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Recommended Citation

Richard J. Pierce Jr., Realizing the Promise of Restructuring the Electricity Market, 40 Wake Forest L. Rev. 451 (2005).

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REALIZING THE PROMISE OF RESTRUCTURING THE ELECTRICITY MARKET

Richard J. Pierce, Jr.*

The proposal set forth in this article would create a contestable market for bulk power in which all bulk power transactions would be governed by relational contracts. In this regulatory regime, the participants in the newly created market for bulk power would be forced by competitive pressures to minimize costs, to achieve greater economies of scale through restructuring, and to adopt pricing policies based on marginal cost. The benefits available from reform of the electricity industry under this proposal may well exceed the aggregate gains from all prior deregulation initiatives.¹

I stand by the claims I made about deregulating and restructuring of the bulk power market almost twenty years ago—it has the potential to save the nation many billions of dollars per year by improving the efficiency of both the structure and the operation of the electricity market. Indeed, deregulation of the wholesale power market has already had those effects in the one region in which it has been fully implemented. The mid-atlantic region was restructured and subjected to a governance structure that relies primarily on competition in 1997. By 2002, the region was saving over three billion dollars per year, and generating plants in the region had improved their operating performance by five to twenty percent as a result of the competitive pressures unleashed by the restructuring process.²

I must admit, however, that the restructuring process has been far more difficult than I expected. Like the other long-time participants in the restructuring process, I began with optimism and enthusiasm that has been replaced by frustration over the last few

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¹ Richard J. Pierce, Jr., A Proposal to Deregulate the Market For Bulk Power, 72 Va. L. Rev. 1183, 1235 (1986).

² Kira Markiewicz, Nancy Rose & Catherine Wolfram, Has Restructuring Improved Operating Efficiency at US Generating Plants? Center for the Study of Energy Markets, University of California Energy Institute 2 (2004); Ronald J. Sutherland, Estimating the Benefits of Restructuring Electricity Markets: an Application to the PJM Region, Center for the Advancement of Energy Markets 4 (2003).

years. In this essay, I will provide an overview of the peaks and valleys that we have encountered on the bumpy road to a restructured electricity market.

In part I, I describe the reasons why I joined with other scholars in an effort to restructure the electricity market in the mid-1980s. The market was characterized by large, well-documented structural and operational maladies; it had performed poorly for over a decade; its basic characteristics were consistent with increased reliance on market forces as an effective governance mechanism; and, our recent success in restructuring analogous markets provided cause for optimism that we could implement a socially-beneficial restructuring of the U.S. electricity market.

In part II, I describe what we expected to happen in the restructuring process. We were aware of some of the serious obstacles we would have to overcome, but we believed that we could borrow enough of the elements from the recent successes of the U.S. effort to restructure its natural gas market and the British effort to restructure its electricity market to design and implement a socially-beneficial restructuring of the U.S. electricity market. By unbundling the natural monopoly functions from the functions that are susceptible to effective competition and forcing the participants in the structurally-competitive functions to compete with each other, we believed that we could replace the inefficient, ineffectively-regulated local monopoly service providers with robustly competitive regional markets in which competition forced service providers to reduce their bloated costs and to abandon their inefficient methods of operation.

In part III, I describe where we are in the restructuring process today. We have achieved a high degree of success in one region – the middle atlantic – and we have made considerable progress throughout the northeast, but the effort to create an efficient

national market has stalled. We also have one growing problem – increasingly inadequate transmission capacity -- that eventually will cause even the efficiently-functioning middle atlantic market to perform in an unacceptable manner.

In part IV, I describe the combination of economic, legal, and political problems that have produced this frustrating situation. I argue that the economic and legal problems could be solved if we had the political will to do so, but that a few ineffectively regulated regional monopolists in the southeast and northwest have capitalized opportunistically on the Enron and California scandals to block further progress in restructuring the national market.

In part V, I suggest potential ways in which we can overcome the political obstacles to completion of the process of restructuring the national electricity market. With patience and persistence, I am confident that we can eventually bring to the rest of the country the substantial benefits of restructuring that the middle atlantic states are already enjoying.

I. WHY RESTRUCTURE?

A. The Status Quo Ante Was Irreparably Broken

At the time I began to argue in support of the need to restructure the electricity market in the mid-1980s, electricity in the United States was provided by over two hundred utilities. The ownership structure of the industry was complicated and varied, but most consumers purchased electricity from a privately-owned monopoly service

provider that was regulated primarily by one or more state public utility commissions (PUCs). The vast majority of electric utilities were completely vertically integrated – each engaged in generation, transmission, and distribution of electricity.

Between 1948 and 1974, several excellent studies had documented the existence of serious problems with the structure and performance of the market.³ The best of the lot was reported in a book published by the Brookings Institution in 1974 and written by then-Professor, now-Justice Stephen Breyer of Harvard and Paul MacAvoy of Yale.⁴ They analyzed the structure and performance of the market and found it wanting in many respects. They found that the combination of utilities that were too small to take advantage of available economies of scale, unwilling to coordinate their operations with each other, insulated from competitive pressures by regulation, and ineffectively regulated, created an inefficient market in which the U.S. wasted many billions of dollars of resources each year.⁵

The Breyer and MacAvoy study did not initially create any widespread movement in support of restructuring the electricity market. The public and politicians were content with the seriously flawed structure of the market because a steady stream of technological innovations had produced a continuous decrease in the price of electricity.⁶ Neither the public nor our elected representatives pay much attention to a

³ E.g., The Twentieth Century Fund, *Electric Power and Government Policy* (1948); James Meeks, *Concentration in the Electric Power Industry: The Impact of Antitrust Policy*, 72 *Colum. L. Rev.* 64; John Miller, *A Needed Reform in the Organization and Regulation of the Interstate Electric Power Industry*, 38 *Fordham L. Rev.* 635; Leland Olds, *The Economic Planning Function Under Public Regulation*, 48 *Am. Econ. Rev.* 553 (1958).

⁴ Stephen Breyer & Paul MacAvoy, *Energy Regulation by the Federal Power Commission* (1974).

⁵ *Id.* at 89-121.

⁶ Paul L. Joskow, *Inflation & Environmental Concern: Structural Change in the Process of Public Utility Price Regulation*, 17 *J. L. & Econ.* 291, 306-309 (1974).

market unless and until the price of the good or service sold in the market begins to increase significantly.⁷

Shortly after publication of the Breyer and MacAvoy study, the price of electricity began to increase sharply. Between 1974 and 1984, the average price of electricity in the U.S. increased by approximately 250 per cent.⁸ That large price increase attracted the attention of consumers and politicians.⁹ State PUCs and state legislators took many actions in response to the populist clamor to do something to stop the greedy utilities from ripping off the helpless consumers.¹⁰ I will describe some of those extraordinarily counterproductive measures shortly,¹¹ but the increased public and political salience of electricity issues also had a beneficial effect. Scholars began to increase their efforts to understand the electricity market and to consider ways of restructuring that market to produce better results.

In 1983, Paul Joskow and Richard Schmalensee of MIT published a book that remains today the most thorough analysis of the structure and performance of the U.S. electricity market.¹² They recognized the existence of serious flaws in the market and the potential for beneficial restructuring,¹³ but they also counseled caution because of the characteristics of the electricity market that render it more difficult to

⁷ Id. at 300-314.

⁸ Energy Information Administration, Table 8.6: Average Retail Prices of Electricity, 1960-2002, EIA website (visited Aug. 20, 2004).

⁹ Richard J. Pierce, Jr., Public Utility Regulatory Takings: Should the Judiciary Attempt to Police the Political Institutions? 77 *Geo. L. J.* 2031, 2048-2049 (1989).

¹⁰ 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, 1347-1348, 1354-1376 (1993); Pierce, *supra*, note 9, at 2049-2053.

¹¹ Text at notes 24-25 *infra*.

¹² Paul L. Joskow & Richard Schmalensee, *Markets for Power: An Analysis of Electric Utility Deregulation* (1983).

¹³ Id. at 4-8, 82-90, 215-221.

restructure than any of the other markets that the U.S. had recently restructured.¹⁴ Joskow and Schmalensee expressed concern that a restructured market might actually perform worse than the pre-existing market if the architects of reform did not recognize the unique features of the electricity market and reflect those features in the new market structure.¹⁵ The unique features that concerned Joskow and Schmalensee included the extreme variation in the quantity of electricity demanded at different points in time, the inability to store electricity economically, the resulting need to equate the highly variable quantity produced and quantity demanded precisely at every location and at every second, and the complicated manner in which electricity flows over an integrated transmission grid so that a change in supply, demand, or transmission capacity in one location can have major effects on the availability of electricity five hundred or even one thousand miles away.¹⁶

I wrote the article quoted at the beginning of this article in 1986 largely in response to the Joskow and Schmalensee book. I acknowledged the validity of the many reasons for caution they identified,¹⁷ but I argued that we needed to embark on a restructuring project anyway because Joskow and Schmalensee had understated the extent and adverse effects of the flaws in the existing market.¹⁸ I summarized the problems that Breyer and MacAvoy had identified in 1974¹⁹ and described serious new problems that had arisen since Breyer and MacAvoy published their study.²⁰ In another article I co-authored with Bernie Black in 1993, I updated that list of

¹⁴ Id. at 109-198.

¹⁵ Id. at 26-29, 59-62, 109-138, 154-156.

¹⁶ Id. at 62-66. See also Paul L. Joskow, *The Difficult Transition to Competitive Electricity Markets in the U.S.*, AEI-Brookings Joint Center for Regulatory Studies 9-13 (2003).

¹⁷ Pierce, *supra*. note 1, at 1219-1221.

¹⁸ Id. at 1191-1208.

¹⁹ Id. at 1192-1197.

²⁰ Id. at 1197-1208.

problems in the performance of the pre-existing market by adding more problems that had surfaced after I wrote the 1986 article.²¹ A brief summary of five of the problems I documented in 1986 and 1993 should suffice to explain why I perceived a critical need to initiate a restructuring effort notwithstanding the many good reasons for caution identified by Joskow and Schmalensee.

(1) The standard ratemaking formula used by all PUCs contains a massive temporal bias.²² Basically, it treats a capital investment as if it costs approximately four times as much in its first year of operation as in its twentieth year of operation.²³ When coupled with the larger and more lumpy patterns of capital investments utilities were required to make in the 1970s and 1980s, this temporal bias distorted all prices and consumer purchasing incentives. It also sent consumers, the general public, and politicians seriously inaccurate signals that implicitly suggested that old, economically and environmentally obsolete generating units were good, while new more efficient and cleaner units were bad.

(2) The combination of cost-of-service regulation of retail electricity rates, ownership of transmission lines and generating plants by the same firms that distributed and sold the electricity to consumers, and ineffective regulation of the prices paid by distributors to purchase electricity from their corporate affiliates, allowed utilities to engage in extensive self-dealing that inflated the prices they charged consumers.

²¹ Black & Pierce, *supra*. note 10, at 1347-1348, 1354-1384.

²² Pierce, *supra*. note 1, at 1202-1203.

²³ Peter Navarro, Bruce Peterson & Thomas Stauffer, A Critical Comparison of Utility-type Ratemaking Methodologies in Oil Pipeline Regulation, 12 *Bell J. of Econ.* 392 (1981).

