



Consumer Federation of America

**BEHIND THE HEADLINES OF ELECTRICITY RESTRUCTURING
A STORY OF GREED, IRRESPONSIBILITY AND MISMANAGEMENT
OF A VITAL SERVICE IN A VULNERABLE MARKET**

(And you thought this was about irrational tree huggers
who wouldn't allow power plants or transmission lines to be built,
but still want to run their air conditioners without paying a fair price for electricity)

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BEHIND THE HEADLINES OF ELECTRICITY RESTRUCTURING

A STORY OF GREED, IRRESPONSIBILITY AND MISMANAGEMENT OF A VITAL COMMODITY IN A VULNERABLE MARKET

EXECUTIVE SUMMARY

From the start of the deregulation debate consumer advocates warned that the fundamentals of electricity service – “the physics of electrons and the economics of electricity” – make it virtually impossible to create orderly retail markets that will benefit residential consumers. Electricity is a vital commodity in a vulnerable market. It cannot be economically stored, has no substitutes and requires perfect, instantaneous balance. The rigorous real-time physics of the electricity network make it susceptible to highly disruptive accidents. Surplus generation and transmission capacity are not generally available and take long lead times to build. Inelasticity and weather-sensitivity of demand make electricity prone to severe peaks and programs to rapidly shed load have not been developed.

Premature deregulation led to profit maximization that tightened electricity markets by reducing supplies, limiting reserves, eliminating back up requirements, undercutting conservation programs, and preventing facilities from being built. The small number of suppliers and the tendency for electricity product and geographic markets to be highly restricted in time and space make the exercise of market power and the implementation of gaming strategies that drive prices up easy to execute. Price spikes produce such huge windfalls that suppliers exhibit an OPEC-like (backward bending) supply curve, in which supplies are reduced, not increased, as prices rise.

Ignoring warnings about the existence of market power and capacity constraints, the Federal Energy Regulatory Commission (FERC) irresponsibly deregulated the wholesale market. Federal policymakers should never forget that FERC fought for control of California markets and deregulated them over the opposition of many in California. In California and elsewhere, FERC rubber stamped industry rules for operating the grid that are prone to manipulation and abuse. FERC’s voluntary approach to forming regional transmission organizations has failed to produce nondiscriminatory access. FERC allowed a wave of mergers to concentrate generation markets, rendering them more vulnerable to the abuse of market power. FERC made matters much worse by refusing to exercise responsible oversight authority until very recently, when the abuse became just too blatant to ignore any longer.

Managing the complex set of real-time transactions necessary to physically and financially clear electricity markets raises transactions costs and has resulted in institutions that are plagued by manipulation and gaming. California’s market institutions may appear to have been particularly flawed – including split markets for various types of energy and transmission, an auction that paid all producers the highest price allowed, a lack of reserve requirements, and a ban on long term contracts – but there is an ongoing debate about how important these factors were in comparison to the underlying problems of market power and the nature of the commodity. Markets with different institutions have suffered similar problems, albeit not as severe as California’s.

The inevitable result of greed, irresponsibility and mismanagement of a vital commodity in a volatile market is a dramatic run up in price and a massive, unjustified and economically inefficient transfer of wealth from consumers to producers. In one week in 1998 in the

Midwest, \$500 million changed hands. Well over a billion dollars of rents was collected in California before the summer 2000 problem and billions more are being litigated for the summer's debacle. The California Independent System Operator has asked for over \$500 million in refunds for last December/January. Over \$70 million was collected in spike costs in New York City in one day. The New England power pool experienced price run-ups and PJM has been afflicted with dramatically rising capacity charges.

Competition has recently collapsed in the places like Pennsylvania and utilities there are seeking to bust their price caps, just as in California. This in spite of the fact that restructuring in Pennsylvania was supposed to be easy because of high prices at the outset, excess generation capacity, and location in the middle of a long standing power pool, well-endowed with transmission assets.

To the extent residential ratepayers have benefited from restructuring, it has been a result of rate reductions mandated by regulators not driven by market developments. In fact, a good case can be made that, given market conditions, consumers would have saved as much or more under effective regulation, without exposing them to price spike risk. Under the best of circumstances, for residential consumers, electricity restructuring was a solution to a high cost problem that has not worked very well, under the worst of circumstances it threatens to make them much worse off.

Consumers now face claims that larger reserve margins, higher capital costs, and faster depreciation are necessary to make the market work, in addition to new transaction costs resulting from the creation of new market institutions. Gone are the fanciful claims of 40 percent savings that were used to sell electricity restructuring to the public. Rather than bring dramatic new innovation and efficiency to the market, many of the entrants seem to have based their business models, and policymakers based their projections of consumer savings, on the ability to sell electricity powered by cheap natural gas. When cheap gas disappeared, so did the benefits of electricity restructuring.

Consumers resist effort to force price spikes into their bills, and rightly so, because a large part of the market price run up is caused by artificial scarcity, abuse of market power and the pure stupidity of poorly designed markets. Until utility industry institutions demonstrate that they have wrung the inefficient and unjustified rents out of the system, consumers are unwilling to bear the burden of dealing with legitimate scarcity problems. This resistance is reinforced when they discover that the solutions now proposed are to use mandatory economic dispatch in transmission, long term contracts in supply, and vigorous interruptible and conservation programs on the demand side. In other words, after wasting tens of billions of dollars, we find that the old system works better.

We need a new "Ten Consumer Commandments Of Electricity Restructuring." (1) Lawmakers should not to go forward with deregulation if they haven't already. If policymakers do decide to deregulate, they should (2) start with wholesale competition, (3) pay careful attention to creating an open and adequate transmission system, (4) build effective market structures, and (5) that ensure that there is adequate capacity and competition before deregulation. They should (6) require reserve margins, (7) encourage fuel diversity including distributed generation, and (8) have vigorous demand-side management programs in place. They (9) must have serious law enforcement mechanisms in place and (10) take ultimate responsibility for the final structure and performance of the industry.

INTRODUCTION

In the past year the failure of restructured energy markets has caused a growing number of analysts and public policy officials to question whether the electricity market can be organized on the basis of pure market transactions. For example, California Public Utility Commissioner Carl Wood has suggested that some policymakers are exhibiting a "theological devotion to deregulation at any price"¹ and Paul Krugman, hardly a wild-eyed consumer advocate, challenged deregulation "mythology" in the *New York Times* stating that "the defenders of deregulation should stop making excuses and look seriously at what went wrong."²

Unfortunately, as consumers in California have learned, when policymakers rely on blind faith in the mythology of deregulation, rather than a clear-eyed assessment of the reality of electricity markets, the heaviest price is paid by ordinary citizens and taxpayers. In fact, consumers raised many questions about restructuring before it was undertaken,³ and have charted its failures throughout the process.⁴ This paper presents a consumer point of view of what went wrong. It presents serious charges and conclusions based on the record of actual market behavior and outcomes across the country that raise strong doubts about the viability of restructuring as a public policy.

A VITAL, INHERENTLY VOLATILE COMMODITY

In order to make a market, there must be a supply side, a demand side and a highway of commerce in between. In electricity, we have none of the above (see Exhibit 1). It has been clear for quite some time that the physics of electrons and the economics of electricity make it highly unlikely that residential ratepayers will benefit from the deregulation of retail electricity markets and the experience of restructuring to date bears that out.

Electrons are among the most demanding, ornery little beings in nature. They go where they want and if they arrive under the wrong circumstances, they can do serious harm. The

¹ *Talk of the Nation*, August 9, 2000.

² Krugman, Paul, "The Unreal Thing," *New York Times*, February 18, 2001.

