiction discussed in section II.*A*.[63] may also prove to be a major impediment to utilities' ability to recover transition costs from their customers. That confused and ambiguous division of regulatory power provides the FERC and the PUCs a perfect opportunity to play "Alphonse and Gaston" at utilities' expense. Each can express empathy for a utility's plight, and then provide a plausible basis for its conclusion that the other institution bears responsibility to alleviate that plight. Of course, each institution also has the option of blaming Adam Smith for the financial distress of utilities. Courts have long recognized a distinction between a regulatory action that causes a regulatee financial distress and market forces that have the same effect.[64]

In summary, the prospect of bearing large transition costs will induce many utilities to expend substantial resources in efforts to reallocate transition costs to suppliers and to customers. Given the magnitude of the transition costs and the difficulty utilities will experience in reallocating those costs, however, that prospect will induce many utilities to engage in desperate measures designed to block or to stall the transition.

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61. *See infra* text accompanying notes 71-72.

62. *See* Associated Gas Distribs. v. FERC, 893 F.2d 349 (D.C. Cir. 1989); Pierce, *supra* note 10 (discussing *Associated Gas*). On July 11, 1994, the FERC issued a notice of proposed rulemaking in which it proposed to authorize utilities to reallocate some transition costs to their customers by establishing a transition cost surcharge applicable to use of their transmission lines. *See* Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 59 Fed. Reg. 35,274 (1994). Ironically, the next day the District of Columbia Circuit Court issued an opinion in which it suggested that all such transmission cost surcharges are unlawful. *See* Cajun Elec. Power Coop. v. FERC, 28 F.3d 173 (D.C. Cir. 1994).

63. *See supra* notes 33-54 and accompanying text.

64. *See, e.g.*, Market St. Ry. v. Railroad Comm'n, 324 U.S. 548, 554, 563-67 (1945).

C. *The Nature of Transmission*

Transmission of electricity differs in important respects from transportation of gas. Unlike gas pipelines, most transmission lines have no valves. Valves (called phase shifters) could be installed on transmission lines, but extreme caution is necessary in determining the locations and uses of phase shifters in order to avoid significant sacrifice of the goal of maintaining reliable service. In the absence of valves, electricity flows through an interconnected transmission grid in inverse relation to the impedance on each line. As a result, a transmission transaction that appears to involve use of the capacity of a single transmission line from point A to point B often requires use of a portion of the capacity of a dozen other lines. Such "loop flows" are ubiquitous in any regional transmission grid. Moreover, transmission grids are less forgiving of momentary operational imbalances than are pipeline transportation grids. Pipeline operators can accommodate relatively large temporary imbalances and fluctuations in patterns of receipts and deliveries. There is no analog to "line pack" in a transmission grid. Reliable electricity service is critically dependent on the grid's ability to respond to changed conditions on an instantaneous basis.

Traditionally, utilities and regulators have largely ignored loop flows and treated transmission transactions as if electricity flowed in accordance with the simple path designated in a contract. This tendency to ignore the reality of transmission for contractual and regulatory purposes worked tolerably well in the past because (1) provision of transmission services for third parties required only a modest proportion of total capacity; and (2) transmission owning utilities (TOUs) relied on a variety of informal cooperative mechanisms to keep the loop flow problem within reasonable bounds.

William Hogan argues that we can no longer afford to ignore the loop flow problem, and the related problem of network interactions, in the new environment in which TOUs will be required to provide transmission service to large numbers of third parties.[65] He argues that we must supplement the bilateral trade model of transmission access that the FERC is in the process of implementing today with a pool-based model. If Hogan is correct, we must change in fundamental ways our methods of transacting for transmission service and regulating transmission access. The short-term, spot trading pool market would determine the actual operation of the grid, while long-term bilateral contracts would become "futures" contracts that would determine the financial implications of transactions.