(3) Many state PUCs and state legislators had implemented well-intentioned, but poorly conceived programs in which they forced utilities to enter into long-term contracts with entities called “qualified facilities” or “QFs” at prices several times the market price of electricity²⁴ and in which they allowed utilities to use ratepayer funds to purchase inefficient “conservation equipment” that consumers never would have purchased if they were free to make the decision whether to invest in the equipment, e.g., expensive low energy-consumption light bulbs that consumers rarely used because they did not like the quality of the light they produce.²⁵

(4) Utilities made approximately one hundred billion dollars of investments in capital assets that proved to be either unnecessary, unnecessarily expensive, or premature.²⁶ Those investments were predicated on market forecasts that proved to be seriously flawed.²⁷ All firms make some bad investments based on forecasting errors, but there were two good reasons to believe that cost-of-service regulation of electric utilities greatly increased the risk of bad forecasts that produce bad investments. First, while unregulated participants in competitive markets suffer massive losses if they make bad investments based on inaccurate market forecasts, regulated monopolists do not. They pass the costs of those investments on to ratepayers. As a result, regulated monopolists have much less incentive to make accurate market forecasts than do

²⁴ Black & Pierce, *supra*. note 10, at 1347-1348; Department of Energy Rep. No. PE-70404-H1, *Emerging Policy Issues in PURPA Implementation* 5.21–5.40 (1986); Michael A. Einhorn, *Avoided Cost Pricing: Who Wins?* *Pub. Util. Fort.*, May 30, 1985, at 33.

²⁵ Black & Pierce, *supra*. note 10, at 1362-1384; Testimony of Paul L. Joskow, FERC; *Electricity Demand Side Bidding: Hearing Before the Subcomm. on Energy and Power of the House Comm. on Energy and Commerce*, 100th Cong., 2d Sess. 30, 49-96 (1988).

²⁶ Pierce, *supra*. note 9, at 2048-2053.

²⁷ Richard J. Pierce, Jr., *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 *U. Penn. L. Rev.* 497, 500-505 (1984).

unregulated participants in competitive markets.²⁸ Second, in some common situations, the standard formula for calculating rates based on cost-of-service creates an incentive for regulated firms to make excessive investments in capital assets, so utilities had an incentive to make forecasts that overstated their apparent need for more capital investment.²⁹

(5) State PUCs and state legislatures overreacted to the investment mistakes of the utilities by disallowing in their rates over twenty billion dollars of their investments in generating plants.³⁰ As I have explained at length elsewhere, the unprecedented magnitude of the regulatory disallowances of the 1980s far exceeded any amount that could be justified based on a need to punish utilities for making errors of judgment.³¹

The first four problems had the effect of increasing the price of electricity far beyond the price at which electricity would sell in an unregulated competitive market. In several states, including California, New York, and Massachusetts, the regulated price of electricity in the mid-1980s was over twice the price at which electricity would sell in an unregulated competitive market.³² That, in turn, created a powerful political movement in support of restructuring of the electricity market. That movement was led by industrial consumers who found they were no longer able to compete because of their high electricity rates and by state politicians who watched

²⁸ Id. at 525-527.

²⁹ Id. at 506-507; Harvey Averch & Leland Johnson, Behavior of The Firm Under Regulatory Constraint, 52 Am. Econ. Rev. 1052 (1962).

³⁰ Pierce, *supra*. note 9, at 2049-2053.

³¹ Id. at 2049-2053; Pierce, *supra*. note 27, at 531-532, 556-560; A. Lawrence Kolbe & William B. Tye, The Duquesne Opinion: How Much “Hope” Is There for Investors in Regulated Firms? 8 Yale J. on Reg. 113 (1991).

³² The average price of electricity in each state in each month is reported in Energy Information Administration Table 5.6.A, Average Retail Price of Electricity to Ultimate Consumers by End Use Sector, By State, available on the EIA website. For comparisons between the retail price and the market price in the early 1990s, see Charles M. Studness, The Financial Cost of Utility Regulation, Pub. Util. Fort., Nov. 1, 1993, at 48; Olof S. Nelson & Roger W. Sant, Two IPP Points of View, Pub. Util. Fort., June 1, 1993, at 62,63.

industrial consumers vote with their feet by closing their high electricity-cost facilities and reallocating production to facilities in states with lower rates.³³

The fifth problem had the potential to create a severe shortage of electricity in the future.³⁴ Utilities in many states concluded that they could not justify putting their shareholders' money at risk by investing in generating plants that state politicians could then disallow in the utility's rates.³⁵ The unprecedented massive rate disallowances of the 1980s induced many utilities to refuse to invest in any state-regulated capital asset, no matter how critically important that asset might be to the utility's future ability to provide service. Those disallowances also had a major impact on the thinking of many utility executives.³⁶ Before the disallowances, utility CEOs were unanimously opposed to any proposed restructuring that would reduce their regulatory protections and increase their exposure to the cruel world of competition. After the disallowances, many utility CEOs were open to the possibility of such a restructuring.

Up to this point, I have discussed the problems with the structure and performance of the electricity market as if the problems were roughly the same across the country. That was not the case. There were, and still are, major regional differences that continue to have important effects on the politics of electricity restructuring. The

³³ Joskow provides an excellent description of the early stages of the process in Paul L. Joskow, *Deregulation and Regulatory Reform in the Electric Power Sector*, in *Deregulation of Network Industries: The Next Steps* (S. Peltzman & Clifford Winston, eds.), Brookings Press (2000). See also James L. Sweeney, *The California Electricity Crisis* 18-22 (2002); Charles M. Studness, *The Calm Before the Storm*, *Pub. Util. Fort.*, July 1, 1993, at 31; California Public Utility Commission, *Division of Strategic Planning, California's Electric Services Industry: Perspectives on the Past, Strategies for the Future* (1993).

³⁴ Sources in note 31, *supra*.

³⁵ A. Lawrence Kolbe & William B. Tye, *The Fair Allowed Rate of Return with Regulatory Risk*, 15 *Res. in L. & Econ.* 129 (1992).

³⁶ Black & Pierce, *supra*. note 10, at 1347.

major differences lie in three areas – industry structure, regulatory climate, and degree of access to federally-subsidized resources.

The structure of the industry differs significantly by region. Generally, utilities in the southeast, lower midwest, and west are much larger than utilities in the northeast and upper midwest. The extraordinarily balkanized utility structure in the northeast and upper midwest limits severely the ability of the utilities in those areas to operate on an efficient scale, while large, multi-state firms like PacifiCorp, American Electric Power, Entergy, and The Southern Company are in a much better position to take advantage of available economies of scale and coordination.

The state regulatory environment in which utilities operate also varies greatly by region. Utilities in the northeast and California were subjected to costly regulatory obligations to purchase high cost power from QFs and to make extravagant and inefficient investments in “conservation.” Utilities in other parts of the country were not burdened with those costly regulatory obligations. Similarly, the massive investment disallowances of the 1980s were imposed disproportionately on utilities in California and northeastern states. Utilities in the lower midwest and southeast experienced virtually no disallowances. They remained profitable throughout the period in which utilities in the northeast and California were experiencing severe problems retaining access to capital markets.

Finally, utilities vary with respect to their access to subsidized resources. In particular, utilities in the northwest have legally preferred access to the large quantity of federally-subsidized hydroelectricity that is generated by the dams owned and operated by the Bonneville Power Administration.

The net effects of these differences included much higher electricity prices in California, the northeast, and the upper midwest than in the northwest, lower midwest, and southeast.³⁷ That, in turn, created a political environment in which there was much stronger popular and political support for restructuring in California, the northeast, and the upper midwest, than in the southeast, lower midwest, and northwest. People in the regions with low electricity prices could not understand what all the fuss was about. They were content with the status quo ante, and many feared that the restructuring movement was designed to allow outsiders to “steal” their low-cost resources. That concern is particularly strong in the northwest, where federally-subsidized hydropower is considered sacrosanct, but it is also powerful in the southeast and lower midwest, where a high proportion of the electricity is generated in low-cost coal plants that would not be politically acceptable in the northeast or in California.

In addition, many politicians in the low-cost states saw the high cost of electricity in other states as a valuable opportunity. Some states used the relatively low cost of their electricity as a tool in encouraging industrial firms to close their plants in high cost states and to open new plants in low cost states. Thus, for instance, California lost many facilities (and jobs) to states like Utah, Nevada, and Idaho.

The regulatory differences among the states have also produced dramatically different attitudes among utility executives. CEOs of utilities in high-cost, high investment disallowance states like New York, Massachusetts, and California became enthusiastic proponents of restructuring, while CEOs of utilities in low-cost, no investment disallowance states were pleased with the status quo ante. They were

³⁷ Energy Information Administration, *supra.*, note 32.

leading the quiet, comfortable life of an ineffectively regulated monopolist and had no desire to be thrust into a new world in which they would actually have to compete to survive and prosper.

Those utilities became known in the trade as the “just say no” group. They have become far more sophisticated in the positions they take today. They often say that they support restructuring but then argue in support of methods of restructuring that would be patently ineffective.³⁸ Many also say that they support restructuring, but that the state PUCs that regulate them will not allow them to participate in the restructuring process, while they quietly urge those same PUCs to continue to forbid them from participating in the restructuring process.³⁹ Behind all of these clever verbal subterfuges, however, the “just say no” group is still just saying no. They are using all of the formidable political resources at their disposal to block the nationwide movement to restructure the electricity market that the FERC has been leading for the past decade. Of course, the tremendous variation in the rates charged by utilities is itself powerful evidence of inefficiency in the pre-existing structure and performance of the electricity market. In a competitive market, the high-cost suppliers have no choice but to reduce their costs and to become more efficient to match the performance of the low cost suppliers in order to survive.

³⁸ Thus, for instance, utilities in Florida proposed to create a “competitive market” that included only the state of Florida and then proceeded to use state law to preclude third parties from constructing generating plants in the state, thereby rendering competition impossible. *Tampa Electric v. Garcia*, 767 So. 2d 428 (Fla. 2000). Utilities in the midwest blocked restructuring by attempting to create two different “swiss cheese” markets in which contiguous utilities were in different markets subject to inconsistent market rules. Richard J. Pierce, Jr. *Why FERC Must Mandate Efficiently Structured Regional ISOs*, *The Electricity Journal*, Jan./Feb. 1999, at 49.

³⁹ Thus, for instance, the Virginia Corporation Commission has forbidden Virginia utilities from participating in regional markets. See FERC Opinion No. 427, *New PJM Companies, et al.*, 107 FERC ¶ 61,271 (2004).

B. The Characteristics of the Electricity Market Are Consistent with a
Competitive Market

The powerful evidence that the electricity market was performing poorly that was available in the 1980s supported the need for some type of restructuring or regulatory reform effort, but the particular type of restructuring we urged was shaped primarily by the basic economic characteristics of the market. For most of the twentieth century, all of the main functions necessary to provide electricity service were natural monopolies. They were not susceptible to effective and efficient governance by an unregulated competitive market. Initially, provision of electricity was a local natural monopoly function the regulation of which was appropriately assigned to local governments. As transmission technology improved and generation economies of scale increased, utilities began to provide service beyond the boundaries of the localities that regulated them, and we wisely transferred regulatory responsibility from local governments to state PUCs. Gradually, however, additional changes in technology transformed the basic economic characteristics of the market.

Transmission and distribution remain natural monopoly functions. No one except the folks at Cato Institute support deregulation of transmission or distribution.⁴⁰ In fact, most proponents of restructuring of the electricity market have consistently argued that regulators need to increase the efficacy of regulation of transmission in a restructured market.⁴¹ Generation is no longer a natural monopoly function,

⁴⁰ Richard L. Gordon, Don't Restructure: Deregulate, 20 Cato J. 327 (2001).

⁴¹ E.g., Richard J. Pierce, Jr., The FERC Must Adopt an Efficient Transmission Pricing System Now, The Electricity Journal, Oct. 1997, at 79.

however.⁴² Two changes in technology have had dramatic effects on the generation market. First, transmission has become so efficient that electricity can now be transmitted many hundreds of miles over ultra high voltage lines at little cost. Second, development of extraordinarily efficient gas turbines now permits economic generation of electricity in units only a fraction of the size of the units that were essential for efficient generation just two decades ago. When those two changes are combined, it becomes obvious that generation is now a function that can, and should, be performed in an unregulated competitive market. In a restructured market, hundreds of generators can compete with each other to generate and sell electricity.