³ Cooper, Mark, *Industrial Organization and Market Performance in the Transportation and Communications Industries: A Review of Current Theories and Empirical Applications to the Railroad, Electric Utility, Airline, Telecommunications and Oil Pipeline Industries with Hypotheses about Natural Gas Pipelines* (January 1986) (hereafter, Cooper, *Organization*), identified basic economic conditions in the electricity industry that raise doubts about the prospects for deregulation as the debate was beginning (see also Cooper, Mark, "Theory vs. Reality," *Consumer Federation of America Utilities Conference*, April 6, 1987). Cooper, Mark, "Protecting the Public Interest in the Transition to Competition in New York Industries," [The Electric Utility Industry in Transition](#) (Public Utilities Reports, Inc. & the New York State Energy Research and Development Authority, 1994), stated the concerns as the policy of restructuring was being formulated. Cooper, Mark, *Residential Consumer Economics of Electric Utility Restructuring* (Consumer Federation of America and Consumers Union, July 1998) (hereafter, Cooper, *Economics*), identified specific flaws in the restructuring policies that had been adopted.

⁴ Cooper, Mark, *Electricity Restructuring and the Price Spikes of 1998* (Consumer Federation of America and Consumers Union, June 1999) (hereafter, Cooper, *Spike*), *Reconsidering Electricity Restructuring* (Consumer Federation and Consumers Union, November 2000) (hereafter, Cooper, *Reconsidering*). Earlier analysis has reviewed conceptual, simulation and foreign evidence. This paper relies solely on the domestic, U.S. experience to date. These concerns have been expressed in presentations to state policymaker including, the Arizona Public Service Commission, April 17, 2000), the Wisconsin Public Power Association (June 28, 2000) Nevada Energy Policy Committee, November 30, 2000, Florida Public Utility Commission (January 13, 2001) and the Consumer Affairs Committee of the National Association of Regulatory Utility Commissioners (February 25, 2001). A videotape of the Nevada presentation is available, as is a written transcript of the presentation in Florida.

physical system demands perfect balance on a real time basis. The demanding real time nature of its physics makes it prone to highly disruptive outages. Unfortunately, electricity cannot be economically stored to respond to these outages.

At the same time, electricity is a necessity that has no substitute on the demand side in the short-term.⁵ Denial of access to the service results in deprivation. Demand is highly sensitive to weather, which can create severe peaks in demand. Moreover, for the vast majority of consumers and over the relevant range of economic values, reliability is an externality. This is a network industry in which the fate of each depends upon the actions of all. Individuals cannot create their own reliability or capture its full value in private transactions.⁶

To keep things in balance, the system needs lots of reserves close at hand, or lots of transmission capacity readily available to move abundant supplies from far away, or lots of load that can be quickly shed. Most electricity markets do not have that luxury today.⁷ Contracting to achieve real-time balance simultaneously in five, six or seven different markets over broad geographic areas⁸ has proven a daunting task⁹ that consumes substantial resources and may undermine economies of coordination and integration,¹⁰ while it imposes many new

⁵ *Webster's Third New International Dictionary, Unabridged* (Springfield, MA, 1986) defines a substitute as "something that is put in the place of something else or is available for use instead of something else." This is in contrast to the definition of deprivation, "to take away, to take something away from." Turning out the lights or turning off the air conditioning is not a substitute.

⁶ It has now become apparent that the value of peak load reduction is far higher than the market clearing price at the peak. Marcus, William B., and Greg Russzon, *Cost Curve Analysis of the California Power Markets*, (JBS Energy, Inc., September 29, 2000), estimates the value of peak shaving at between 5 and 10 times the market clearing price. Borenstein, Severin, *The Trouble With Electricity Markets* (January 2001) (hereafter, Borenstein, *Trouble*), uses an example in which the value of reduced demand is just under four times the market price. He argues that the ISO should capture this externality. The point is that it is highly unlikely that this externality will be internalized in direct, bilateral market transactions.

⁷ Cambridge Energy Research Associates (CERA), *Electric Power Trends: 2001* (2000); *High Tension: The Future of Power Transmission in North America* (August 2000) (hereafter, CERA, *High Tension*).

⁸ Geographic scope is needed to achieve what network economists call pool effects in network industries. Stabell, Charles B. and Oysteing D. Fjeldstad, "Configuring Value Chains for Competitive Advantage: On chains, Shops and Networks," *Strategic Management Journal*, 19:1998 or load balancing in the electric utility industry, Cooper, *Economics*.

⁹ Rosen, Richard, Freyr Sverrisson and John Stutz, *Can Electric Utility Restructuring Meet the Challenges It Has Created* (Tellus Institute, November 2000) raise questions about the ability of any set of institutions to run the industry based primarily on external market transactions. Earle, Robert L, Phillip Q. Hanser, Weldon C. Johnson and James D. Reitzes, "Lessons from the First Year of Competition in the California Electricity Market," *The Electricity Journal* (October 1999), describes the process in a context that finds the potential for market power and inefficiency.

¹⁰ Restructuring, p. 7. References cited in the original as supporting this observation include Gegaux, Douglas and Kenneth Nowotny, "Competition and the Electric Utility Industry," *Yale Journal on Regulation*, 10:63, 1997; Gilsdorf, Keith, "Testing for Subadditivity of Vertically-Integrated Electric Utilities," *Southern Economic Journal*, 18:12, 1995; Henderson, J. Stephen, "Cost Estimation for Vertically Integrated Firms: the Cost of Electricity," M. A. Crew (Ed.), *Analyzing the Impact of Regulatory Change in Public Utilities* (Lexington, MA, Lexington Books, 1985); Hirst, Erick and Brenda Kirby, "Dynamic Scheduling: The Forgotten Issue," *Public Utilities Fortnightly*, April 15, 1997; Kaserman, David L. and John W. Mayo, "The Measurement of Vertical Economies and the Efficient Structure of the Electric Utility Industry," *Journal of Industrial Economics*, 29:5, 1991; Kwoka, John E. Jr., *Power Structure: Ownership, Integration, and Competition in the U.S. Electricity Industry* (Dordrecht, Boston: 1996); Roberts, Mark J., "Economies of Density and Size in the Production and Delivery of Electric Power," *Land Economics*, 62:4, 1986.

administrative and transaction costs to support the new commerce.¹¹ While the engineers have managed to impose enough order to keep the lights on (with increasingly less success than under the old system),¹² the economic institutions have failed to create orderly markets.¹³

It takes a long time to bring power plants and transmission lines into service, and in a deregulated market no one takes responsibility for building excess capacity.¹⁴ Since it takes so long to add capacity and capacity additions are so visible, it is easy to avoid the excess long-term capacity. In many markets, the small number of bidders and the availability of information

¹¹ Restructuring, p. 8. References cited in the text in support of this proposition include Mistr, Alfred E. Jr., "Incremental-cost Pricing: What Efficiency Requires," *Public Utilities Fortnightly*, January 1, 1996; Oren, Shmuel, S., "Economic Inefficiency of Passive Transmission Rights in Congested Electricity Systems with Competitive Generation," *The Energy Journal*, 18:1, 1997, "Passive Transmission Rights Will Not Do the Job," *The Electricity Journal*, 10:5, 1997; Ostroski, Gerald B., "Embedded-cost Pricing: What Fairness Demands," *Public Utilities Fortnightly*, January 1, 1996; Radford, Bruce W., "Electric Transmission: An Overview," *Public Utilities Fortnightly*, January 1, 1996; Volpe, Mark J., "Let's Not Socialize Transmission Rates," *Public Utility Fortnightly*, February 15, 1997. Bohi, Douglas and Karen Palmer; "The Efficiency of Wholesale vs. Retail Competition in Electricity," *The Electricity Journal*, October 1996; Gegaux, Douglas and Kenneth Nowotny, "Competition and the Electric Utility Industry," *Yale Journal on Regulation*, 10:63, 1997, Cornelli, Steve, "Will Customer Choice Always Lower Costs?," *The Electricity Journal*, October, 1996. One post-restructuring estimate puts the increase in cost resulting from restructuring at just under \$34 billion or 13 percent of the total bill (see Casazza, J. A., *Errant Economics? Lousy Law? Market Manipulation? All Three!!*, n.d.