Hogan's factual predicates are relatively easy to understand. First, to the extent that transmission capacity is constrained, the price of transmission service must include congestion costs, i.e., the opportunity cost of not being able to run a relatively low cost generating unit at a particular loca-

65. *See* William W. Hogan, *An Efficient Electricity Pool Market Model, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1994); William W. Hogan, *Markets in Real Electric Networks Require Reactive Prices*, 14 ENERGY J. 171 (1993); William W. Hogan, *Electric Transmission: A New Model for Old Principles*, ELECTRICITY J. 18 (1993); William W. Hogan, *Contract Networks for Electric Power Transmission*, 4 J. REG. ECON. 211 (1992).

tion because of a contractual or regulatory obligation to provide a particular transmission service. If transmission prices do not include congestion costs, they will induce firms to construct generating units in inappropriate locations. Second, because of ubiquitous and constantly changing loop flows within a grid, it is impossible to establish a single congestion cost appropriate for each transmission transaction in all, or even most, conditions. The congestion effects of most transmission transactions will vary substantially from day-to-day, and even from hour-to-hour, as generating sources and loads vary around the grid. Thus, in the presence of significant capacity constraints, exclusive reliance on bilateral trade in transmission capacity inevitably will yield inappropriate transmission prices, significant out-of-merit dispatch of generating units, and inappropriate patterns of investment in both generating and transmission assets.

Hogan's prescription is to create a pool-based electricity market. In such a system, the price of electricity is both location-specific and time-specific. The pool market would be implemented in each region through use of a bidding system similar to that now in use in England, but with incorporation of the congestion costs that the English system ignores at present. The short-term price of transmission from point A to point B is the difference between the location-specific spot price of electricity at each point. The short-term transmission price would vary substantially, depending on the constantly changing load and generation patterns on the grid. In conditions of congestion, it would be very large, reflecting the difference between the marginal cost of a low cost generating unit that cannot operate because of transmission capacity constraints, and the marginal cost of the more expensive unit that must displace the low cost unit.

The spot price system would exist simultaneously with long-term contracts, but those contracts would have financial implications only. While they would provide the incentives for an appropriate pattern of investments in generating plants, they would not determine the day-to-day or minute-to-minute performance of the market. The actual operation of the market would be controlled by a regional, central dispatch system, using an algorithm based on short-term marginal cost.

Hogan's pool-based market would require new ways of transacting business, new institutions, and new methods of regulation. Several existing institutions are plausible candidates to operate the regional pools, with appropriate changes in the institutions' governing boards and assigned missions. Regional reliability councils could broaden their mission to include economic efficiency. Power pools could expand their memberships and revise their missions and computer programs to focus on short-term efficiency criteria. The Regional Transmission Groups (RTGs) that the FERC is nurturing into existence could undertake a broader mission consistent with a new name, Regional Transaction Groups.

The entity that controls each regional pool market, which Hogan calls "Poolco," would possess monopoly power and would therefore need to be regulated by some institution in some manner. The only logical candidate to regulate Poolcos is the FERC. However, the FERC would need to

adopt new approaches to regulation. FERC's primary function might consist of periodic review of Poolcos' control algorithms to ensure that they are designed to further social welfare criteria rather than cartel wealth maximization criteria. Alternatively, the FERC might focus its attention primarily on each Poolco's governance structure and voting rules, based on the expectation that an appropriately governed Poolco will hire competent grid operators who will strive to maximize social welfare.[66]

Hogan's arguments in support of pool-based markets have not convinced all members of the Harvard Electricity Policy Group. Jeff Skilling of Enron has launched an aggressive counterattack that includes a critique of the pool-based model and a defense of the bilateral trade model.[67] While the bilateral trade model seems to be a comfortable alternative, Hogan is probably right. He is right when operating in an environment in which significant capacity constraints in the transmission grid give rise to large and constantly changing congestion costs. In contrast, the bilateral trade model alone would work reasonably well if it were applied to a grid in which capacity constraints exist only in isolated locations or in unusual load conditions. At least in the northeast and the middle Atlantic states, where there is intense opposition to construction or expansion of transmission lines, the present allocation of regulatory power to authorize construction or expansion of transmission lines is far more likely to create a capacity-constrained grid that requires use of the pool-based model than the ample capacity grid required to obtain acceptable results through implementation of the bilateral trade model.[68]

No matter how we ultimately resolve the debate between the proponents of a pool-based model and the proponents of a bilateral trade model, the physical nature of electricity transmission will complicate the task of managing a transition to a competitive electricity market. To produce socially beneficial results, any method of implementing the equal access mandate of the EPAct must take account of the unique features of interconnected transmission grids—ubiquitous loop flows and network interactions—as well as the need to respond instantaneously to changes in source and load patterns. Moreover, this problem relates back to the problems created by the present allocation of regulatory authority and forward to the problems created by the present industry structure. Equal access will be difficult to implement in part because of the complicated and irrational allocation of regulatory power over the grid and in part because the grid is owned by hundreds of firms. When the nature of transmission is combined with the fragmented ownership of the grid, it becomes apparent that many transmission transactions will have significant effects on scores of TOUs. The new legal regime must account for those effects on third parties.