Changes in technology also have had major effects on the appropriate geographic scope of an electricity market. Just as improvements in transmission technology in the early twentieth century dictated a change in geographic scope from localities to states, the much larger improvements in transmission technology in the late twentieth century require a change in geographic scope from states to regions, nations, or even continents. Indeed, the most efficient geographic scope for an electricity market today is continental.⁴³ The amount of electricity generated in Ontario affects the amount and cost of the electricity available in Florida, while the amount of electricity consumed in California affects the amount of electricity that must be generated in Alberta and the price of electricity purchased in Salt Lake City. Electricity on an integrated transmission grid flows in extraordinarily complicated and volatile ways in inverse

⁴² Richard J. Pierce, Jr., Using the Gas Industry as a Guide to Restructuring the Electricity Industry, 13 Res. in L. & Econ. 7, 17 (1991).

⁴³ This creates a potential problem, since there is no agency that has jurisdiction over electricity transactions across north america. So far, however, the governments of Canada and Mexico have cooperated with FERC's efforts to create competitive markets that cover the entire continent.

proportion to the resistance on each line.⁴⁴ North America consists of three integrated transmission grids – one in the east, one in the west, and one that covers about two-thirds of Texas. Electricity markets in north america should have geographic scopes that correspond to the boundaries of the three integrated grids.⁴⁵ State boundaries are, or should be, totally irrelevant. Electrons pay no attention to state laws or boundaries.

Before I leave the topic of the appropriate scope of an electricity market, I should discuss briefly another important scope issue. In this article, I will discuss only restructuring and deregulation of the wholesale electricity market. It is much easier to structure an effectively-competitive wholesale electricity market than to structure an effectively-competitive retail market. I have explained why that is true at some length elsewhere.⁴⁶ In short, as the size of the typical transaction declines, transaction costs increase relative to transaction benefits until at some point costs exceed benefits. Thus, it is relatively easy to design a market in which electricity distributors and industrial consumers that purchase large quantities of electricity can obtain large net benefits as a result of their access to a competitive market, but it is devilishly difficult to design a market in which small consumers can obtain net benefits by purchasing on a competitive market.

So far, the U.S. has failed in its efforts to create effectively competitive retail electricity markets, though the success of the British suggests that eventually we may

⁴⁴ Pierce, *supra*. note 42, at 22-24.

⁴⁵ Michael Bailey & Christopher Eaton, *Moving toward Seamless Energy Markets: Evidence from the Northeast*, *The Electricity Journal*, July 2001, at 51; Pierce, *supra*. note 38.

⁴⁶ I explained the problem in the context of retail natural gas markets, but retail electricity markets pose identical problems. Richard J. Pierce, Jr., *Intrastate Natural Gas Regulation: an Alternative Perspective*, 9 *Yale J. on Reg.* 407 (1992). See also Paul Joskow & Jean Tirole, *Retail Electricity Competition*, presented at the Ninth annual POWER Conference, UC Berkeley, March 19, 2004.

be able to accomplish that goal as well.⁴⁷ In any event, it is important to recognize that all consumers benefit greatly from creation of a competitive wholesale market. If the replacement of a monopoly supplier with a competitive market allows a distributor to reduce its acquisition costs by twenty per cent, for instance, all of the distributors' customers benefit from that change in market structure.

C. The Success of Other Restructuring Efforts

The third factor that contributed to my decision to join other academics in proposing ways of restructuring the wholesale electricity market was the success that the U.S. and other nations had enjoyed in restructuring roughly analogous markets. During the 1970s and 1980s, the U.S. restructured its financial market, long distance telecommunications market, trucking market, rail-freight market, air transport market, and natural gas market.⁴⁸ In each case, the results included billions of dollars of annual cost savings and efficiency enhancements.⁴⁹ Many of the proponents of electricity restructuring had played active roles in those earlier restructuring programs. I had been particularly active in the process of restructuring the natural gas market – the market that provides the closest analogy to the electricity market.⁵⁰ Like the other academic proponents of electricity restructuring, I analyzed the results of those prior efforts, concluded that they were successful, identified the characteristics

⁴⁷ Joskow, *supra*. note 16, at 24-37.

⁴⁸ Richard J. Pierce, Jr. & Ernest Gellhorn, *Regulated Industries* 339-408 (4th ed. 1999).

⁴⁹ *Id.* at 339-408.

⁵⁰ E.g., Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 *En. L. J.* 1 (1988); Richard J. Pierce, Jr., *Reconsidering the Roles of Regulation and Competition in the Natural Gas Industry*, 97 *Harv. L. Rev.* 345 (1983).

of the markets that explained their success, and found enough analogous characteristics of the electricity market to be confident of similar success in restructuring the electricity market.⁵¹ In addition, by the time the U.S. began to look seriously at the possibility of restructuring its electricity market, the British and Scandinavians had already achieved a significant measure of success in restructuring their electricity markets.⁵² Each of these past successes was both a source of optimism about the prospects for a successful restructuring of the U.S. electricity market and a potentially valuable source of insights with respect to the kinds of restructuring and related reforms that have proven effective in a variety of circumstances.

II. WHAT WE EXPECTED IN THE RESTRUCTURING PROCESS

A. Obstacles to Restructuring

We did not expect the process of restructuring the electricity market to be quick or easy. At the outset, we were aware of several serious problems we would have to overcome. The Joskow and Schmalensee book had identified quite a few formidable obstacles to a socially-beneficial restructuring.⁵³ First, the very nature of electricity gives rise to unique market characteristics that must be accommodated in a market design. Electricity demand varies over time by as much as a factor of ten; it cannot be

⁵¹ Pierce, *supra*. note 42; Richard J. Pierce, Jr., The State of the Transition to Competitive Markets in Natural Gas and Electricity, 15 En. L. J. 323 (1994).

⁵² See Lars Bergman & Bo Andersson, Market Structure and the Price of Electricity, Stockholm School of Economics (1994); Swedish Energy Commission, Summary of the Electricity Market in Change Proposal (1993); Richard Green & David Newbery, Competition in the British Electricity Spot Market, 100 J. Pol. Econ. 929 (1992).

⁵³ Joskow & Schmalensee, *supra*. note 12, at 109-198.

economically stored; and, it flows around an integrated transmission grid in constantly changing patterns in inverse proportion to the impedance on each of the thousands of lines that comprise the grid. Thus, any market must be capable of equating the highly variable supply and demand precisely at every second at each of the thousands of nodes at which power enters or leaves the grid.

Second, the pre-existing ownership structure of the assets that are used to perform each of the functions necessary to provide electricity service was fundamentally inconsistent with a new market design that would rely to a greater extent on competition and market forces to produce socially desirable results. Ideally, functions that are susceptible to governance by unregulated competition should be performed by firms that are unrelated to the firms that perform the natural monopoly functions. Thus, for instance, generating units should not be owned and operated by firms that also own and control transmission and distribution lines.⁵⁴ Firms that engage in transmission or distribution have monopoly power in performing those functions. If a firm that engages in distribution or transmission also engages in generation and wholesale of electricity, it has both the ability and the incentive to discriminate in favor of its own generating activities, e.g., a transmission or distribution firm has the ability and incentive to buy electricity from itself for five cents per kilowatt hour (kwh), rather than from an independent competitor for three cents per kwh. Yet, the pre-existing ownership structure was dominated by vertically-integrated utilities, i.e., the same firm typically owned all of the transmission lines, distribution lines, and generating units in a particular locality. The systemic self-dealing and discrimination

⁵⁴ The problems created by this characteristic of the pre-existing structure of the market are described in Richard J. Pierce, Jr., *The Advantages of De-integrating the Electricity Industry*, *The Electricity Journal*, November 1994, at 16.

that was certain to be produced by voluntary transactions in such a market was inconsistent with creation of an effectively competitive wholesale market.

The pre-existing ownership structure was inconsistent with creation of an efficient wholesale market in other important ways as well. In some areas, one or a few firms owned a percentage of the generating assets in a region that was too high to support a confident prediction that effective competition would evolve in the wholesale market.⁵⁵ In all areas, the ownership pattern of transmission assets was totally incompatible with creation of an effectively competitive wholesale market. North America has three integrated transmission grids – one in the east, one in the west, and one that serves about two-thirds of Texas. Those grids are ruled by the laws of physics, not the laws of man. Each operates as a single unit in which a small change in input, output, or capacity in a single location has potential effects at every other location on the grid.

Each regional transmission grid should be owned and operated by a single entity – either a regulated private firm or a governmental entity with jurisdiction that corresponds to geographic scope of the grid it owns. In other words, the eastern and western grids should be owned and operated by a single entity and that entity should be either owned by, or regulated by, the federal government. That is the pattern of ownership and control of transmission grids on every continent except north america. The pre-existing pattern of ownership of transmission assets in north america was (and still is) totally inconsistent with efficient operation of the grid. Each of approximately two hundred entities owns portions of the eastern and western grids. That structure is not only incompatible with creation of an effectively-performing

⁵⁵ Richard J. Pierce, Jr., *Antitrust Policy in the New Electricity Industry*, 17 En. L. J. 29 (1996).

competitive wholesale electricity market, it is incompatible with efficient performance of any conceivable version of the north american electricity market.⁵⁶

Third, the legal environment was poorly-suited to the restructuring task. Ideally, restructuring should be implemented by a federal agency with broad regulatory power and with the power to force changes in the ownership of the assets that perform the functions needed to supply electricity. Instead, FERC had only the limited regulatory powers conferred upon it by the Federal Power Act.⁵⁷ That 1935 statute was enacted before the eastern and western transmission grids existed. At that time, the vast majority of activities involved in the generation, transmission, distribution, and sale of electricity took place within a single state and affected only the citizens of that state. The Federal Power Act was enacted to fill the gap in state regulatory authority that the Supreme Court had created by holding that no state could regulate interstate wholesales of electricity.⁵⁸ In 1935, only a small fraction of electricity transactions had any interstate effect. Today, virtually all electricity transactions have interstate effects. Yet, the Federal Power Act retains the jurisdictional allocation of authority that fit the geographic scope of the market in 1935. States have most of the regulatory authority over electric utilities, with FERC relegated to a minor role.

B. A Plan for Restructuring

⁵⁶ Pierce, *supra*. note 38.

⁵⁷ 16 U.S.C. §§791a-825u. Congress conferred additional powers on FERC in the Energy Policy Act of 1992, Pub. L. No. 102-486. initially, some people believed that those powers would be useful to FERC, but FERC has found them far too limited to be of any use in the restructuring process.

⁵⁸See *FPC v. Southern California Edison Co.* 376 U. S. 205 (1964).

I was optimistic that FERC could implement an effective electricity restructuring and regulatory reform process notwithstanding the difficulty of the task and the obstacles it had to overcome. At the time, FERC had just completed an extraordinarily successful restructuring of the natural gas market.⁵⁹ FERC had used a carefully-crafted combination of carrots and sticks to induce the participants in that market to acquiesce in the kind of massive changes that were required to transform the fatally ill system of pervasive regulation of natural gas into an efficient unregulated competitive wholesale gas market. Federal courts had played critical roles in support of that remarkable transformation. FERC had been successful in persuading the federal courts that the status quo ante in the gas market was unacceptable – “unjust, unreasonable, and unduly discriminatory” in the language of the Natural Gas Act⁶⁰ – and that the participants in the gas market had to acquiesce in FERC’s restructuring initiatives in order to comply with the broad statutory standards in the Natural Gas Act.⁶¹ The Federal Power Act incorporates the same broad legal standards as the Natural Gas Act, and the pervasively regulated electricity market was performing as miserably as was the gas market when FERC restructured that market.⁶² I believed that FERC could reconstitute the electricity market using a variation of the basic legal strategy it had used to such good effect when it reconstituted the natural gas market.⁶³

⁵⁹ Pierce, supra. note 52; Pierce, supra. note 51.