¹² Energy Information Administration, *Interim Report of the U.S. Department of Energy's Power Outage Supply Study Team* (January 1999) (hereafter, EIA, *Outages*).

¹³ Defenders of restructuring first tried to shrug off price spikes and quality problems as accidents caused by a few technological breakdowns interacting with extraordinarily high demand (see "As Might be Expected, Any Lesson to be Learned from the June Power Crisis and Price Spikes Depend Upon Whom You Ask," *Foster Electric Report*, No 145, August 5, 1998, quoting, AEP, p. 15; Federal Energy Regulatory Commission, Staff Report to the Federal Energy Regulatory Commission on the Causes of the Pricing Abnormalities in the Midwest During June 1998 (Washington, D.C., 1998) (hereafter, FERC, Staff Report), p. 4-13; but see Public Utilities Commission of Ohio Report, Ohio's Electric Market (June 22-26, 1998); What Happened and Why: A Report to the Ohio General Assembly (Columbus, Oh, 1998), for a different point of view). As problems persisted, they have shifted the blame to a transitory shortage of supply or bad rules in a few markets (Bill Briar, *Talk of The Nation*, August, 10, 2000). Given high enough prices, they claim a little patience will call forth new supplies that will solve the problem. In fact, some have argued that prices as high as \$25,000 per megawatt hour are justified (see Michaels, Robert J. and Jerry Ellig, *Electricity Passes the Market Test* (Mercatus Center, October 19. Enron Power Marketing, Inc., *Analysis of the Midwestern Electricity Price Spikes of Late June 1998*, (Enron), p. 2). An analogous response for the summer 2000 problems in California can be found in Electric Power Supply Association, *California: The Real Story*, September 11, 2000.

¹⁴ Hirst, Eric and Stand Hadley, "Generation Adequacy: Who Decides," *Electricity Journal* (October 1999) and Borenstein, *Trouble*, argue for market-based solutions to ensuring capacity sufficiency on the basis of demand side responsiveness, not supply-side construction of reserves.

make it easy to engage in strategic bidding that drives prices up.¹⁵ It is hard to see how an excessive reliance on competitive markets will produce either reliability or economic order.¹⁶

In fact, producers do not even have an interest in delivering existing capacity. Having learned how to manipulate the market, the primary interest of producers is to keep it tight.¹⁷ Exorbitant prices do not elicit efficient supply responses, they reward and create an incentive for more effective gaming. There is a formal theory of this in economics. It is called a backward bending supply curve. It has been extensively applied to labor markets¹⁸ and, not surprisingly, to the OPEC cartel.¹⁹ To state the concept in layman's terms, you make so much money by running the price up that you are much better off by cutting back production than by increasing output, which would lower the price. You can only get away with this when demand is inelastic (since that creates huge economic rents) and the supply beyond your control cannot be easily expanded in the short-term (since competition would dissipate the rents).²⁰

To make matters even worse, the interstate highway system for the movement of electrons is grossly inadequate.²¹ It was not designed to handle these transactions. Capacity is constrained and extremely difficult to expand for environmental and social, not economic, reasons.²² Even where capacity is available, it can be easily manipulated.²³ Transmission

¹⁵ McDiarmid, Robert C., Lisa G. Dowden, and Daniel I. Davidson, "A Modest Proposal: Revoke the Nobel Prize? Recognize the Limitations of Theory? Or Grant a License to Steal?," *Electricity Journal*, January/February 2001; "Comments and Testimony of the Utility Reform Network (TURN) and the Utility Consumers; Action Network (UCAN) of the November 1, 2000, Order Proposing Remedies for California Wholesale Electric Markets," before the Federal Energy Regulatory Commission, *San Diego Gas & Electric, et. al.*, Docket No. EL00-95-000, November 22, 2000 (hereafter TURN); "Testimony of Eric Charles Woychik, on behalf of TURN and UCAN, *San Diego Gas & Electric, et. al.*, Docket No. EL00-95-000, November 22, 2000 (hereafter, Woychik).

¹⁶ Rosen, Sverrisson and Stutz, argue the physics and economic constraints in markets for electricity; Coyle, Eugene, *Price Discrimination, Electronic Redlining, and Price Fixing in Deregulated Electric Power* (American Public Power Association, January 2000) argues the economic problems.

¹⁷ Puller, Steven L., "Pricing and Firm Conduct in California's Deregulated Electricity Market" (November 2000), finds strong evidence of static market power and weak evidence of dynamic gaming in the first year of the market. There is a general consensus that gaming increased in subsequent years (Kahn, Michael and Loretta Lynch, *California's Electricity Options and Challenges: Report to Governor Gray Davis*, (hereafter, *Options*) Chapter III; Marcus, William and Jan Hamrin, *How We Got into the California Energy Crisis*, JBS Energy (2000)) (hereafter, Marcus, *Crisis*).

¹⁸ That the concept is routine is attested to by its inclusion in introductory texts, see for example, Taylor, John, B., *Economics* (Houghton Mifflin, Boston, 1998), pp. 327-329.

¹⁹ Adelman, Morris, "OPEC the Clumsy Cartel," *The Energy Journal*, 1:1980; Bohi, Douglas and W. David Montgomery, *Oil Prices, Energy Security and Import Policy* (Resources for the Future, Washington, 1982); Aperjis, Dimitri, *The Oil Market in the 1980s: OPEC Oil Policy and Economic Development* (Ballinger, Cambridge, 1982); Teece, David, "OPEC Behavior: An Alternative View," in James M. Griffin and David J. Teece (Eds.), *OPEC Behavior and World Oil Prices* (George Allen and Unwin, London, 1982); Adelman, Morris, "OPEC as a Cartel," in James M. Griffin and David J. Teece (Eds.), *OPEC Behavior and World Oil Prices* (George Allen and Unwin, London, 1982).

²⁰ Wolak, Frank A., et al., "An Analysis of the June 2000 Price Spike in California ISO's Energy and Ancillary Service Market," *Market Surveillance Committee of the California Independent System Operator* (September 6, 2000), p. 14 (hereafter, Wolak, *Analysis*).

²¹ CERA, *High Tension*.

²² Brendan, Kirby and Eric Hirst, "Maintaining Transmission Adequacy in the Future," *Electricity Journal* (1999), acknowledge the primary importance of noneconomic factors.

²³ Rao, Narasimha and Richard D. Tabors, *Transmission Markets: Stretching the Rules for Fun and Profit*, TCA Working Paper, No. 327-0400 (April 2000).

owners who also own generation assets can promote their private interests to the detriment of the public by withholding capacity from competitors or pricing transmission to transfer all the scarcity rents to the owners of the bottleneck facility.²⁴

These are the conditions that create the vulnerability in electricity markets and produce the horrendous price spikes that deregulated electricity markets have experienced in the past three years.²⁵ This is the vital, volatile part of the story; now we turn to the greed, irresponsibility and mismanagement parts.

CALIFORNIA: RACING TO DISASTER

As the crisis in California has unfolded and detailed analysis comes available, it becomes more and more evident that residential ratepayers have good reason to be mad as hell and every right to declare they will not take it any more. They have been the victims of greed exploiting a vulnerable market.

The fact that not much capacity was added in California is well known, but substantially over-stated.²⁶ Tight supply-demand developments in California are not that different from the rest of the country, which has contributed to the presently tight markets and growing concerns about future tight markets from coast-to-coast.²⁷

What receives less attention are all the other things that did or did not happen in California to make the market tight. Here I do not mean the hot weather and lack of rain, about which we hear so much. Responsible public policy cannot allow the health and welfare of its citizens to rely on the luck of weather. What I mean are the things that market participants

²⁴ Tabors, Richard D. and Luis Paz Galindo, *Transmission Pricing in PJM: Allowing the Economics of the Market to Work* (May 12, 1999).