66. O'NEILL & WHITMORE, *supra* note 27, at 15-19.

67. Jeff Skilling, Untitled Outline of Speech, *in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY PROJECT (1994).

68. *See supra* text accompanying notes 44-54.

D. Industry Structure

The structure of the gas industry prior to the transition to a competitive gas market did not differ significantly from the optimal post-transition industry structure. Moreover, the pre-transition structure of the gas industry facilitated the transition in many important ways. The discussion will begin by considering ownership of the critical bottleneck facilities. In the pre-transition gas industry, gas typically could be transported thousands of miles through use of pipelines owned by only one or two firms. That structural feature made it relatively easy to implement a system of equal access to bottleneck facilities. Moreover, most consumers had access to more than one transportation route by the time the gas transition had been underway for a few years.[69] This feature allowed the FERC to rely on market forces to a considerable extent to produce acceptable results in the gas transportation market.

By contrast, most electricity transmission transactions will require use of transmission lines owned and operated by a dozen or more firms, and putative competition among TOUs would be purely illusory in most circumstances. Electricity will follow the same complicated and constantly changing path over lines owned by many TOUs no matter which TOU agrees to provide the transmission service at issue. The electricity transition would be much easier to implement if each regional grid were owned by a single firm. In the absence of such a massive horizontal integration of transmission lines, the FERC must attempt to create multi-firm entities that will behave as if they constitute a single firm—hence, the wisdom of FERC's effort to encourage the creation of RTGs.[70] Moreover, the absence of any potential for competition to play a significant role initially in governing the transmission function will require the FERC to rely on traditional, clumsy command and control regulation to govern that function to a greater extent than was true with respect to the gas transportation function. Eventually, competition may be capable of governing the transmission market, but competition for provision of transmission service can evolve only through reliance on a secondary market in which multiple contractual holders of capacity rights on a grid can resell or lease those rights.

The structurally-based problems extend well beyond the fragmented pattern of ownership of the transmission grid. The pre-transition gas industry was characterized by only modest vertical integration. Most gas consumers purchased from an LDC, which had purchased from several independent pipelines, which had purchased from hundreds of independent producers. By contrast, the electricity industry is highly vertically integrated. Most consumers buy from a vertically integrated utility that

69. In 1980, each local distribution company was served by an average of 3.6 pipelines. *See* Joseph P. Kalt, *Market Power and the Possibilities of Competition*, *in* DRAWING THE LINE ON NATURAL GAS REGULATION 89, 101 (J. Kalt & F. Schuler eds. 1987). That number is much larger today because of the many new pipeline interconnections the FERC has authorized. *See Natural Gas*, *supra* note 51 (testimony of Victor Rezendes).

70. *See* William L. Massey, *Transition to Competition: Federal Initiatives and Industry Opportunities*, ELECTRICITY J. 26 (1994); O'NEILL & WHITMORE, *supra* note 27, at 15-19.

generates and transmits the vast bulk of the electricity it distributes. This structural difference will complicate the transition in several ways.

First, vertical integration will effect significantly the allocation of transition costs. Gas pipelines enjoyed considerable success in reallocating a large proportion of their transition costs to their contractual suppliers.[71] As a result, the gas transition resulted in the bankruptcy of thousands of producers and only one major pipeline. Within a few years, most pipelines had absorbed the residual transition costs and returned to a state of good financial health. Electric utilities can avail themselves of this option to some extent through litigation with Independent Power Producers (IPPs) and contractual suppliers of generating fuel, but they cannot hope to achieve anything approaching the degree of success pipelines enjoyed in reallocating transition costs to suppliers. This consequence of vertical integration, when combined with the magnitude of the costs of the electricity transition,[72] will induce many electric utilities to devote substantial resources to efforts to stop or stall the transition and to reallocate transition costs to customers.