⁶⁰ 15 U.S.C. §§717-717z.

⁶¹ E.g., *Associated Gas Distributors v. FERC*, 824 F. 2d 981 (D.C. Cir. 1987) (upholding FERC rule that required gas pipelines to provide equal access to third party owners of gas).

⁶² Pierce, supra. note 38, at 54-56.

⁶³ Pierce, supra. note 42, at 31-40.

By the time the U.S. began the process of restructuring its electricity market, the basic elements of the required restructuring were well known from both the U.S. experiences in restructuring other markets and from the British and Scandinavian experiences in restructuring their electricity markets.⁶⁴ Step one was functional unbundling. Generation and wholesale of electricity could be governed effectively by an unregulated competitive market only if those functions could be separated from the natural monopoly functions of distribution and transmission. Ideally, that functional unbundling would take place through changes in ownership – asset divestiture – induced by FERC. As a second best, it could be implemented by requiring firms that own both transmission lines and generating assets to provide equal access to their transmission lines to electricity generated and sold by third parties.

Step two was rationalization of the structures of the generation and transmission functions. In the case of generation, FERC could induce enough “voluntary” divestiture to assure a structurally competitive market by conditioning a firm’s ability to make sales at unregulated prices on the firm’s willingness to engage in sufficient divestiture to preclude it from exercising market power. Restructuring of transmission presented a greater challenge. Ideally, FERC would induce transmission asset owners to consolidate their assets under the ownership of a single firm. As a second best, FERC would leave the fragmented ownership structure intact initially, but would induce the owners to place control of all of the assets that comprise a regional grid in the hands of a single entity.

⁶⁴ The basic elements of the restructuring process are described in Pierce & Gellhorn, *supra*. note 48, at 364-378, and in Joskow, *supra*. note 16, at 8-9.

Bill Hogan of Harvard's Kennedy School provided the last essential element of a viable plan to restructure the U.S. electricity market. In 1993, he published "Electric Transmission: A New Model for Old Principles."⁶⁵ In that article, Hogan described and explained how to design a computer-implemented auction market that would clear the electricity market at each node on a grid at each point in time and reflect the existence of scarce transmission capacity at some times and places by calculating automatically the market price of electricity at each of the thousands of nodes on an integrated transmission grid. The Hogan model solved one of the most important and difficult problems in the restructuring process – how to price transmission. Hogan's system of auction-created nodal prices allows the price of electricity to increase significantly at any node on the grid at which transmission capacity becomes constrained. That increased nodal price simultaneously prices both electricity itself and transmission of electricity, clears the market, allocates scarce transmission capacity to the highest value uses, and provides a price signal indicating the need to expand capacity in order to eliminate or reduce the scarcity of the capacity available to serve that node. With Hogan's plan in hand, we were in a position to embark on the restructuring process with optimism.

III. THE RESULTS OF THE RESTRUCTURING PROCESS TO DATE

A. Near Complete Success in the Middle Atlantic Region

⁶⁵ William W. Hogan, Electric Transmission: A New Model for Old Principles, The Electricity Journal, March 1993, at 18.

The restructuring process has already achieved near complete success in the middle atlantic region, referred to as P-J-M in the electricity industry. P-J-M includes Pennsylvania, Maryland, New Jersey, Delaware, and the District of Columbia. In this region, many utilities deintegrated vertically, and most power is now sold to distribution companies by independent third party generators. The transmission grid in the P-J-M area is still characterized by a highly fragmented pattern of ownership, but the grid is operated and controlled on an integrated basis by a single entity, called the P-J-M Independent System Operator (ISO). The participants in the P-J-M market adopted the Hogan plan, often referred to as nodal pricing, in 1997.⁶⁶ As a result, P-J-M is now saving about 3.2 billion dollars per year,⁶⁷ and generators in P-J-M have increased their efficiency by five to twenty per cent.⁶⁸

Even P-J-M cannot yet be characterized as a complete success, however, for three reasons. First, P-J-M is only part of what should be the much larger eastern regional market. Competition should take place among all of the participants in the market that are connected to the integrated eastern transmission grid, rather than only among a subset of that large natural market. Second, in the wake of the sharp spike in prices that transpired in California in 2000-2001, P-J-M has adopted price caps that limit the maximum wholesale price of electricity during periods of peak demand. Similar caps have been imposed in the other U.S. markets. Those caps render it impossible for owners of generators to earn revenues sufficient to induce adequate new investment in generating capacity, particularly in the peaking units that are critically needed at

⁶⁶ Andrew W. Williams, *Restructuring PJM to Facilitate Electric Competition*, *The Electricity Journal*, October 1997, at 72.

⁶⁷ Sutherland, *supra*. note 2, at 4.

⁶⁸ Markiewicz, Rose & Wolfram, *supra*. note 2, at 2.

times of peak demand.⁶⁹ Third, P-J-M is plagued by a problem that will eventually doom all restructuring efforts, and that will yield disastrous results for the entire U.S. market no matter how it is structured, unless and until it is solved.⁷⁰ There is a large and growing shortage of transmission capacity in P-J-M.

B. Partial Success in New England, New York, and Texas

The restructuring effort has advanced significantly in New England, New York, and Texas. In each, the transmission grid is controlled and operated by a single entity, called an Independent System Operator (ISO).⁷¹ In each, generators are free to compete with each other to make unregulated wholesales. In each, the market performs reasonably well, and clearly outperforms the system of pervasive regulation that preceded creation of the competitive wholesale market.

The restructuring process cannot yet be considered a complete success in any of these three areas, however. Each suffers from the three weaknesses that limit the efficacy of the P-J-M market, and each has additional limitations. First, each of these areas is smaller than P-J-M and far too small to support an optimally efficient market. In the cases of New York and New England, the boundaries of the markets were based solely on political factors that should be totally irrelevant in setting the boundaries of an electricity market. New York and New England should be parts of the eastern north american market that corresponds with the integrated transmission

⁶⁹ Joskow, *supra*. note 16, at 37-52.

⁷⁰ Richard J. Pierce, Jr., *Environmental Regulation, Energy, and Market Entry*, forthcoming in 2004 Duke Environmental Law & Policy Forum.

⁷¹ FERC Order No. 2000, *Regional Transmission Organizations*, 65 Fed. Reg. 809, 813-817(2000).

grid that connects all generators and loads east of the Rocky Mountains in the U.S. and Canada. In the case of Texas, the geographic scope of the market corresponds to the scope of the separate grid that connects most of the generators and loads in Texas, but that grid itself is too small to support an optimally efficient market. Texas authorities have refused to allow most of the state's utilities to interconnect their transmission lines with out-of-state utilities because of the state's traditional antipathy toward federal regulation of energy resources.

Second, the rules that govern trade in the Texas, New York, and New England markets are simply not as good as the rules that govern the P-J-M market.⁷² The differences are particularly important in the treatment of transmission congestion in each of the markets. The nodal pricing system that applies in P-J-M is superior to the crude transmission pricing systems that apply in the other three markets. The rules that govern trade in the New York and New England markets are also incompatible with the rules that govern the P-J-M market. That incompatibility alone limits the efficiency and efficacy of the markets by making it difficult and costly for participants in the three markets to engage in trade that crosses the artificial boundaries that separate the three markets. Thus, for instance, a generator in Pennsylvania or New Jersey cannot economically sell in New York or New England, and a distribution company in New York City must overcome formidable artificial obstacles to transmit power from a generator in Canada across the separate New England market into the New York market. Limiting regional trade in electricity in this manner is no more sensible than limiting trade in any other good or service

⁷² For descriptions of the flaws in these markets, see Pierce, *supra*. note 38; Johannes Pfeifenberger, Phil Hansen, Greg Basheda & Peter Fox-Penner, *The Electricity Journal*, July 1998, at 80; Bailey & Eaton, *supra*. note 45.

geographically. Imagine how inefficient the markets for refrigerators, meat, or automobiles would be if we restricted trade to markets as small as Texas, New York, or New England.

C. Failure in California

The story of the disastrous restructuring effort in California has been told at great length by many people in many versions in many places. I have already described the California debacle, including its etiology and consequences, in considerable detail elsewhere.⁷³ I will provide only a brief overview here that is designed to be helpful in allowing readers to understand the relationships between the California restructuring effort and the national restructuring effort.

California created something called the California market in 1998. It is an understatement to characterize the California market as flawed. One of the major participants in the process of creating the California market was Dan Fessler, a contracts professor at University of California at Davis who was then President of the California PUC. Fessler was well aware of the many peculiar characteristics of the “market” that the California legislature ultimately created. To start with, it makes no more sense to think about the “California market” than to think about the “New York market.” California is part of the integrated western transmission grid that connects all generators and loads in all of the U.S states west of the rocky mountains, plus two Canadian provinces and two Mexican states. California is far from self-sufficient in

⁷³ Richard J. Pierce, Jr., How Will the California Debacle Affect Energy Deregulation? 54 Ad. L. Rev. 389 (2002). See also Sweeney, *supra*. note 33.

electricity. It is heavily reliant on a combination of hydroelectric power from the BPA dams in the northwest and electricity from the coal-fired generating plants in the four corners area of the southwest. As Fessler noted repeatedly, anything called the “California market” was destined to be highly abstract and divorced from reality.⁷⁴ If California wanted to be served by a restructured market, however, it had no choice but to go it alone. Neither its neighbors to the north nor its neighbors to the east had any desire to create a restructured regional market that included California, and FERC lacked the power to create such a regional market over the objections of those states.

The restructured California market produced good results for its first two years. In 2000-2001, however, the price of electricity in California increased as much as ten-fold for a few months. The spike in the price of electricity in California had many major effects, including the unprecedented recall of the then-Governor and his replacement by an Austrian-born movie star/bodybuilder. The California price spike also began a seemingly never-ending debate between those who attribute the spike to market manipulation by firms like Enron and those who attribute it instead to flaws in the design of the market. That entire debate is premised on a false dichotomy. All markets are potentially vulnerable to manipulation. All markets have some flaws. A severely flawed market is particularly vulnerable to manipulation. The California market had so many serious flaws that widespread and extremely damaging manipulation of the market was inevitable.

One useful way to understand the flaws in the California market is to identify the sources of the games that several market participants, including Enron, used to manipulate the market. Thanks to the many memos and tape recordings that

⁷⁴ Numerous conversations with then-President Fessler in the mid-1990s.

memorialized the thinking of Enron's traders, the major forms of market manipulation that took place are now well-known.⁷⁵ They can be divided into three categories.

The first category of market manipulation – colorfully called “ricochet” by Enron – involved sales made in ways that circumvented price caps. With price caps imposed on some but not all wholesale transactions, sellers avoided the price caps and artificially inflated the price of electricity by engaging in complicated combinations of transactions. Thus, for instance, if a seller in California wanted to sell electricity to a buyer in California, it could avoid the effect of the price cap California imposed on intrastate wholesales by selling electricity to a firm in Utah at the same time the firm in Utah made an identical sale to the buyer in California. Not surprisingly, the net effect of such ricochet sales was to create prices in California that not only exceeded the price caps California imposed but also the price at which any efficiently-functioning market would clear. Imagine what would happen to the price of oranges in California if they could be purchased by Californians only after they were first subject to a pair of matching sham sales from a California firm to a Utah firm and back to another California firm.

The second category of market manipulation involved transactions Enron colorfully called “death star,” “load shift,” and “wheel out.” Each allowed a seller to profit by creating an apparent but non-existent shortage of transmission capacity and then either selling at an artificially inflated price that reflected the existence of the

⁷⁵ For a description of Enron's methods of market manipulation, see Jonathan Falk, Substituting Outrage for Thought: The Enron “Smoking Gun” Memos, *The Electricity Journal*, Aug./Sep. 2002, at 13.

apparent shortage or by engaging in transactions that appeared to reduce the magnitude of the apparent shortage.