²⁵ Cooper, Mark, *Organization*, used the term vulnerable markets to apply to electricity and natural gas, in particular, based on four characteristics – strategic actions to restrict entry, vertical integration, transactional concerns, and a low elasticity of demand (pp. 18-19). Specific traits of electricity markets that were identified as a source of concern and reason not to deregulate included a natural monopoly in transmission and distribution based on economies of scale and coordination (short-term management and long term planning), price discrimination, unequal bargaining power between sellers and buyers (who were under an obligation to serve), and the administrative cost of trying to run the grid in a competitive environment (pp. 72-73). General traits of these network industries that were a source of concern included concentration, nondiscriminatory carriage, price discrimination, cross subsidies, high cost/low density markets and large economic rents (pp. 115-120). Taken together, this analysis anticipates the deregulation debacle precisely.

²⁶ Kahn, *Options*, p. 36, give an estimate of approximately 672 MW added capacity, or 2 percent, for 1996 to 1999. This is compared to a growth in peak demand of 5,522 MW over the period. In contrast, nationwide, generating capacity has declined by about 10 percent, while noncoincident peak increased by 10 percent (Energy Information Administration, *Electric Power Annual 1999*, December 2000, Tables 34, 35). Harvey, Hal Bentham Paulos and Eric Heitz, “California and the Energy Crisis: Diagnosis and Cure,” *Energy Foundation*, March 8, 2001, look at the decade of the 1990s and show substantial additions to capacity, particularly smaller scale units.

²⁷ In addition to the price spikes of 1998 (see FERC Staff Report, PUCO); the summer of 1999 experienced price spikes (see Rose, Kenneth, *The California Electric Restructuring Meltdown and the Fallout in Other States*, National Conference of State Legislature, AFI/ASI Joint Winter Meeting, AFI Energy and Transportation Committee (December 13, 2000) (hereafter *Other States*); *The California Electric Meltdown*, presentation to the NRRI Board of Directors Meeting, September 14, 2000, (hereafter, (Rose, *Meltdown*);; Bowring, Joseph, et. al., *Monitoring the PJM Market: Summer 1999*, UCEI Power Conference, March 17, 2000) and supply outages (EIA, *Outages*); and the summer of 2000 also exhibited sharp run ups in New York and New England (see Rose, *Meltdown*, Rosen, Sverrisson and Stutz).

did and policymakers let them do to protect their private interests at the expense of the public interest.²⁸

Not only did utilities refuse to build power plants, they actively prevented as much as 4,000 megawatts of long-term resources from entering the system and failed to provide an equal amount of short term resources.²⁹ Utilities cut back on their spending on conservation, which led to a shortfall in demand reduction of a couple thousand megawatts. In defense of their distribution assets, they also fought steadfastly against distributed generation, which could be bringing substantial capacity on line, in addition to relieving demands on transmission assets.³⁰ Citing the impending competitive market, utilities refused to buy about a thousand megawatts of renewable energy that they were supposed to. Utilities failed to produce spot and interruptible contracts for large quantities of additional capacity to which they were committed.³¹ When they were given the opportunity to enter into long-term contract, they failed to fully avail themselves of the hedging opportunities to mitigate the exposure to price run-ups.³²

The independent power producers also did not build any power plants. Instead, they bought the existing ones. They immediately began running plants less than the previous owners.³³ On any given day during the recent price spikes these plants were producing between 2000 and 6000 megawatts less than their historic average.³⁴ The same independent generators also opposed long-term contracts, which would have kept utilities out of the volatile spot market.³⁵

²⁸ An account of the immense sums spent in opposing vigorous competition at the federal level can be found in Benton, James C., "Money and Power: The Fight Over Electricity Deregulation," *CQ Weekly*, August 12, 2000.

²⁹ The key elements of this scenario were laid out in Kahn, *Options*. An interesting perspective on perceptions about the crisis that tracks many of the arguments made below can be found in "Roundtable Dialogue on California Energy Crisis," *Sacramento Bee* (December 24, 2000). Marcus, *Crisis*, provides specific estimates of the size of each of the factors, as do Harvey, et al.

³⁰ See Marcus, *Crisis*. The Department of Energy documented the difficulties that utilities created for the expansion of supply through distributed generation see Alderfer, R. Brent, M. Monika Eldridge, and Thomas J. Starrs, *Making Connections: Case Studies of Interconnection Barriers and their Impact on Distributed Power Projects* (National Renewable Energy Laboratory, May 2000).

³¹ Marcus, *Crisis*, gives the following figures for long term resources 1400 MW renewables and cogeneration, 2000 MW of efficiency – and for short term resources – 2300 MW of uncontracted spot capacity and 2500 MW of bogus interruptible contracts (see also Harvey, et al.) The California Energy Commission put distributed generation as high as 20 percent, or as much as 10,000 MW, by 2010, which alarmed PG&E, see *Pacific Gas and Electric Company's Position on Distribution Competition, Distributed Generation and the Role of the Distribution Company*, p. 27.

³² Wolak, *Analysis*, and Kahn, Alfred, et al., *Pricing in the California Power Exchange electricity Market: Should California Switch from Uniform Pricing to Pay-as-Bid Pricing* (California Power Exchange, January 23, 2001) also recognize that utilities did not take these opportunities, but excuse it by suggesting they did not trust regulators.

³³ Puller, shows an immediate reduction in utilization after deregulation and divestiture.

³⁴ Rose, *Other States*, shows an increase in unplanned outages between 1999 and 2000 of about 1,000 MW in June, 1,600 MW in July, and 2,500 MW in August. Marcus, *Crisis*, states, "Forced outage rates for California natural gas plants over the past five years have gone from the traditional 5-10 percent per year outage rate to an average of almost 50 percent."

³⁵ Krugman.

The disappearance of these assets is part of a pattern of resource denial that has the effect of driving up the price of electricity.³⁶ Whether it is purely strategic, or illegally manipulative, or even collusive, remains to be seen,³⁷ but there is no doubt that the pursuit of private interests has denied the electricity market in California substantial resources.³⁸ This profit driven denial of resources equal to between 10 and 20 percent of peak demand had a substantial impact on price and performance.³⁹ As a result, the public welfare was placed at the mercy of the weather and the ability of producers to game the market.

This is the greed part of the story.

REGULATORY IRRESPONSIBILITY THAT HARMS THE PUBLIC

For its part the Federal Energy Regulatory Commission (FERC) prematurely deregulated price over the objection of many in California. In fact, FERC fought California authorities to assert control over the Independent System Operator (ISO) and then deregulated the price of energy in the California wholesale market, even though its market analysis was fundamentally flawed. This enabled private interests to take advantage of the bad situation that they had helped to create.

FERC failed to reasonably analyze the market before it deregulated. It treated the state as one big market, when it is evident that there are distinct and separate north-south markets because of a capacity constraint.⁴⁰ It failed to identify load pockets that would be constrained at peak times.⁴¹ It deregulated ancillary services, even though it was told market power existed in these markets.⁴² It accepted on faith that “must run” plants would mitigate market power, without any concrete plan to do so.⁴³

More generally, FERC has rubber stamped industry rules on transmission capacity availability and transmission load relief that simply cannot ensure open transmission networks

³⁶ Borenstein, Everin, James Bushnell and Frank A. Wolak, *Diagnosing Market Power in California’s Restructured Electricity Market* (August 2000).

³⁷ Puller; Department of Market Analysis, *Report on Real Time Supply Costs Above Single Price Auction Threshold: December 8, 2000 – January 31, 2001*, February 28, 2001 (hereafter, DMA, Supply Costs)

³⁸ In addition to findings on market power cited above, see Bohn, Roger E., Alvin K. Klevorick and Charles G. Stalon, Market Monitoring Committee of the California Power Exchange, *Report on Market Issues in the California Power Exchange Energy Markets* (August 17, 1998) and Energy Information Administration, *Horizontal Market Power in Restructured Electricity Markets* (March 2000).