Vertical integration also will limit electric utilities' ability to reallocate transition costs to their customers. Gas pipelines were able to convince the FERC to reallocate a significant proportion of their transition costs to the LDCs,[73] thereby leaving the PUCs with the more politically painful process of deciding whether, and to what extent, to allocate LDC transition costs to consumers.[74] Vertically integrated electric utilities can reallocate transition costs downstream only to consumers. The FERC has limited ability to authorize reallocation of transition costs to consumers, and it is likely to be reluctant to attempt to engage in that type of reallocation of costs. It is less dangerous politically for a federal agency to authorize inter-firm reallocations of transition costs, e.g., from interstate pipelines to the LDCs, than to authorize its regulatees to reallocate transition costs directly to consumers. The PUCs also are likely to be reluctant to compel consumers to bear large transition costs. Moreover, the jurisdictional confusion with respect to this issue may provide the PUCs with the relatively painless option of blaming the FERC for the transition and taking the position that the FERC should be responsible for implementing any socially desirable reallocation of transition costs.[75]

Vertical integration will, therefore, contribute significantly to a situation in which the electricity transition will yield broader and deeper financial distress among electric utilities than the gas transition caused among gas pipelines. That, in turn, will induce many utilities to devote substantial resources to the creation of obstacles to the transition.

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71. Pierce, *supra* note 10.

72. *See supra* text accompanying notes 57-64.

73. *See, e.g.*, KN Energy, Inc. v. FERC, 968 F.2d 1295 (D.C. Cir. 1992).

74. *See, e.g.*, Energy N. Natural Gas, 124 Pub. Util. Rep. 4th (PUR) 160 (1991); Pennsylvania Pub. Util. Comm'n v. Claysville Natural Gas Co., 121 Pub. Util. Rep. 4th (PUR) 423 (1991); Connecticut Natural Gas Corp., 127 Pub. Util. Rep. 4th (PUR) 193 (1991).

75. *See supra* text accompanying notes 39-44.

Vertical integration will have an even more significant impact on the transition in another respect. In the gas industry, the FERC was able to introduce competition in the wholesale market rapidly and comprehensively by eliminating the variable cost component of the minimum bill provisions in pipelines' contracts and tariffs[76] and mandating third party access to pipelines.[77] This gave the LDCs the freedom to displace gas previously purchased from pipelines with less expensive gas purchased from third parties. The LDCs then drove the wholesale market transition process to a rapid conclusion by switching to the lowest cost suppliers.

This scenario is highly implausible in the vertically integrated electricity industry. A vertically integrated distribution company is unlikely to be willing to displace its own electricity with less expensive electricity potentially available from third parties. Instead, the electricity transition has taken place to date only at the margin in the context of new generating sources.[78] If it were to continue only in this manner, the transition probably would not be complete for another fifty years. Proponents of the electricity transition are unlikely to be that patient, given the enormous social welfare gains potentially available from a complete transition to a competitive electricity market. The history of the gas transition is instructive on this point. The initial transition plan, reflected in the Natural Gas Policy Act of 1978, contemplated a long and slow transition process.[79] A combination of market and political forces soon demonstrated that the transition could not take place in that manner.[80] Once the transition began, it created its own irresistible momentum.

Vertical integration also helps to explain why retail wheeling has become the most controversial issue in the electricity transition. While the analogous issue in the gas transition, LDC bypass, provoked controversy, it actually played a relatively modest role in the overall gas transition process.[81] Most of the consumer benefits of the gas transition derived from FERC's rapid creation of a fully-competitive wholesale gas market. Vertical integration greatly diminishes the potential for consumers to derive analogous benefits from creation of a competitive wholesale electricity market.[82] Instead, absent vertical deintegration, those consumer benefits are available only through retail wheeling.

Retail wheeling raises a host of controversial issues. However, these issues can be viewed as independent of the unequivocal consumer benefits potentially available through a combination of vertical deintegration and creation of a fully competitive wholesale electricity market. Retail wheel-

76. Order No. 380, 49 Fed. Reg. 22,778 (1984) (to be codified at 10 C.F.R. pt. 463).

77. Order No. 436, 50 Fed. Reg. 42,408 (1985) (to be codified at 14 C.F.R. pt. 383, 17 C.F.R. pts. 1, 31).

78. Joskow, *supra* note 30.

79. Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1, 11 (1988).

80. *Id.* at 22-24.