The third category of manipulation of the California market accounted for by far the largest proportion of the price increase that was attributable to manipulation of some sort, but it has been largely ignored by the press – probably because Enron never assigned it a colorful name. It consisted of increasing the market price of electricity by unilaterally withholding available generating capacity from the market.⁷⁶

Each of these categories of manipulation of the California market was made possible by one or more of the glaring flaws in the California market. “Ricochet transactions” can exist only when there are multiple markets for the same good or service coupled with different regulatory rules applicable to each market.⁷⁷ The “California market” was always going to be vulnerable to some problems of this sort because there is no such thing as a California market in reality. California is just part of the western market. Without access to electricity generated outside California, California would experience blackouts on a regular basis. The architects of the restructured California market greatly increased the potential for this type of market manipulation, however, by creating multiple wholesale markets within California and then imposing price caps on transactions in some of those markets. Market participants will always go to considerable lengths to avoid being subject to price caps.

⁷⁶ Paul L. Joskow & Edward Kahn, A Quantitative Analysis of Pricing Behavior in California’s Electricity Market During Summer 2000, 23 En. J. 1 (2002).

⁷⁷ Richard J. Pierce, Jr., Market Manipulation and Market Flaws, The Electricity Journal, Jan./Feb. 2003, at 39, 42.

The manipulative transactions referred to as “death star,” “load shift,” and “wheel out” were made possible by the ill-conceived method of pricing transmission that was adopted by the architects of the California market.⁷⁸ The nodal pricing system that P-J-M uses recognizes that a transmission grid can become congested at any of its thousands of nodes, i.e., points at which electricity enters a grid from a source or leaves the grid to serve a load center. Like other methods of market-based pricing, nodal pricing uses price as a means of rationing a service in conditions of scarcity and as a means of inducing people to act in ways that will reduce or eliminate the scarcity. Thus, when demand for electricity at a node exceeds the supply that the grid can make available at that node, the price of electricity bought at the node goes up, sometimes by a significant amount. Under nodal pricing, a market participant also gets paid, in effect, for reducing congestion at a node by, for instance, engaging in a transaction that requires transmission in the opposite direction from the dominant direction of the flow at the congested node.

The architects of the California market rejected nodal pricing and adopted instead something called zonal pricing. Zonal pricing assigns each of the thousand of nodes on a grid to one of several zones. Under zonal pricing, when demand for electricity at a node exceeds the supply that the grid can make available at that node, the price of electricity in the zone that includes the congested node increases even though most of the nodes in the zone are not congested. Zonal pricing provides market participants at least two ways in which they can artificially inflate their revenues. The first step in each case is to create the appearance of congestion within a zone by engaging in transactions that create congestion at some node in the zone. Then the market

⁷⁸ Id. at 41-42.

participant can increase its revenues either by engaging in lots of high-priced sales over the uncongested nodes in the apparently congested zone or by engaging in transactions that appear to reduce the congestion in the actually uncongested zone by requiring transmission in the opposite direction from the direction of the dominant flows in the zone.

The final and quantitatively most important type of manipulation consisted of increasing the price of electricity through artificial, unilateral withholding of available capacity from the market. In the vast majority of markets, firms do not engage in unilateral withholding of capacity because a firm that withholds capacity loses more revenues as a result of the reduction in the number of units it sells than it gains as a result of the higher unit price at which it can sell. The well-known exception to that generalization applies when a firm has a very high share of the market --- the monopoly problem. The architects of the California market avoided the monopoly problem. No participant in the California market had more than a relatively modest share of the market.

The architects of the California market created an incentive for a firm to engage in artificial unilateral withholding of capacity through other means, however. First, California inexplicably prohibited electricity distribution companies from using the most effective means of protecting themselves from the risk of unilateral withholding by prohibiting distribution companies from entering into long-term contracts with wholesale suppliers.⁷⁹ Second, by imposing a ceiling on the retail price of electricity that was far below the price at which the wholesale market would clear, the architects

⁷⁹ Eric Hirst, *The California Electricity Crisis: Lessons for Other States* 3-5 (2001); Edward D. Kee, *Vesting Contracts, a Tool for Electricity Transition*, *The Electricity Journal*, July 2001, at 11.

of the market made it impossible for the market to work the way all competitive markets work. In technical economic terms, the ceiling on the retail price of electricity created a wholesale market characterized by completely price-inelastic demand.

It may be easiest for a non-economist to understand this phenomenon by illustrating it in the context of the market for oranges. If something happens that increases the relative scarcity of oranges, the price of oranges will increase from, say fifty cents to seventy cents. Why doesn't the price increase instead to say, five dollars or ten dollars or one hundred dollars? The answer in technical terms is that the demand for oranges is not completely price inelastic. In common sense terms, people reduce the quantity of oranges (or anything else) they buy as the price they pay increases. As the increased price reduces the quantity of oranges demanded, the market reaches a new equilibrium price a bit higher than the prior market price. Imagine what would happen, however, if consumers confront the same retail price for oranges when oranges become more scarce. In that situation, demand for oranges would not decline, and the wholesale price of oranges would continue to increase until it approached infinity.

That is basically what happened in the California electricity market in 2000-2001. For a variety of reasons that have been discussed at great length elsewhere, electricity became relatively more scarce.⁸⁰ The wholesale price of electricity increased as a natural consequence of that change in market conditions. The ceiling on the retail price then had the effect of insulating consumers from having to pay a higher price for electricity. With no reduction in quantity demanded in response to the

⁸⁰ Pierce, *supra*. note 73, at 396-397.

increase in relative scarcity, the wholesale price just continued to escalate.⁸¹ It finally came down only after the California PUC finally eliminated the retail price ceiling and authorized the retailers to increase the prices they charged.⁸² During the period in which the retail price ceiling precluded consumers from confronting the economic consequences of the relatively scarce supply of electricity, any electricity wholesaler could increase its profits by unilaterally withholding available supplies from the market.⁸³

Thus, it is easy to identify the many severe flaws in the California market that rendered it extraordinarily vulnerable to manipulation. They can be summarized as: The market was too small, and it did not correspond to any logical economic or physical borders. What should have been a single wholesale market was divided into several markets, each of which was subject to different rules. Price caps imposed on some but not all of the wholesale markets discouraged firms from participating in some markets and encouraged them to participate in others and to engage in complicated transactions that disguised the fact that they were actually selling in the price-controlled part of the wholesale market. The crude and inaccurate method of pricing transmission encouraged firms to engage in a variety of counterproductive and expensive transactions. The prohibition on long-term contracts precluded buyers in the wholesale market from protecting themselves from the risk that sellers would engage in unilateral withholding of generating capacity. Finally, and most importantly, the retail price ceiling eliminated all possible demand responses to a

⁸¹ Pierce, *supra*. note 77, at 45-46; Carl H. Silsbee & John L. Jurewitz, Wholesale Generator Incentives to Exercise Market Power in the California Electricity Market, *the Electricity Journal*, Aug./Sep 2001, at 51..

⁸² Pierce, *supra*. note 73, at 397.

⁸³ Joskow & Kahn, *supra*. note 76.

wholesale price increase, thereby rendering it profitable for firms to withhold available capacity, thereby increasing the wholesale price still further in a potentially never-ending upward spiral.

These flaws and the vulnerability to market manipulation they created were well-known during the period in which the California legislature crafted and implemented its restructuring plan. The process of designing a restructured market applicable to California, like the process of designing restructured markets applicable to P-J-M, New York, and New England, was dominated by a debate between the proponents of Hogan's nodal pricing system and proponents of the "bilateral trading" plan designed and urged by Enron.⁸⁴ Most of the utilities potentially affected by restructuring were willing to acquiesce in any restructuring plan that included means through which they could recover their billions of dollars of "stranded costs," i.e., the amount by which the value of their capital assets would decline as a result of the lower prices they could charge in an unregulated competitive wholesale market. Most advocates for residential consumers were willing to acquiesce in any plan that included a retail price freeze. Enron was able to convince most industrial consumers that its bilateral trading plan was better for them than Hogan's nodal pricing plan. Hogan and the other academic proponents of the nodal pricing plan repeatedly warned the decisionmakers that the Enron plan was badly flawed and that its adoption would create a market that is extremely vulnerable to manipulation.⁸⁵ Enron prevailed in the California debate, while Hogan prevailed in the P-J-M debate, and the New York and New England decisionmaking processes resulted in complicated compromises.

⁸⁴ Paul Joskow has called this debate "empty and unnecessarily confusing." Joskow, *supra*. note 16, at 21.

⁸⁵ E.g., William Hogan, *Nodes and Zones in Electricity Markets: Seeking Simplified Congestion Pricing*, 18th Annual Conference of the USAEE/IAEE, San Francisco, Sep. 1997.

D. Failure in the Rest of the Country

Before the price spike in the California market, FERC was painstakingly attempting to implement a socially-beneficial form of restructuring in each region of the country. It faced major legal and political obstacles. Its statutory authority was severely limited. Its efforts were strongly opposed by the “just say no” utilities in the southeast, lower midwest, and northwest who wanted to continue to live the quiet, prosperous life of an ineffectively regulated monopolist. Moreover, many members of Congress from those areas sided with their utilities and urged FERC to abandon its efforts to restructure the market.

FERC continued to persevere in the face of those obstacles, however. It was not without assets it could deploy in its restructuring effort. It had the demonstrable success of the P-J-M market it could use to illustrate the advantages of restructuring. It had strong support from most of the participants in the restructured markets in P-J-M, New York, New England, and Texas, and strong support from most of the politicians in the middle atlantic states, the northeast, Texas, California, and the upper midwest. It had a variety of regulatory sticks and carrots it could use to encourage reluctant market participants to acquiesce in a restructured market. It also got a major boost from a unanimous victory in a major Supreme Court case that both upheld FERC’s restructuring efforts to date and prodded it to take the next logical steps in the restructuring process.

FERC used a two track approach in its restructuring efforts. First, it required each utility to make a filing in which it described its restructuring plan, and it initiated restructuring proceedings in each region of the country.⁸⁶ The regional proceedings made slow, halting progress in the southeast, midwest, and northwest. The “just say no” group of utilities that dominated the markets in those regions used a variety of tactics in an effort to block or slow the restructuring process.⁸⁷ Second, FERC began a rulemaking proceeding to decide whether to mandate a standard market design (SMD) that would apply to all regions of the country.⁸⁸ The proposed SMD was comprised of the elements of each of the regional restructuring plans that FERC believed to have produced the best results. The SMD drew heavily from the nodal pricing plan that Hogan had proposed and that P-J-M had adopted with excellent results. FERC conducted numerous hearings on the SMD and solicited multiple rounds of comments on its proposal to mandate adoption of the SMD in every region. Of course, if each region adopted the SMD, it would be easy to combine suboptimally-sized regions like P-J-M, New England, New York, the midwest, and the southeast into an integrated eastern market, and to combine undersized regions like the northwest, southwest, and California into a single integrated western market.

FERC experienced strenuous opposition to its SMD from the “just say no” group and their political supporters, but it seemed inevitable that FERC ultimately would adopt its national SMD proposal and likely that the Supreme Court would uphold that

⁸⁶ FERC Order No. 2000, 65 Fed. Reg. 809 (2000).

⁸⁷ See notes 38 and 39 *supra*.