³⁹ Marcus and Russzon call it a summer 2000 shift. They show that the jump in gas prices runs the cost from 8.3 cents per kWh to 16.5 cents at 40,000 MW without the summer shift and 24 cents with the summer shift. At 45,000 MW, the price is 78 cents per kWh and at 35,000 MW, it is 11.4 cents. Adding 5,000 to 10,000 MW to the system has a huge benefit in relieving price pressures.

⁴⁰ Borenstein, Severin, James Bushnell and Steven Stoft, “The Competitive Effects of Transmission Capacity in a Deregulated Electricity Market,” *Rand Journal of Economics*, 31:2, 2000, p. 318, state, matter of factly, “Congestion on the north-south transmission lines often divides the state into at least two distinct geographic markets.” See also Dowden, Lisa G, Robert C. McDiarmid and Will S. Huang, *Market Power: Will We Know it When We See It?: The California Experience*, American Public Power Association (December 2000); Marcus, *Crisis*.

⁴¹ Bushnell, James and Frank A. Wolak, “Regulation and the Leverage of Local Market Power in California’s Electricity Market” (July 1999).

⁴² Dowden, McDiarmid, and Huang; Marcus, *Crisis*.

⁴³ Dowden, McDiarmid, and Huang; Marcus, *Crisis*.

or prevent manipulation of transmission capacity availability.⁴⁴ It has wasted years on voluntary approaches to forming independent, responsible transmission organizations that must be a cornerstone of the interstate market.⁴⁵

The FERC has also pursued a remarkably permissive merger policy.⁴⁶ As a result, national and regional markets have become much more concentrated.⁴⁷

FERC refuses to responsibly police the markets it has irresponsibly deregulated.⁴⁸ It has defended the secrecy of spot market bidding, which appears to have the effect of allowing tight oligopolies of bidders to play their games behind closed doors.⁴⁹ It refused to requisition and study bidding records for abusive patterns after the first price spikes in 1998,⁵⁰ and the second price spikes in 1999,⁵¹ which emboldened strategic bidders for the really big killing of 2000.

FERC approves rates without subjecting them to refund, so that market manipulators know they will never have to disgorge their ill-gotten gains.⁵² It even rushed in to allow a hasty reorganization of one of the California utilities to shield its assets from its creditors.⁵³ As the only dissenting Commissioner put it, if the FERC had exercised more responsibility earlier, "capping spot market prices at variable operating costs plus a capacity adder... there is reason to believe that applicants would not be in such dire straits now."⁵⁴

This is the irresponsibility part of the story.

REGULATORY MISMANAGEMENT MAKES MATTERS WORSE

Things would have been bad no matter what the California market institutions looked like, but the institutions certainly did not help matters and made them worse in a number of

⁴⁴ Rao and Tabors. The importance of transmission is underscored in Borenstein, Bushnell and Stoft.

⁴⁵ Consumer Federation of America, "Request for Reconsideration," *Regional Transmission Organizations*, United States of America, Federal Energy Regulatory Commission, Docket No. RM99-2-000; Order No. 2000, Session (January 20, 1999).

⁴⁶ Cooper, Mark, *Mergers and Open Access to Transmission in the Restructuring Electric Industry: Analytic Tools, Empirical Evidence and Policies to Build Effective Market Structures*, (Consumer Federation of America, April 2000).

⁴⁷ Energy Information Administration, *The Changing Structure of the Electric Power Industry 1999: Mergers and Other Corporate Combinations* (December 1999).

⁴⁸ Dowden, McDiarmid, and Huang, recounts the evidence presented to FERC on market power and FERC's seeming inaction; Cooper, *Spikes*, discusses the failure of FERC to react vigorously to complaints of market power in response to the 1998 price spikes.

⁴⁹ Dowden, McDiarmid and Huang.

⁵⁰ Cooper, *Spikes*.

⁵¹ A frustrated FERC staff member wrote a blistering critique of FERC's unwillingness to investigate transaction data in 1998 and 1999, just prior to the onset of the big problems in the California market in 2000. See *Open Memorandum*, From: Ron Rattey, OMTR, To:FERC Staff (June 2, 2000).

⁵² Dowden, McDiarmid, and Huang.

⁵³ *Order Authorizing Disposition of Jurisdictional Facilities*, PGE National Energy Group, Inc., PG&E Enterprises and PG&E Shareholdings, Inc, Federal Energy Regulatory Commission (January 12, 2001).

⁵⁴ Commissioner Massey, dissenting, *Order Authorizing Disposition of Jurisdictional Facilities*, PGE National Energy Group, Inc., PG&E Enterprises and PG&E Shareholdings, Inc, Federal Energy Regulatory Commission (January 12, 2001).

ways.⁵⁵ The California Independent System Operator (CAISO) adopted a one price auction,⁵⁶ which pays the highest price to everyone in an industry that is just dripping with scarcity (ground) rents.⁵⁷ It failed to impose a reserve requirement.⁵⁸ Different rules between the PX and the ISO resulted in considerable underscheduling and drove up prices.⁵⁹ The Market Surveillance Committee immediately and repeatedly found market power in its general studies,⁶⁰ but the ISO never sought to discipline those responsible.⁶¹

⁵⁵ Some analysts emphasize the problem of imperfect institutions interacting with market power (see TURN and Woychik). This view should be distinguished from those who argue that market imperfections are the primary, if not sole cause of the problems (see Chandley, John D., Scott Harvey and William Hogan, *Electricity Market Reform in California*, November 22, 2000 and *Issues in the Analysis of Market Power in California*, October 27, 2000.

⁵⁶ McDiarmid, *Modest Proposal*. Kahn, et al. argue, based primarily on experimental results, that the bidding system does not matter much, compared to the problems of market power, tight supplies and inelastic demand and given the ability of those with market power to adapt their bidding strategies to any system. To the extent that the purpose is to prevent attention from being directed away from the important issues, this is a useful analysis, but the arguments miss the fundamental problem identified by other analysts and the victims of the one-price system. The critics of the one-price system focus on the massive economic rents and the lottery nature of the one price system, which exposes a few very high price offers to little risk, a bidding strategy which is consistent with the backward bending supply curve (see the sources cited at notes 12 and 13 in Kahn, et al.).

McDiarmid, et al., *Modest Proposal*, summarizes the lottery nature of this type of auction as follows: "I know that a simple bidding strategy of bidding very high on the last few MW will be extremely profitable for everyone, including me, if I have enough MW already running at the time, and so I will follow that strategy and I expect anyone else in the business to have enough brains to see the same advantage."

They describe the huge rents as follows (p. 16):

the cost difference from a market clearing price of \$75 or one of \$1,075 is \$50 million per hour, or \$500 million per 10-hour peak period. If the bidding behavior of one of the last few suppliers were rational then, the failure of a 100 MW unit to be dispatched would mean that the last supplier would lose \$75,000 (gross revenue, which would translate into significantly less on lost profits after reduction of the out-of-pocket costs) for a 10-hour period; but if that supplier had 4,000 MW already in the market dispatched based on bids that would be rational for the second-price theory, the additional amount that it would gain *for the output of those units already running* if a market-clearing price at the \$1,075 level were established would be \$4 million per hour, or \$40, million for the 10-hour period.

Roundtable participants clearly care a great deal about the average price and believe that the very high rents available on all sales at peak times has dissuaded sellers from offering reasonable prices for longer terms. Similarly, Florida Municipal Electric Association, which represents consumers, show substantial rents, see *Energy 2020 Study Commission Wholesale Deregulation Proposal Will Raise Electric Rates and Maximize Profits of Private Utility Shareholders*. TURN and Woychik, do not accept this point of view.

⁵⁷ Rosen, Sverrisson, and Stutz, stress the importance of rents in the industry.

⁵⁸ Wolak, et. al.; TURN and Woychik, stress this problem.

⁵⁹ Wolak, et. al.