81. PIERCE, *supra* note 20, at 16-17.

82. *See* Richard J. Pierce, Jr., *A Proposal to Deregulate the Market for Bulk Power*, 72 VA. L. REV. 1183, 1207-08 (1986).

ing: (1) reduces the PUCs' discretionary power to engage in a variety of redistribution programs, e.g., through allocation of common costs, implementation of lifeline rates, and restrictions on terminations of service for non-payment of bills; (2) reduces the PUCs' discretionary power to implement various programs that are intended to improve air quality or to encourage conservation of electricity; (3) threatens to increase the rates paid by small consumers by eliminating or reducing the magnitude of large consumers' contributions to common costs; and (4) threatens to leave small consumers as the only group of customers to which transition costs can be reallocated. These arguably independent effects of retail wheeling help to explain the superficially puzzling phenomenon of alliances against competition formed among utilities, environmental groups, and consumer advocacy groups.[83] While retail wheeling may play a significant role in the electricity transition, it will continue to provoke vigorous opposition from a variety of interest groups in addition to utilities. Moreover, retail wheeling alone has limited potential to benefit small consumers.

Most of the consumer benefits of competition are potentially available through another transition path—creation of a fully competitive wholesale market through vertical deintegration.[84] While this path will create its own set of opposing alliances, it is likely to drive a wedge down the middle of the peculiar alliances that now oppose retail wheeling. One way or another, the FERC will implement the statutory mandate of equal access to transmission lines over the next few years. The easiest way to implement the other necessary element of this transition strategy—vertical deintegration—is through municipalization, or threatened municipalization, of distribution assets.

It is likely that a wave of threatened municipalizations of distribution systems will sweep the country sometime during the next few years.[85] The following hypothetical illustrates the political and economic forces that could precipitate a wave of municipalizations through reference to the mythical state of Green. Like most states, Green has numerous suppliers of electricity, each of which operates as a regulated monopolist. In addition to Green P&L, parts of Green are served by two other vertically integrated utilities and by several small, pre-existing, municipally-owned distribution systems. Green P&L serves 18 cities in Green, as well as many suburban and rural areas. Green P&L's rates are the eighth highest in the country. The other two vertically integrated utilities charge lower rates, as do several other utilities in adjacent states.

Until last month, the municipal distribution systems in Green charged rates roughly equivalent to those charged by Green P&L. Indeed, it could hardly have been otherwise, since they purchased most of their power from Green P&L. That situation changed dramatically last month, however.

83. Black & Pierce, *supra* note 29, at 1350-54, 1356-58, 1386-87, 1430-31.

84. O'NEILL & WHITMORE, *supra* note 27, at 10-13; Pierce, *supra* note 82, at 1208-18.

85. Numerous municipalizations are already underway or in advanced stages of the planning process. *See* Clinton Vince, *Achieving More Competitive Rates for Industrials Through Buyouts: Use of the Public Power Option, in* WORKING PAPERS OF THE HARVARD ELECTRICITY POLICY GROUP (1993).

The municipal systems discovered that FERC's rules implementing the equal access provision of the EPAct produced several offers from other potential bulk power suppliers to replace Green P&L's power with less expensive power to be wheeled over Green P&L's transmission lines at Green P&L's new, relatively low, system-wide transmission rates. After conducting an auction of sorts, the pre-existing municipal systems accepted the lowest offers and reduced their rates by 25% to reflect the resulting savings in the cost of wholesale electricity.

In the meantime, the Mayor of Smithville, the largest city in Green, has been desperately attempting to devise means of reversing Smithville's declining economic base. After winning a bitter struggle with Smithville's public employee unions and privatizing many municipal services, she discovers that she still is experiencing great difficulty attracting and retaining residents and employers. Then she reads the article in the *Smithville Gazette* describing the success of several neighboring cities in reducing their electricity rates by 25%.[86] The article was brought to her attention by several large employers in Smithville, who referred to it as one of their reasons for seriously considering relocation to one of the neighboring cities with lower electricity rates. A light bulb goes on in the Mayor's mind. If she municipalizes the distribution assets of Green P&L in Smithville, she can achieve analogous results for her citizens. With electricity costs 25% lower, she can attract and retain residents and employers, reverse Smithville's economic misfortunes, and improve dramatically her chances of a successful run for the Governor's mansion or for a Senate seat.

After consulting with specialists in utility law, she identifies one major obstacle to her grand plan. The caselaw relevant to municipalization in Green is complicated and unfavorable in some respects.[87] Under existing law, Smithville might be required to pay a high price for the distribution system, including consequential damages that are analogous to transition costs. Moreover, the municipalization process is likely to require years of litigation. That body of law is susceptible to potential change by the Green legislature, however. The Mayor assembles her natural allies, including businesses in Smithville, consumer advocacy organizations in Smithville, and mayors of similarly situated cities, and begins an aggressive lobbying campaign to obtain enactment of a state statute that authorizes a more expeditious, lower cost municipalization process.