⁸⁸ FERC Notice of Proposed Rulemaking, Remediating Undue Discrimination Through Open Access Transmission Service and Standard Electricity Market Design, IV FERC Stats. & Regs. ¶32,563 (2002).

action⁸⁹ – until the California price spike arrived on the scene. The California debacle and the closely related Enron scandal changed the political landscape dramatically. Initially, it caused California politicians to switch from strong proponents of restructuring to strident opponents of restructuring. California abandoned its restructuring plan, transferred to a state agency the exclusive authority to purchase electricity for the state’s consumers, and criticized FERC harshly.⁹⁰

California’s change of position alone would not have been enough to derail the SMD initiative, however. Political movements in California often prove to be transient. Popular new Governor Schwarzenegger has abandoned the state’s short-lived and disastrous experiment with a socialized electricity market and announced his support for a return to a new version of a restructured market.⁹¹

In the meantime, however, the “just say no” group recognized that the California debacle and the Enron scandal provided them an unprecedented opportunity to kill the SMD initiative and to halt the restructuring process. They used those incidents to support their arguments to politicians in the southeast and northwest that restructuring would have devastating effects on their states and regions. As Paul Joskow recently described the situation: “FERC has found itself at war with many states in the Southeast and the West as they resist its efforts to expand institutions it believes are necessary to support efficient competitive wholesale markets in all regions of the

⁸⁹ In *New York v. FERC*, 535 U.S. 1 (2002), the Supreme Court unanimously upheld FERC’s initial restructuring initiative and suggested that FERC might be required to take the further steps it was then considering.

⁹⁰ Pierce, *supra*. note 73, at 401-404.

⁹¹ Rebecca Smith, Schwarzenegger Backs Reopening Electricity Market, *The Wall Street Journal*, August 11, 2004, at B2.

country.”⁹² The “just say no” group has now succeeded in its effort to kill the SMD initiative, at least for the moment. Every energy bill that has been reported out of Committee or enacted in either House of Congress over the last two years has included a provision that bars FERC from implementing the SMD for two or three years.⁹³ None of those bills has become law, but FERC has gotten the message that both SMD and its national restructuring effort are politically dead at least for the next few years.⁹⁴

IV. WHAT HAS STOPPED RESTRUCTURING?

We certainly encountered all of the many economic, legal, and political problems that we expected to confront when we embarked on the electricity restructuring process. As Joskow and Schmalensee cautioned, the complicated physics and economics of the processes through which electricity is generated, transmitted, distributed, and sold make it difficult to design and to implement a socially-beneficial restructuring of the electricity market.⁹⁵ Those characteristics also create an unforgiving environment in which any number of potential design flaws can produce a market that performs poorly. Moreover, we have confirmed that the pre-existing patterns of ownership and control of the factors of production are inconsistent with creation of an efficiently-functioning wholesale market and that FERC lacks the legal

⁹² Joskow, *supra* note 16, at 3. See also Mary Ann Sullivan, Joseph C. Bell, & John R. Lilyestrom, Standard Market Design: What Went Wrong? What Next? *The Electricity Journal*, July 2003, at 11,12.

⁹³ See Joshua Z. Rokach, Taking the Fork in the Road: Retooling Electricity Policy, *The Electricity Journal*, July 2004, at 60, 63.

⁹⁴ *Id.* at 60, 64.

⁹⁵ See text at notes 12-16, 53-54 *supra*.

tools required to implement a socially-beneficial restructuring expeditiously, it at all.⁹⁶

Still, we enjoyed a great deal of success in restructuring the middle atlantic, northeastern, and Texas markets, and we seemed to be on the verge of success in restructuring the national market until the effort was derailed by the California debacle and the Enron scandal. While we anticipated most of the serious problems that we encountered, there were some economic, legal and political problems that surprised us, at least in terms of their magnitude and the extent of their adverse effects on the restructuring process.

A. Economic Problems

We encountered three economic problems that surprised us in the severity of their effects and the difficulty of designing around them. The first was the risk of unilateral exercise of market power by firms with only modest shares of a market. Economists have long been aware of the risk that a firm with a large share of a market, e.g., eighty per cent, might artificially increase the price of a good or service by unilaterally withholding available capacity.⁹⁷ A firm with a large market share often can engage in profitable withholding of capacity. Economists have also long been aware of the risk that a group of firms with a large share of a market in the aggregate might artificially increase the price of a good or service by engaging in collusive

⁹⁶ See text at notes 54-58 supra.

⁹⁷ E.g., Ernest Gellhorn & William E. Kovacic, *Antitrust Law and Economics* 52-90 (4th ed. 1994).

withholding of capacity.⁹⁸ Collusive withholding of capacity is often profitable when unilateral withholding is not. Those two well-known risks lie at the core of the concerns addressed by antitrust law, and they have spawned a voluminous literature that describes the nature and source of the risks and the many ways in which they can be minimized. The proponents of restructuring were well aware of those risks and argued in support of the need to take a variety of steps to minimize them.⁹⁹ FERC took those admonitions seriously and took most of the steps that were urged upon it to address the potential risk of unilateral or collusive exercises of market power.

As the restructuring process progressed, however, many of us were surprised to discover that there are some circumstances in which even a firm with only a small share of an electricity market, e.g., ten per cent, can engage in profitable withholding of capacity. In the vast majority of markets, there is no risk that a firm with a small share of a market will engage in unilateral withholding because the firm would lose more revenue as a result of the reduction in the number of units it sold than it would gain as a result of the increased price at which it could sell each unit. There is one circumstance in which a firm with a small share of a market can engage in profitable unilateral withholding, however. If the supply of the good or service is completely or almost completely price inelastic, and the demand for the good or service is also completely or nearly completely price inelastic, even a firm with a small share of a market can profitably withhold capacity.¹⁰⁰ The firm will not suffer a reduction in the number of units it sells as a result of the increase in market price produced by its

⁹⁸ Id. at 156-157.

⁹⁹ E.g., Pierce, *supra*. note 55.

¹⁰⁰ Joskow and Kahn provide an excellent explanation of this phenomenon in Joskow & Kahn, *supra*. note 76. See also Silsbee & Jurewitz, *supra*. note 76.

withholding, and its loss of revenue attributable to the units it withholds will be less than the increase in revenue attributable to the increase in market price produced by its withholding. That situation is so rare that the risk of unilateral withholding by a firm with a small share of a market is appropriately ignored in antitrust law.

The conditions that make it profitable for a firm with a small market share to engage in unilateral withholding can exist in an electricity market, however, and those conditions did exist in California during the price spike of 2000-2001.¹⁰¹ Unilateral withholding may well have played a significant role in causing, or at least in exacerbating, the price spike. For a variety of reasons that I have described elsewhere, California was extremely short of generating capacity during that period.¹⁰² That created a situation in which price elasticity of supply was virtually non-existent, i.e., even a large increase in the price of electricity could not increase significantly the quantity of electricity made available for purchase. Obviously, that is an undesirable situation that state and federal authorities should do their best to avoid, but it is a situation that is almost certain to exist at least for brief periods of time in any electricity market. As discussed in section IIIC, the ceiling that California imposed on the retail price of electricity created a situation in which price elasticity of demand was also virtually non-existent, i.e., an increase in the wholesale price of electricity would not produce a reduction in quantity demanded because the retail price ceiling insured that consumers did not actually confront an increase in price.

There is one obvious lesson from the California experience. The government should never impose a ceiling on the retail price of electricity that makes it impossible

¹⁰¹ Id.

¹⁰² Pierce, *supra*. note 73, at 396-399.

for consumers to confront, and to react to, an increase in the relative scarcity of electricity available on the wholesale market. There is also a broader lesson from that experience. Electricity markets should be designed to maximize price elasticity of demand. The participants in the restructuring process are now placing greater emphasis on including design features that maximize the potential for demand responses to changes in market conditions. The proponents of restructuring are urging state and federal regulators to take steps such as insuring that large industrial consumers confront the real price of electricity immediately and to begin to encourage installation of the interval meters that will enable smaller consumers to confront the real price of electricity as well.¹⁰³

Second, and related to the first problem, we discovered that all price ceilings have serious adverse effects on the efficacy of a competitive wholesale market. We knew at the beginning of the restructuring process that price controls have severe adverse effects on the performance of a market. Those severe adverse effects had been documented in scores of studies of the price controls we once applied to financial services, natural gas, trucking, airline passenger service, oil, and, to all products and services during the ill-conceived Nixon era of economy-wide price controls.¹⁰⁴ We underestimated the extent of the magnitude of the adverse effects of various types of price controls on the performance of restructured electricity markets, however. As I discussed in sections IIIC and IVA, a ceiling on the retail price of electricity creates a market that is vulnerable to manipulation through unilateral withholding of capacity. As I discussed in section IIIC, price caps that apply to some but not all of a wholesale

¹⁰³ E.g., Joskow, *supra*. note 16, at 23.

¹⁰⁴ Pierce & Gellhorn, *supra*. note 48, at 339-378.

market distort the incentives of market participants by discouraging them from selling in the part of the market that is subject to the caps, encouraging them to sell in the part of the market that is not subject to such caps, and encouraging them to engage in complicated combinations of transactions that make it appear that they are selling in the part of the market that is not subject to the caps when they are actually selling in the part of the market that is subject to the caps. Finally, as I discussed in section IIIA, price caps that apply to all parts of a wholesale market make it impossible for generators to earn revenues sufficient to induce them to make needed investments in new generating capacity, particularly in the peaking units that are essential to avoid blackouts at times of peak demand.

Third, we discovered that transmission capacity constraints are having large and growing adverse effects on the performance of the market. Transmission capacity per megawatt of electricity generated has declined by thirty per cent over the past twenty years and is expected to decline by another eleven per cent over the next ten years.¹⁰⁵ The number of electricity curtailments due to inadequate transmission capacity has increased by six hundred per cent over the last five years, and the cost of transmission congestion is now estimated at 4.8 billion dollars per year.¹⁰⁶ Inadequate transmission capacity has played a major explanatory role in every recent price spike and blackout, including the price spike in California in 2000-2001¹⁰⁷ and the northeast power

¹⁰⁵ Eric Hirst, U.S. Transmission Capacity: Present Status and Future Prospects 7-9 (2004).

¹⁰⁶ *Id.* at 7-8.

¹⁰⁷ Peter Navarro & Michael Shames, Aftershocks – and Essential Lessons – from the California Electricity Debacle, *The Electricity Journal* May 2003, 24,26; Robert R. Nordhaus, Electric Power Deregulation: Making Partially Deregulated Markets Work, 54 *Admin. L. Rev.* 365, 372 (2002).

blackout of 2003.¹⁰⁸ The causes of the growing shortage of transmission capacity are well-known and well-documented. FERC has not yet devised and implemented a method of encouraging adequate investment in transmission capacity,¹⁰⁹ and NIMBY-based opposition to proposed transmission expansion projects doom most projects at the state and local agencies that now have authority to authorize or to veto such projects.¹¹⁰ Unless we solve this problem soon, we are certain to experience large increases in both the number and severity of price spikes and the number and severity of blackouts.¹¹¹ This problem will manifest itself in increasingly costly ways whether we continue and complete the national restructuring process, stop now and settle for what we have been able to accomplish so far, or reverse course and return to the pervasively regulated market we had a decade ago.

B. Legal Problems

Generally, the legal problems we encountered were about what we expected to encounter at the beginning of the restructuring process. The 1935 Federal Power Act does not confer on FERC the range of powers required to allow FERC to implement a restructuring plan directly. FERC must instead rely on a combination of regulatory carrots and sticks, and its bully pulpit, to persuade market participants to cooperate with FERC's restructuring initiatives. FERC has had an uneven record in the lower

¹⁰⁸ Edward N. Krapels, *Goodbye Gridlock (2): How to End the Shortage in Transmission Investment that Led to the Northeast Blackout (2003)*.

¹⁰⁹ Joskow, *supra* note 16, at 52-57.

¹¹⁰ Pierce, *supra* note 70, at ___; Ashley C. Brown, *Vision Without Site: Site Without Vision*, *The Electricity Journal*, October 2003, 23-24.