⁶⁰ See, Market Surveillance Committee, "Analysis of Order Proposing Remedies for California Wholesale Electric Markets," *Federal Energy Regulatory Commission*, Dockets ER00-95-000, et. Al., (December 4, 2000), as well as Wolak, et. al., Bushnell, and Wolak, Borenstein, Bushnell and Wolak, and Bohn, Klevorick and Stalon.

⁶¹ Two and a half years after first noting the market power problem, the California Independent System Operator finally did take action under FERC's soft cap regime, requesting refunds of over \$.5 billion of unjust and unreasonable charges for two months (see "Motion for Issuance of Refund Notice to Sellers, Request for Data, Request for Hearing, and Request for Expedited Action of the California Independent System Operator Corporation and the California Electricity Oversight Board," before the Federal energy Regulatory Commission, *San Diego Gas & Electric Company*, docket Nos. EL00-95-000, EL00-98-000 and ER01-607-000, March 1, 2001.

The California Public Utilities Commission adopted a prohibition on long-term contracts, which forced utilities into spot markets.⁶² The ISO suggests that a large part of the responsibility for the failure of the demand side to respond in the short and long term rests with the CPUC and or the legislature.⁶³

To push through restructuring, the legislature bought the utilities off by paying them at least 100 percent of their stranded costs and letting them sell the wrong assets, while it put no restraints on how the gains of assets sales would be disposed of. As a result, the utilities put over \$10 billion of net stranded cost,⁶⁴ over \$10 billion of asset sales and \$3 billion of excess deferred taxes in their pockets, which they claim are empty when it comes to spot market purchases.⁶⁵ In total, over \$25 billion of capital was transferred to the parent holding companies of the utilities, with no obligation to invest any of it in California electricity markets.⁶⁶

Remarkably, we can find a similar scenario simultaneously unfolding in natural gas. The CPUC let the electric utilities out of natural gas storage requirements because they are noncore customers,⁶⁷ which is an absurd misdefinition of core and noncore that exacerbated the problem.⁶⁸ Large corporate consumers got out from under their obligations to keep fuel in storage (including electric utilities) and the obligation to have alternative fuel capacity since all these contingencies cost too much in a competitive market.⁶⁹ Simultaneously, utilities fought against increasing pipeline capacity into the state. Firm transmission rights and gas brokering functions were transferred to unregulated affiliates, who have every interest in charging the utility sister companies the highest price possible. FERC deregulated a capacity constrained market with storage at unprecedentedly low levels. Then we get the inevitable accident. When prices go through the roof, the utilities blackmail consumers with threats of service cut offs, and the policymakers open the public's pocketbook. Given affiliate transactions from which parent holding companies profit, when their unregulated gas subsidiaries extract the highest price for gas from the sister utility subsidiaries, there are now serious concerns about the run up of gas prices.

This is the mismanagement part of the story.

⁶² *ISO Response to Selected Portions of the Summer 2000 Report to the Governor* (August 8, 2000); Wolak, et. al. TURN and Woychik, question the importance of the lack of long term contracts (see also Harvey, Scott M. and William Hogan, *California Electricity Prices and Forward Market Hedging*, October 17, 2000.

⁶³ *ISO Response*, p. 5.

Indeed, planners of deregulation recognized that much of the success of the markets depend on work to be implemented and/or regulated by state policymakers. This work included development of demand responsiveness products, implementation of hedging instruments for entities that serve load, development of real time rates and installation of real time meters, promotion of consumer education on issues of price responsiveness and conservation, and facilitation of review of transmission lines and/or substations at critical junctions in the transmission system. Most of this work remains to be done.

⁶⁴ Kaloko.

⁶⁵ Turn, *Memo to Legislators on Audits of Pacific Gas and Electric and Southern California Edison* (January 31, 2001; *the \$12 Billion Deception*,

⁶⁶ The financial problems in the electricity spot markets now threaten the distribution network, as maintenance and hook-ups are squeezed for cash flow.

⁶⁷ Wolak et. al.

⁶⁸ Marcus, *Crisis*.

⁶⁹ Marcus, *Crisis*.

THE ALARMING COSTS TO CONSUMERS IN VULNERABLE MARKETS

If you listen to the theology and mythology of deregulation, you would think the California problem is about irrational tree huggers who wouldn't let anyone build generation plants or transmission lines but still want to run their air conditioners in the summer and their Christmas lights in the winter, without paying a fair price for electricity, but it is not. This is about consumers who have been misused and abused and are not willing to be led like lambs to the slaughter. This is about the inevitable result of greed, irresponsibility and mismanagement in a volatile market for a vulnerable commodity -- a volatile run up in prices⁷⁰ and a massive, inefficient and unjustified transfer of wealth from consumers to producers.⁷¹

Consumers in California paid a heavy price in economic rents – scarcity rents, monopoly rents, and for lack of a better word, stupidity rents.⁷² Since the existence of these rents is both an irritant to consumers and the diverse sources of rents makes solutions to the current problems complex and contentious, let me be clear about how I use this term. The consumer paying an extremely high bill may not care much about the details of the cause of the problem, but policymakers, who should have a desire to eliminate the rents, will need different policies to effectively address the each of the different rents.

An economic rent is “a payment to a factor in excess of what is necessary to keep it at its present occupation.”⁷³ More importantly, “in perfect competition, no rents are made by any factor, because changes in supply bid prices of inputs and labor down to the level just necessary to keep them employed.”⁷⁴

Scarcity rents (see Exhibit 2)⁷⁵ and monopoly rents (see Exhibit 3)⁷⁶ have long been recognized in the economic literature. “In general, economic rents accrue where changes in supply of this sort are not possible: to a brain surgeon with rare skills, difficult to emulate; or to a monopoly protected by barriers to entry.” In the case of brain surgeons, the skills may be

⁷⁰ Siddiqui, Afzal S., Chris Mornay and Karl Khavkin, “Excessive Price Volatility in the California Ancillary Services Markets: Causes, Effects and Solutions,” *Electricity Journal*, 6.

⁷¹ Sheffri, Anjali, *Comprehensive Market Redesign: Options, Mitigation* (October 4, 2000).

⁷² Teece, David, J. and Mary Coleman, “The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries,” *The Antitrust Bulletin* (Winter 1998), identifies Ricardian (scarcity), Schumpeterian (entrepreneurial) and monopoly (Porterian) rents (pp. 819-822).

⁷³ Pearce, George, *The Dictionary of Modern Economics* (MIT Press, Cambridge, 1984), p. 124.

⁷⁴ Bannock, Graham, R.E. Banock and Evan Davis, *Dictionary of Economics* (Penguin, London, 1987). P. 128.

⁷⁵ Teece and Coleman, p. 819, define scarcity rents as :

In many contexts where knowledge and other assets underpin a firm's competitive advantage, additional inputs cannot simply be purchased on the market to expand output... historically at least, economists have associated Ricardian rents with scarce natural resources like land or iron ore.

The origin of the concept has been associated with land, hence it is occasionally referred to as ground rents (Rutherford, Donald, *Dictionary of Economics* (Routledge: London, 1992), p. 137).

As land was regarded in **classic economics** as the only fixed factor of production, it alone earned rent. However, as any factor of production can be fixed in supply, ‘rent’ can be earned by any factor of production. Popular examples of factors with an **inelasticity of supply** abound; labor can earn economic rent as persons with rare talents (e.g. opera singers and top sports players) have high earnings largely consisting of economic rent.

⁷⁶ Teece and Coleman, p. 822) define present Monopoly (Porterian) rents which “stems from the naked exercise of market power by a firm (or firms).”

permanently rare. In the case of monopoly, rents persist as long as market entry is prevented from driving down the price through competition.

A third category of rents flows from (temporary) imperfections in market responses (see Exhibit 4).⁷⁷ These have lately come to be associated with Schumpeterian market processes.