Smithville's lobbying is opposed by Green P&L and the other two vertically integrated utilities in the state. The utilities are not joined by their traditional allies in the retail wheeling wars, however. State consumer advocacy groups and environmental groups are unlikely to side with utilities against cities in a war over the availability of the municipalization option. Municipalization does not raise as starkly the concerns that some-

86. *See, e.g.*, Erlind Cravitz, *Small Utilities Luring Away Customers*, N.Y. TIMES, Apr. 10, 1994, § 14, at 1 (reporting that nine municipally-owned distribution systems in New Jersey have lowered their rates 26% by switching from their traditional supplier to an out-of-state supplier).

87. For a description of the complicated and widely variable legal rules applicable to municipalizations, see Vince, *supra* note 85, at 10-18.

times induce those groups to oppose retail wheeling. In fact, Green P&L has difficulty assembling a potent set of allies against this method of making the transition to a competitive electricity market. The concept of municipalization and the prospect of reduced electricity rates resonates with liberal groups, while conservative groups find the prospect of a transition to a competitive electricity market appealing.

With some effort, Green P&L finds some allies. The PUC joins Green P&L's opposition because widespread municipalization would reduce its power. The local government units in which Green P&L's generating plants are located oppose municipalization because of their potential loss of jobs and tax revenues. Many local government units have long used utility assets as cash cows, subject to disproportionately high taxes that are viable only because of the utility's monopoly power. Owners of other assets that may be subject to potential municipalization, e.g., professional sports franchises, agree to oppose the effort to make municipalization easier and less expensive. A vigorous battle then takes place in the state legislature, with indeterminate results. If Smithville prevails and municipalizes, other cities in Green soon will follow, with rural and suburban counties not far behind the cities. Once deintegration and the resulting competitive market reduce electricity prices in Smithville and other parts of Green, mayors of similarly situated cities in other states, and the legislatures in those states, will experience intense political pressure to follow the examples of Smithville and Green.

It is difficult to predict the initial outcome of this controversy in any particular state. The political variables that will affect the outcome in any particular state are too complicated to permit confident prediction. However, it seems highly likely that utilities eventually will lose this battle. The forces that allow this scenario to unfold exist in many cities and states. Eventually, a utility will lose one of the many municipalization battles in some state. Once that happens, and some major city achieves a substantial resulting decrease in electricity rates, the deintegration through municipalization movement will develop momentum so great that utilities will be unable to defeat it in any state or city. Once consumers recognize that the transition to a competitive electricity market will reduce their bills by $20 to $30 billion per year, the transition will be supported by populist forces far more powerful than the loose coalition of industrial consumers and academic analysts that now provide the primary impetus in support of the transition.

A utility that faces a plausible threat of municipalization of its distribution assets to effectuate a transition to a competitive market can preempt that threat by acting in a manner that is likely to produce better results both for it and for the performance of the electricity market. It can deintegrate voluntarily by spinning off its distribution assets into a subsidiary. By acting in that manner, the utility can retain control of its distribution assets, avoid the high cost and uncertainties associated with a contested municipalization, and commit voluntarily to provide a structural framework that is conducive to creation of a fully competitive wholesale

market. Moreover, the state PUC will retain its regulatory power over the newly formed distribution company.

If the distribution subsidiary were wholly-owned by the parent or tied to the parent with long-term, high-priced power contracts, the pro-competition forces would not consider such a corporate restructuring sufficient to assure consumers the benefits of competition. It is notoriously easy for corporate affiliates to engage in abusive regulatory self-dealing by, *inter alia*, making purchases from affiliates at above market prices, and it is notoriously difficult for regulators to detect and to prohibit all abusive self-dealing.[88] The utility can make its commitment to competition credible, however, in one of two ways. First, it can simply spin-off its distribution assets into an independent corporation. Second, it can adopt a non-traditional corporate structure of the type urged by William Baumol and Gregory Sidak in their 1994 book on telecommunications policy.[89] The subsidiary could have "two classes of stock, one with voting rights but with a negligible claim to the affiliated corporation's residual net cash flows, the other with negligible (or no) voting rights but with a claim to virtually all the affiliate's residual net cash flows."[90] Both classes of shares must be publicly traded, and the second class of shares must be owned by unaffiliated individuals or institutions. As Baumol and Sidak demonstrate, this corporate structure diminishes significantly the risk of undetected regulatory self-dealing. It reduces the incentive to engage in abusive self-dealing and provides market based methods of detecting self-dealing. The structure also has the advantage of allowing the utility to continue to take advantage of all available economies of scale and coordination. If the electricity transition is implemented in this manner, transition costs will be allocated through contracts between the parent and the new subsidiary as part of an overall resolution of a municipalization dispute with a unit of local government.