¹¹¹ Pierce, *supra* note 70, at ___.

courts so far, but the Supreme Court strengthened its hand significantly in its unanimous 2002 decision in *New York v. FERC*.¹¹² The Court upheld the validity of FERC's attempt to use its authority over electricity transmission as the hook on which to hang its first steps toward restructuring and implicitly encouraged FERC to take the logical next steps in implementing its restructuring plan.

The main legal problems that have halted the restructuring process and that threaten to render ineffective even the regional markets that have been restructured fall under the general heading of federalism – states have far too much power, and FERC has far too little power. FERC's admonitions and entreaties have been sufficient to induce market participants to cooperate with FERC's restructuring initiatives in regions in which state authorities are generally supportive of restructuring – the northeast and middle atlantic states. In regions in which states are opposed to restructuring, however, FERC's limited powers are not up to the job. In the southeast, in particular, the “just say no” utilities have been able to use the formidable powers of their state PUCs as a shield to protect them from FERC's efforts to expose them to competition.

States that oppose restructuring use a wide variety of subtle and not so subtle means to protect their utilities from having to compete with other electricity wholesalers. Thus, for instance, Virginia prohibits its utilities from allowing any regional Independent System Operator (ISO) to exercise control over transmission assets owned by Virginia utilities.¹¹³ ISOs are a critical component of FERC's

¹¹² 535 U. S. 1.

¹¹³ See FERC Opinion No. 427, *New PJM Companies, et al.*, 107 FERC ¶ 61,271 (2004).

restructuring program.¹¹⁴ As long as local utilities can exercise complete control over access to the transmission lines in a state, they can and do use their preferred access to transmission as a means of handicapping severely all potential competitors in the wholesale market. Florida uses a different approach. It refuses to authorize construction of merchant generating plants, i.e., generating plants that would compete with the plants owned by the state's utilities.¹¹⁵ With no non-utility generating plants allowed in the state and limited transmission capacity into the state, competition in the wholesale market is ineffective.

Even in the regional markets that have been successfully restructured, state regulatory power to veto critically-needed expansions of transmission capacity threatens to render the newly-restructured markets ineffective.¹¹⁶ Transmission capacity constraints are already imposing billions of dollars of costs per year on consumers¹¹⁷ and are precluding many residents of major metropolitan areas from enjoying the benefits of competition during the increasingly large proportion of time in which capacity constraints create urban islands that are inaccessible to less expensive electricity generated outside the urban area.¹¹⁸

C. Political Problems

Each of the economic and legal problems described in sections A and B can be solved relatively easily. We can reduce the risk of unilateral withholding of capacity

¹¹⁴ Pierce, *supra*. note 38.

¹¹⁵ E.g., *Tampa Electric Co. v. Garcia*, 767 So. 2d 428 (Fla. 2000).

¹¹⁶ Pierce, *supra*. note 70, at ____.

¹¹⁷ Hirst, *supra*. note 105, at 7-9.

¹¹⁸ Krapels, *supra*. note 108, at 7-8.

to a tolerable level by refraining from imposing a freeze on the retail price of electricity and by taking a variety of other well-known actions that will increase the price elasticity of demand in the wholesale electricity market. We can avoid the many adverse effects of price caps on electricity wholesales simply by refraining from imposing caps on the wholesale price of electricity. We can eliminate the ability of the “just say no” utilities to use their state PUCs to shield them from FERC’s pressure to cooperate in the restructuring process by transferring most regulatory power from state PUCs to FERC. Finally, we can eliminate the growing shortage of transmission capacity by conferring on FERC pre-emptive power to approve proposed transmission expansion projects, by giving FERC authority to determine the rates applicable to all transmission service, and by increasing the allowed rate of return on investments in transmission expansion projects.

While each of these solutions to economic and legal problems is well-known and can be implemented easily in theory, each solution requires a variety of political actors to behave in ways that are likely to subject them to controversy and criticism. I will next describe the political impediments to implementation of each of the solutions to the economic and legal problems that have stalled the restructuring process.

1. Risk of Unilateral Withholding

The risk of unilateral withholding of generating capacity from a market can be reduced in several ways, including allowing electricity distributors to enter into long-

term purchase contracts – a commonsense measure that California inexplicably refused to allow when it created its ill-fated market. See Hirst, *supra*. note 79, at 3-5. The most effective single step that can be taken to reduce this risk, however, is to create conditions in which consumers experience the increases in the wholesale price of electricity that are inevitable when quantity demanded increases relative to available supply. Without government insulation of consumers from wholesale market price increases, the short-term price elasticity of demand for electricity is approximately 0.2, i.e., a price increase of ten per cent will produce a two per cent reduction in quantity demanded.¹¹⁹ That is enough to limit wholesale price increases by rendering it uneconomic for a firm with a relatively modest share of the market to engage in unilateral withholding of capacity.¹²⁰ There are many ways in which government decisionmakers can increase or decrease the price elasticity of demand for electricity.¹²¹

The most effective means of insuring that wholesale price increases elicit demand responses that deter unilateral withholding is to charge all consumers realtime prices, i.e., prices that reflect the highly variable marginal cost of electricity as supply and demand conditions change.¹²² Adoption of universal realtime prices is not an option that is available in the short-term, however. Even if state regulators were willing to adopt universal realtime pricing, the vast majority of residential and other small

¹¹⁹ For a good description of price elasticity of demand, see Howell Jackson, Lousi Kaplow, Steven M. Shavell, W. Kip Viscusi & David Cope, *Analytical Methods for Lawyers* 300-305 (2003).

¹²⁰ Steven Braithwait, *Demand Response Is Important – But Let's Not Oversell (or Overprice) It*, *The Electricity Journal*, June 2003, at 52; Michael B. Rosenzweig, Hamish Fraser, Jonathon Falk & Sarah P. Voll, *Market Power and Demand Responsiveness: Letting Customers Protect Themselves*, *The Electricity Journal*, May 2003, at 11; Larry E. Ruff, *Demand Response Reality Versus "Resource,"* *The Electricity Journal*, Dec. 2002, at 10.

¹²¹ Sources cited in note 120 *supra*.

¹²² sources cited in note 120 *supra*.

consumers do not have the interval meters needed to charge them realtime prices. Fortunately, it is possible to obtain enough demand response to deter unilateral withholding by taking steps short of universal adoption of realtime pricing.

The first, and most important, step that must be taken to create a demand response is to refrain from imposing a ceiling on retail prices that is below the price at which the market will clear. When that essential first step is coupled with other easily implemented changes in retail rate setting, like charging large consumers realtime prices and charging small consumers prices that increase at least to some extent with increases in marginal cost, the market will incorporate enough price elasticity of demand to deter unilateral withholding of capacity and to create a market-based limit on the tendency of wholesale prices to spiral upward when supply becomes relatively scarce.¹²³

It will be difficult, however, to persuade state regulators to refrain from imposing retail price ceilings in the wake of the California price spike. The political linkage between the California price spike and the increased pressure to impose retail price ceilings is deeply ironic, since the retail price ceiling imposed by California was one of the major causes of the California price spike. A description of the history of the California retail price ceiling will help to explain the difficulty of resisting the political pressure to impose such a ceiling. The California retail price ceiling had the same genesis as the retail price ceilings that were imposed in other states that have participated in a restructuring process. The ceiling was originally intended as a limit on the rate at which utilities could recover their stranded costs – the billions of dollars by which the value of their generating assets would decline as a result of being

¹²³ sources cited in note 120 supra.

subjected to a competitive wholesale market.¹²⁴ The ceiling was to be temporary. It would disappear automatically once each utility recovered its stranded costs by charging prices that exceeded the wholesale market price of electricity.

When the wholesale price of electricity began to increase significantly in late 2000, the distribution companies that serve northern California and most of southern California had not yet recovered all of their stranded costs and, thus, were still subject to retail price ceilings. When the wholesale market price increased rapidly to, and well beyond, the point at which it exceeded the retail price ceiling, consumers who purchased from those distributors did not respond by decreasing their level of consumption because they did not confront any increase in price. The distributor that serves the San Diego area had already recovered all of its stranded costs, however, so it was no longer subject to a retail price ceiling. Its customers began to confront the higher wholesale market price in the form of increased retail prices and, they began to react to that price increase by reducing the quantity of electricity they purchased. San Diego area consumers also complained loudly, however, that they were being treated unfairly because they were having to pay significantly higher prices, while consumers elsewhere in the state were not.¹²⁵

At this point in the process, the correct response as a matter of public policy would have been to eliminate the price ceilings applicable to the retail prices charged to consumers in northern California and in most of southern California and to authorize the distributors that serve those areas to charge prices that would allow

¹²⁴ For a description of stranded costs and the methods regulators have used to allow firms to recover them, see Pierce & Gellhorn, *supra*. note 48, at 399-408.

¹²⁵ Sweeney, *supra*. note 33, at 72, 114-116, 137.

them to recover the higher prices they were paying in the wholesale market.¹²⁶ That would have put a brake on the upward spiral of the wholesale price and created a situation in which no supplier could profit from unilateral withholding. That response required more political courage than the then-Governor could muster, however. Instead, he retained the pre-existing price ceilings and imposed new ceilings on the retail price of electricity in the San Diego area. That, in turn, produced the predictable results of a continued upward spiral in the wholesale price, as consumers who were insulated from the higher wholesale prices continued to purchase the same quantity of electricity as they did before supply became relatively scarce and suppliers responded rationally to the absence of any demand response to the increased wholesale price by engaging in unilateral withholding of capacity.¹²⁷

The question now is whether a state would be likely to respond to a recurrence of a California-type sharp increase in wholesale prices in the counterproductive way that California responded. If so, restructured markets will perform in unacceptable ways any time that increased relative scarcity of supply yields an increase in wholesale prices that consumers find objectionable. Given the inherently volatile nature of supply and demand for electricity, situations of that type are likely to arise from time to time in any market.

I can think of only two ways to reduce the risk that states will impose ceilings on retail prices that create incentives for suppliers to engage in unilateral withholding of capacity. Congress could enact a statute that forbids a state from acting in that manner, or Congress could enact a statute that empowers FERC to forbid states from

¹²⁶ Pierce, *supra*. note 73, at 402.

¹²⁷ Joskow & Kahn, *supra*. note 76.

imposing such ceilings. It is easy to support a meritocratic argument in support of such a federal role. A state that imposes a ceiling on the retail price of electricity harms consumers in all states that are served by the integrated grid on which wholesale trades are made. Thus, for instance, consumers in Idaho and Arizona suffered significant harm as a result of the retail price ceiling California imposed. Since California consumers did not confront a price increase, they continued their prior level of consumption, thereby increasing the severity of the shortage, increasing the wholesale price still further, creating the incentive for suppliers to engage in unilateral withholding, etc., etc., etc. It seems unlikely, however, that Congress would take either of those actions. Superficially, retail ratemaking seems to be an activity that is suitable for regulation at the state level, and the case in support of transferring all or part of that function to federal regulators requires a level of understanding of economics that is beyond the grasp of most politicians.

2. Wholesale Price Caps

A description of the history of wholesale price caps will help to illustrate the political difficulty of refraining from imposing such caps. During the process of restructuring the California, New York, Texas, New England, and P-J-M markets, there was a debate about the best way to insure that prospective investors would have an adequate incentive to invest in enough generating capacity to serve the market. There was particular concern that investors must be able to predict that they will earn revenues sufficient to allow them to recover their investments in peaking units –

relatively high operating cost generators that are used only during the relatively short periods of time in which demand for electricity exceeds the capacity of the lower operating cost baseload and intermediate load generators.

Some people believed that a competitive wholesale market alone would not provide sufficient revenues to induce investment in adequate generating capacity. They urged creation of other mechanisms that would increase the revenues of generators, e.g., a separate stream of payments to generators who are willing to commit generating capacity to a market. Along with many of the other academic proponents of restructuring, I held the opposite view. I believed, and continue to believe, that a competitive wholesale market will produce revenues sufficient to induce investments in adequate generating capacity. Some of the restructured markets included mechanisms through which generators could supplement the revenues they earned through sales in the competitive wholesale market, while others did not. The performance of those markets reinforced my belief that a competitive market alone is sufficient to create adequate incentives to invest in generating assets.