A firm may develop product and process innovations and /or unique business routines (knowledge assets), but these eventually are imitated by competitors. However, there may be a period of temporary excess returns enjoyed by the developer/owner of the knowledge assets in question. These returns are once again not monopoly rents, but Schumpeterian rents.⁷⁸

Devotees of Schumpeterian rents claim that they are necessary to reward innovation, although that view is not shared by all.⁷⁹

I use the term stupidity rents (see Exhibit 5) to call attention to the fact that these rents are created by market imperfections that are the result of flaws in market design, not the result of entrepreneurial skills (although entrepreneurs may exploit these imperfections). Stupidity rents do no good, except in the perverse sense of demonstrating that the market does not work or results in higher costs.⁸⁰

Scarcity rents can be taxed away without harming economic efficiency.⁸¹ Monopoly rents should be eliminated to promote economic efficiency.⁸² Stupidity rents, which are the

⁷⁷ Pearce, p. 366.

Quasi-rent. The return to a seller of a good or service over and above its *opportunity cost* when the good is temporarily in fixed supply. The concept was applied by *Alfred Marshall* to the determination of the price of capital in the short run when the supply of capital is fixed. The owners of capital receive a payment which differs from the opportunity cost of using that resource by the amount of quasi-rent. In the long run when the factor can be augmented or depleted the equilibrium price will reflect the cost of alternative uses.

⁷⁸ Teece and Coleman, pp. 820-821

⁷⁹ Scherer, F. M. and David Ross, *Industrial Market Structure and Economic Performance* (Boston, Houghton Mifflin: 1990), p. 660.

Viewed in their entirety, the theory and evidence suggest a threshold concept of the most favorable climate for rapid technological change. A bit of monopoly power in the form of structural concentration is conducive to innovation, particularly when advances in the relevant knowledge base occur slowly. But very high concentration has a positive effect only in rare cases, and more often it is apt to retard progress by restricting the number of independent courses of initiative and by dampening firms' incentive to gain market position through accelerated R&D. Likewise, given the important role that technically audacious newcomers play in making radical innovations, it seems important that barriers to new entry be kept at modest level. Schumpeter was right in asserting that perfect competition has no title to being established as the model of dynamic efficiency. But his less cautious followers were wrong when they implied that powerful monopolies and tightly knit cartels had a strong claim to that title. What is needed for rapid technical progress is a subtle blend of competition and monopoly, with more emphasis in general on the former than the latter, and with the role of monopolistic elements diminishing when rich technological opportunities exist.

⁸⁰ Specific and concrete stupidity rents can be identified. Cooper, *Economics*, identified increases in transaction costs and loss of load balancing (pool effects). Cooper, *Outages*, identified breakdowns in coordination, while Cooper, *Spike, and Reconsidering*, identify gaming.

⁸¹ Since supply of a fixed asset does not respond to price changes, there is little or no dead weight loss, as Taylor, p. 350, puts it,

Economic rent is the price of anything that has a fixed supply. Economic rent is also sometimes called *pure rent*. Economic rent is a significant concept in economics precisely because the

most insidious of all, since they turn the fundamental market processes upside down,⁸³ should be prevented.

In the summer of 2000 consumers in California paid more in scarcity rents, monopoly rents and stupidity rents than the total economic cost of producing electricity in the previous eighteen months (the entire period of restructuring).⁸⁴ Market power analysis indicates that the abusive rents are substantially larger than the scarcity rents.⁸⁵ Abuses in the winter of 2000-2001 grew even larger.⁸⁶ The conclusion that market power is being abused is not only supported by the analysis of price, but it is reinforced by the huge profits of the generation owners.⁸⁷

The evidence also shows that market power is being exercised exists across the country (see Exhibit 6). In one week in 1998 in the Midwest, \$500 million changed hands,⁸⁸ well over a billion dollars of rents was collected in California before the summer 2000 problem,⁸⁹ and \$70 million was collected in New York in one day.⁹⁰ The New England power pool experienced price run ups.⁹¹ PJM is now afflicted with the same problems, although there is less willingness to estimate the magnitude of the problem.⁹²

Consumers appear to have lost faith in the process and structure of utility markets for good reason. Until utility industry institutions demonstrate that they have wrung the stupidity and monopoly rents out of the system, consumers are unwilling to bear the burden of dealing with legitimate scarcity problems and rightly so. Consumers insist that utilities, independent generators, and regulators accept their fair share of the responsibility. Having watched utilities take tens of billions of dollars out of consumer pockets for asset transfers, consumers in California are resisting the demands for another \$12 billion to be paid to independent generators in uneconomic spot costs.

This resistance is reinforced when they discover that the solution now proposed is to use mandatory economic dispatch in transmission, long term contracts in supply, and vigorous interruptible and conservation programs on the demand side. In other words, after wasting \$25

quantity supplied does not depend on the price. Thus, a tax on economic rents would not change the amount supplied; it would not affect economic efficiency or cause a deadweight loss.

⁸² Scherer and Ross, pp. 15-29. Abuse of monopoly power imposes static, deadweight loss (see Asch, Peter, *Industrial Organization and Antitrust Policy* (New York, John Wiley and Sons: 1983) p. 83) and may impose dynamic x-efficiency losses (see Asch, p. 97).

⁸³ They not only create facilitate the abuse of monopoly power, they create substantial x-efficiency losses, by fostering the disincentive to produce (see Asch, p. 97).

⁸⁴ Wolak, et. al. Joskow, Paul and Edward Kahn, *A Quantitative Analysis of Pricing Behavior In California's Wholesale Electricity Market During Summer 2000*, January 15, 2001.

⁸⁵ Sheffri.

⁸⁶ The CAISO asked for about \$.5 billion in refunds. This estimate is forced to accept the FERC set cap of \$250 for December and the \$150 for January. The fact that the \$250 cap generates overcharges equal to more than one fifth of the total costs, at approximately the same level of demand, suggests that if a \$150 cap had been selected for December the overcharges would be much larger. By the CAISO calculation, 63 cents out of every dollar paid in January 2001 violated the soft and very generous cap of \$150 per MWH.

⁸⁷ King and Lynch.

⁸⁸ Cooper, *Spike*.

⁸⁹ Cooper, *Reconsidering*.

⁹⁰ Rosen, Sverrisson and Stutz.

⁹¹ McDiarmid, et al.

⁹² Bowring, et. al., Rose, *Other States*; Stoft, Steven, *PJM's Capacity Market in a Price-spike World* (May 2000).

billion, we find that the old system works better. What has vanished, entirely from the deregulation discussion, are all the promises of efficiency gains and consumer savings. Gone are the fanciful claims of 40 percent savings.⁹³ Instead, consumers in California, who pay among the highest rates in the country,⁹⁴ are told that “California froze retail rates at low levels.”⁹⁵

PENNSYLVANIA: MUDDLING TO NOWHERE

Well, but doesn't it work better elsewhere? Yes, a little bit, and only in comparison to how poorly consumers were doing before restructuring. This brings us to Pennsylvania where, to the extent benefits have been realized, they are the result of regulatory action not market forces. Indeed, market forces now threaten to undermine those regulatory benefits.

Consumer advocates found themselves in a dilemma in Pennsylvania.⁹⁶ Utilities and regulators had saddled many Pennsylvania consumers with some of the highest rates in the nation, while utilities like PECO had excess power that they were selling at bargain basement rates outside of the state. The legislature mandated restructuring and consumer advocates did the best they could to protect the interest of their constituents.⁹⁷

In simple terms, those who wish to import the Pennsylvania model should recognize that it started from very high rates in a situation with excess capacity and lots of transmission resources operated by an existing power pool. It ordered rate reductions and price caps that

⁹³ Maloney, Michael, et. al, *Customer Choice, Consumer Value: An Analysis of Retail Competition in America's Electric Industry* (Citizens for a Sound Economy, 1996).

⁹⁴ Energy Information Administration, *Electricity Sales and Revenue 2000*, shows that California has the third highest residential rates in the nation on a statewide average basis.