The FERC should exercise its regulatory powers in ways that are designed to encourage the kind of industry restructuring that will produce a rapid transition to an efficient electricity market. FERC's effort to nurture RTGs is a step in that direction.[91] The FERC also should look actively for opportunities to encourage vertical deintegration of distribution assets. It should be able to identify forms of "sticks," that it can apply to utilities that retain the vertically integrated structure that interferes with FERC's statutory mandate to create a competitive wholesale market, and "carrots" it can make available to utilities that restructure in ways that will further the congressional goals that underlie the equal access provision of the EPA.[92] It could, for instance, condition utilities' authority to make wholesales at market-based rates or to reallocate transition costs to customers on their adoption of corporate structures that allow each utility's own customers to

88. *See* RICHARD J. PIERCE, JR., ECONOMIC REGULATION 289-92 (1994).

89. BAUMOL & SIDAK, *supra* note 27, at 130-37.

90. J. Gregory Sidak, *Telecommunications in Jericho*, 81 CAL. L. REV. 1209, 1218 (1993).

91. Massey, *supra* note 70.

92. *See, e.g.*, O'NEILL & WHITMORE, *supra* note 27, at 13; Pierce, *supra* note 82, at 1228-30.

obtain the benefits of access to a competitive wholesale market. The FERC used similar incentive systems to good effect in managing the gas transition[93] and in inducing utilities to provide transmission service prior to the enactment of the EPAct.[94] Through some combination of these mechanisms, vertical deintegration and a fully competitive wholesale electricity market seem inevitable.

III. CONCLUSION

The precise path or pace of the electricity transition is unknown, but four predictions can be made. First, the transition will be virtually complete within the next five years. Second, the pace of the transition will accelerate rapidly at some unpredictable point in the transition process when the consumer benefits of deintegration and competition become obvious to the public. Third, neither the path nor the pace of the transition will prove to be manageable by any single institution. Fourth, utilities with high costs when the transition sweeps over them will not survive the transition. They will be unable to reallocate to others enough of their massive transition costs to remain financially viable.

These predictions are not pessimistic. The permanent social welfare gains potentially available from a transition to a fully competitive electricity market dwarf even the highest estimates of the one-time, already sunk, costs of the transition. A post-transition electricity market has the potential to perform at least as efficiently as the post-transition gas market.

It is important, however, that utilities recognize the inevitability of the transition for purposes of their internal decision-making, notwithstanding the predictable vigor with which many will resist the transition. Utilities that reduce their costs rapidly and aggressively and make the many other changes in corporate culture required to participate effectively in a dynamic competitive market will survive the transition and will prosper in the post-transition environment. Utilities that devote all of their resources to resisting the transition, and indulge the tendency to deny the inevitability of the transition, will not be around to participate in the post-transition market.

Utilities also need to resist the tendency to become so preoccupied with minimizing transition costs that they neglect the process of devising a new legal regime that is capable of producing an efficient and reliable post-transition electricity market. While the FERC must take the lead in that process, the task is so difficult and multi-faceted that the FERC cannot hope to be successful without the active assistance of utilities. The FERC desperately needs help in crafting regulatory rules that will produce healthy incentives for socially beneficial patterns of investment and transactions, and in nurturing the new institutions and ways of doing business

93. The equal access regime of Order 436 was implemented in this manner. Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1, 24-25 (1988); Pierce, *supra* note 28, at 10-11.

94. Pierce, *supra* note 28, at 32-36.

that are critical to creation of an efficient and reliable post-transition electricity market. The electric utility community cannot allow the bitter conflicts among market participants that will occur throughout the transition process to mask the reality that all market participants share an interest in creating a new legal environment that will allow the electricity market to function efficiently once the transition is complete.