The widely shared belief that a competitive wholesale market will produce adequate investment incentives depends critically on the assumption that the market will not be subject to price controls, however. In predicting the total stream of revenues that will be earned by a generating unit, the revenues attributable to the conditions of relative scarcity that exist only a small fraction of the time account for a disproportionate share of the total expected revenues. They account for almost all of the revenues earned by peaking units. With price caps on wholesale prices, no

competitive wholesale market will produce enough revenue to induce prospective investors to invest in enough generating capacity to serve the market.¹²⁸

The California wholesale market was not subject to price caps initially, but the state imposed caps on intrastate transactions when the wholesale price began to escalate rapidly in late 2000. Since all firms that could sell in the price-controlled California market also could sell in the unregulated market that existed throughout the rest of the west, they responded to the California price controls by declining to sell in California, increasing their sales in other states, and making sales in the California market through use of the complicated “ricochet” transactions described in section IIC. In the meantime, California applied great political pressure on FERC to impose caps on the price at which all wholesales could be made in the western market. With great reluctance, FERC ultimately responded to that pressure by imposing market-wide caps in that wholesale market. That action eliminated one set of serious problems, but only by creating a new problem. A competitive wholesale market that is subject to price caps cannot produce enough revenue to induce investment in generating capacity that is sufficient to serve the market. Unfortunately, FERC has now applied similar price caps in the other restructured markets.

The experience in California has sent a strong message across the country – politicians cannot be trusted to refrain from imposing caps on wholesale prices when those prices reach levels that displease consumers. That, in turn, means that a restructured market that relies entirely on a competitive wholesale market to produce revenues for generators is insufficient to induce the socially-necessary level of investment in generating capacity. That message does not deal a fatal blow to the

¹²⁸ Joskow, *supra*. note 16, at 37-52.

restructuring movement. It is possible to create a restructured market that supplements a competitive wholesale market with other mechanisms through which generators can earn additional revenues. It is unlikely, however, that such a market will perform nearly as well as a stand-alone unregulated competitive wholesale market.

3. Just Say No Utilities and Their Enabling State PUCS

There are only three potential ways to overcome the formidable obstacle of the “just say no” utilities’ use of the powers of state PUCs to stall the restructuring process. First, we could try to persuade the “just say no” utilities that restructuring is in their best interests. I am not optimistic about the prospects for success in such a venture. In the 1980s, utilities in the middle atlantic states, the northeast, and California were treated so poorly by their state PUCs that they came to believe that they would be better off if their fates were determined primarily by market forces rather than by state regulators.¹²⁹ By contrast, the “just say no” utilities have been treated generously by their state regulators. As a tenured professor, I am well aware of the many advantages of being an ineffectively regulated, entrenched monopolist. The Dean might prefer that I teach or write more or better, but I have the luxury of doing whatever I please. Most academics can empathize with the strong desire of the “just say no” utilities to be free of the stress of having to compete with others. Unless state regulators in the southeast, the lower middle west, and the northwest begin to

¹²⁹ Text at notes 23-36 supra.

replicate the behavior of their counterparts in the northeast and California in the 1970s and 1980s, the “just say no” utilities are likely to continue just to say no.

Second, we could try to persuade the state PUCs that are complicit in their utilities’ efforts to block restructuring that restructuring is in their best interests. That would also be a challenging task. State officials in the middle atlantic states, the northeast, and California became convinced that restructuring was in their best interests primarily because the status quo ante had produced awful results – high prices that angered residential consumers and drove industrial consumers to low cost states, and a regulatory system in which no prospective investor was willing to risk capital by building a new generating plant.¹³⁰ It is possible that similar circumstances will change the views of the state regulators in the southeast, lower mid-west, and northwest, but I do not see anything like that on the horizon. As long as the status quo ante continues to produce results that keep their citizens relatively content, it is hard to imagine why state regulators would voluntarily relinquish control over the utilities that operate in their states. The prospect of increased efficiency alone is unlikely to change the views of the politicians that oppose restructuring.

Third, the federal government could override the preferences of the “just say no” utilities and the states that oppose restructuring and mandate restructuring on a national basis. This could happen in one of two ways. First, Congress could enact a statute that clearly authorizes FERC to implement a national restructuring plan. That is my preferred method of proceeding, but Congress seems incapable of enacting any major energy statute at present, and members of Congress from the southeast and northwest would block inclusion of such a FERC-empowering provision in any

¹³⁰ Text at notes 22-36 supra.

energy legislation that might be enacted in the near future. Second, FERC could use the crude tools now at its disposal in a continuing effort to “persuade” the “just say no” utilities to cooperate with FERC’s restructuring program. That is the method FERC used to restructure the natural gas market in the 1980s. Congress only got around to ratifying FERC’s natural gas restructuring program after it had been fully implemented for years and had proven to be a complete success.

It is easy to provide meritocratic support for one of these two methods of federal imposition of a national restructuring plan. Restructuring can improve significantly the performance of all wholesale electricity markets in the U.S., and no restructuring program can come close to realizing its full potential unless it is implemented on a geographic scale that corresponds to the three integrated transmission grids that support provision of electricity in north america. Thus, for instance, my state of Virginia is hurting not just Virginia consumers but also consumers in Maryland, New York, Ontario, Massachusetts, and North Carolina by forbidding any utility in Virginia from participating in a FERC- initiated restructuring program.

FERC’s Standard Market Design (SMD) proceeding was its attempt to implement this method of restructuring over the objections of the “just say no” utilities and their state PUCs. With a major boost from the Supreme Court, FERC seemed to be on the verge of success in its effort to require all utilities to participate in the process of implementing an SMD applicable to all regions when the California/Enron mess created the perfect opportunity for the “just say no” utilities to rejuvenate their efforts to block restructuring. Since then, every energy bill reported out by a committee or enacted by either House has included a temporary prohibition on FERC

implementation of its SMD proposal.¹³¹ None of those Bills has become law, but FERC has gotten the clear message that it dare not continue to push restructuring in states and regions that oppose it.

4. The Transmission Capacity Shortage

The solution to the problem of the growing shortage of transmission capacity is easy to identify and to support. At present, FERC has the preemptive power to approve a proposed natural gas pipeline over the objections of any state or local government.¹³² FERC exercises that authority consistent with the national interest, and there is no shortage of gas transportation capacity. By contrast, any state or local agency has the power to veto any proposed expansion of transmission capacity, and there is a large and growing shortage of transmission capacity. As I have explained in detail elsewhere, this allocation of regulatory power is certain to continue to produce a growing shortage of capacity that will have devastating effects on the price and availability of electricity. This problem can be eliminated simply by amending the Federal Power Act so that it confers on FERC the same preemptive power to approve transmission expansion projects that the Natural Gas Act already confers on FERC with respect to natural gas pipelines.

The energy bill proposed by the Bush Administration, and every energy bill that has been reported out by a committee or enacted by either House, included a provision that would implement this much-needed reallocation of regulatory

¹³¹ Rokach, *supra*. note 93, at 63.

¹³² 15 U.S.C. §717d.

power.¹³³ None of those bills became law, however, because each also included scores of controversial provisions with questionable or counterproductive effects. Each was also so laden with pork that it would be hard to support the bill, even with the much-needed provision that would give FERC preemptive power to approve transmission expansion projects.¹³⁴ I am not confident that Congress can or will enact a statute that would solve this problem.

V. WHERE DO WE GO FROM HERE?

My proposed course of action at this point sounds like a cliché – we need to be patient but persistent in our efforts to complete the restructuring process. The political environment is not consistent with completion of the restructuring process at present. Any attempt to persuade Congress to enact a statute that clearly authorizes FERC to implement a national restructuring plan would fail in present conditions, and any attempt by FERC to coerce resisting utilities and states into adopting a national SMD would be institutional suicide.

Political conditions are transitory, however. It is important to remember that FERC was poised to implement its proposed SMD over the objections of politicians from the southeast and northwest just a few years ago. The political environment changed in ways that precluded FERC from taking that step only as a result of the California/Enron debacle and the clever exploitation of that incident by the “just say

¹³³ Michael Burr, A Study in States' Rights, Pub. Util. Fort., Feb. 2004, at 21; National Energy Policy Development Group, National Energy Policy 7-17 (2002).

¹³⁴ See House Again Passes GOP Energy Measure, The Washington Post, June 16, 2004, A4; Energy Follies, The Washington Post, Apr. 29, 2004, A24; Energy Voodoo, The Washington Post, Feb. 8, 2004, B6; The GOP Congress: High on the Hog, The Washington Post, Jan. 18, 2004, B1.

no” group. Over time, public memory of that incident will fade, and politicians will begin once more to recognize the need for restructuring.

That process of political change has already begun in California with Governor Schwarzenegger’s announcement of his support for a return to a market in which state regulators play a much smaller role and competition plays a much larger role.¹³⁵ I predict that California politicians will make a complete transformation back to their prior roles as the strongest proponents of national restructuring in the near future. They will soon discover that they cannot afford to continue with the heavy-handed state role in the market that former Governor Davis adopted in response to the price spike of 2000-2001.¹³⁶ Governor Davis converted what should have been a short-term correctable problem in market performance into a long-term problem so severe that it threatens the continued viability of the California economy. The state-dominated electricity market in California has produced by far the highest electricity prices in the western United States.¹³⁷ Residential consumers are furious, and industrial consumers are fleeing California for states in which they can purchase electricity for less than half the price they pay in California. Those were the conditions that initially induced California politicians to take a leading role in the electricity restructuring process in the 1990s. They will have the same effect on California politicians over the next few years. With the return of California politicians to their prior roles as leading supporters of the national restructuring movement and with fading public memory of the California price spike and the Enron scandal, the “just say no” utilities will

¹³⁵ Smith, *supra*. note 91.

¹³⁶ For a description of those measures, see Pierce, *supra*. note 73, at 403-404.

¹³⁷ Energy Information Administration, *supra*. note 32.

discover that they are once more relegated to the roles of a rear guard that can only hope to stall the inevitable.

In the meantime, the continued success of the P-J-M market will become so well-known and well-documented that proponents of restructuring will be able to use that market to demonstrate even to the politicians in the southeast and northwest that well-designed restructured markets produce better results than markets that are dominated by state regulators. Even some of the “just say no” utilities may acquiesce in FERC’s national restructuring program as they begin to realize that restructuring has not produced disastrous results for the utilities that have participated in the restructured markets and that restructured markets provide attractive new opportunities for well-managed firms to prosper.

Once these changed political conditions permit FERC to complete its SMD proceeding and to complete the national restructuring program it began a decade ago, Congress can be expected to ratify FERC’s actions and to attempt to take credit for its success. That is the only constructive role Congress played in FERC’s extraordinarily successful restructuring of the natural gas market in the 1980s. It may be the most that we can realistically expect from Congress in this restructuring process.

There is one context in which we cannot afford to be patient, however. As I have explained recently elsewhere,¹³⁸ we have a large and growing shortage of transmission capacity. That shortage is already costing the nation many billions of dollars per year and precluding many residents of urban areas from obtaining the benefits of the competitive wholesale market during the increasingly frequent periods of time in which transmission constraints create urban islands in which consumers

¹³⁸ Pierce, *supra*. note 70, at ____.

have access only to the typically old, high cost, high polluting generating units that are located in urban areas. If we do not address that problem quickly and effectively, we will experience a constantly increasing incidence of both price spikes and blackouts. Only Congress can solve that problem. It must amend the Federal Power Act so that it is analogous to the Natural Gas Act in conferring power on FERC to engage in preemptive approvals of proposed transmission expansion projects.