⁹⁵ *Manifesto on the California Electricity Crisis*, January 26, 2001.

⁹⁶ These observations are based on direct participation in the Pennsylvania proceedings, see “Direct Testimony of Dr. Mark N. Cooper in Response to the Petition of Enron Energy Services Power, Inc., for Approval of an Electric Competition and Customer Choice Plan and for Authority Pursuant to Section 2801 (E)(3) of the Public Utility Code to Service as the Provider of Last Resort in the Service Territory of PECO Energy Company on Behalf of the American Association of Retired Persons,” *Pennsylvania Public Utility Commission v. PECO*, Docket No. R-00973953 (November 7, 1997); “Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons,” *Application of Pennsylvania Power and Light Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code*, Pennsylvania Public Utility Commission, Docket No. R-00973954 (July 2, 1997); “Testimony of Dr. Mark N. Cooper on Behalf of the American Association of Retired Persons,” *Application of PECO Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code*, Pennsylvania Public Utility Commission (June 20, 1997); as well as participation in other state proceedings, see “Testimony of Dr. Mark N. Cooper on Behalf of the Arizona Consumers Council,” *In the Matter of the Competition in the Provision of Electric Services Throughout the State of Arizona*, The Arizona Corporation Commission (January 21, 1998); “Direct Testimony of Dr. Mark N. Cooper on Behalf of the Virginia Citizens Consumers Council,” *Virginia Electric Power Company, Application of Approval of Alternative Regulatory Plan*, State Corporation Commission of Virginia (December 15, 1997); “Electric Industry Restructuring: Who Wins? Who Loses? Who Cares?” *Hearing on Electric Utility Deregulation, National Association of Attorneys General* (November 18, 1997); “Direct Testimony of Dr. Mark N. Cooper Submitted on behalf of The American Association of Retired Persons, before the Public Service Commission, State of New York, *In the Matter of Competitive Opportunities Case 94-E-0952 New York State Electric and Gas Co. 96-E-0891; Rochester Gas and Electric Corp. 96-E-0898 Consolidated Edison Company of New York, Inc. 96-E-0897*; “Statement of Dr. Mark N. Cooper to the System Benefits Workshop,” *Project on Industry Restructuring*, Project No. 15000, before the Public Utility Commission of Texas (May 28, 1996).

⁹⁷ Office of Consumer Advocate (OCA), *Annual Report, 1998-1999, 1999-2000*.

are still in place. Nevertheless, it now suffers from dramatically rising wholesale prices, a volatile spot market and the abuse of market power. Responding to this tightening situation one utility has been badly burned in the spot market and independent generators are exiting the market, while customers flock back to the incumbent utilities.

Is this situation better than California? Certainly. Is it the outcome that policymakers in other states could or should aspire to? Probably not. To say that consumers have been well treated or that other states should do the same is irresponsible. In spite of having some very tangible assets, Pennsylvania had treated its residential consumers very badly. Only states that start from a condition this bad or worse and have assets this good or better, could benefit from importing its model. The number of such situations is darn near zero. Even if there are some, it is vastly premature to declare Pennsylvania a success for a number of reasons. To the extent that there has been success to date in Pennsylvania, it has little to do with the market.

Exhibit 7 presents this argument graphically. Only one state that has not restructured has residential rates higher than Pennsylvania. Residential rates in Pennsylvania are now just below the average for all restructured states, but remain about 25 percent above the states that have not restructured.⁹⁸

Before restructuring rates in Pennsylvania were about 10th highest in the nation for residential ratepayers on a state-wide basis.⁹⁹ In recent months, it had moved to eleventh. Residential ratepayer savings in Pennsylvania are overwhelmingly the result of rate reductions mandated by regulators, not created by the market.¹⁰⁰ Regulators set the target rate by ordering reductions and, in the residential class, competitors have just matched it, for now.¹⁰¹ Industrial ratepayers enjoyed much larger rate reductions than residential consumers. In other words, the market facilitated price discrimination by allowing industrial customers to find lower priced supplies, at least temporarily, while the residential market did not have similar opportunities.¹⁰² Data for more recent months, however, suggest that rising capacity costs and natural gas prices have pushed the market price up and these opportunities are disappearing.¹⁰³

High rates were concentrated in a few utilities in the eastern part of the state. The vast majority of those consumers who switched to alternative suppliers were customers of those utilities.¹⁰⁴ That is obvious. Rates were so high that it was easy to set a price to beat that would be attractive to competitors. What is not so obvious is that many of these consumers

⁹⁸ These estimates are based on the figures available for September 2000.

⁹⁹ Energy Information Administration, *Electric Sales and Revenues*, various issues. I use 1995 since restructuring was enacted in both California and Pennsylvania in 1996 (see EIA, *Changing Structure*, December 1999, Table 11).

¹⁰⁰ OCA, *Annual Report, 1998-1999, 1999-2000*, describes the regulated rate reductions. The Shopping guide shows that competitors generally offer prices above the regulated rate.

¹⁰¹ About one-fifth of residential consumers have switched to high cost green power, a laudable outcome, but one that can be accomplished with much less disruptive policies (Statement of Representative Frank Tulli, January 16, 2001, gives the numbers for green power).

¹⁰² As described in Cooper, *Economics*, and Coyle, price discrimination has traditionally been a concern in this industry because of its cost characteristics.

¹⁰³ EIA data for October 2000, show almost a 30 percent increase in industrial rates and a 3 percent increase in residential rates. This resulted from including non-utility prices in the index for the first time.

¹⁰⁴ Office of Consumer Advocate, *Pennsylvania Shopping Statistics*, January 2001.

switched to utility affiliates.¹⁰⁵ This is hardly competition, it is just a shell game in which regulators were making up for the past bad treatment of consumers.

The growth of competition has slowed dramatically.¹⁰⁶ In the first two months of 2001, companies serving almost ten percent of the customers who had switched exited the market.¹⁰⁷ Approximately three-quarters of the firms offering service have exited the market.¹⁰⁸

Price caps on residential rates remain in place for consumers (just as they do in most of California), so it is hard to say what will happen when they are removed.¹⁰⁹ The crisis did not hit in California until the price cap came off in San Diego. In fact, one Pennsylvania utility has gotten itself into a California -style problem with high cost spot market purchases, which have driven its costs above the cap.¹¹⁰ It is seeking to break the cap to the tune of hundreds of millions of dollars.¹¹¹ Ironically, this utility has gotten itself into trouble even though Pennsylvania is a net exporter of electricity; it is located in the middle of the grid with lots of generation resources close by; is in an area with a relative abundance of transmission capacity; and is in a power pool that has a reserve margin requirement.¹¹² If utilities can screw up under these favorable circumstances, policymakers should be concerned about what can happen under more challenging conditions.

The difficulties that both incumbents and entrants in Pennsylvania have gotten into underscore a fundamental question that hangs over the restructured market – over-dependence on cheap natural gas. Rather than bring dramatic new efficiency to the market, many of the entrants seem to have based their business models, and regulators based their projections of consumer savings on the ability to sell electricity powered by cheap natural gas. There was little real innovation underlying the move to deregulate, just the prospect that cheap gas would wring out some of the stupidity rents of the old system (expensive nuclear plants).

The power pool/transmission organization for the part of Pennsylvania where the benefits of deregulation are claimed, PJM, and its neighbors are relatively well endowed in generation and transmission resources.¹¹³ It was a long standing pool that has tried to evolve to a wholesale market. It imposes critical restraints on “pure” market transactions, like a

¹⁰⁵ At least one-fifth of the consumers who had switched signed with a utility affiliate, since Exelon’s 10-Q claimed 99,000 customers in September 2000.

¹⁰⁶ Pennsylvania Shopping statistics shows the addition of residential customers who are switching dropped from 10,000 a month in 1999 to 5,000 in 2000,

¹⁰⁷ Reeves, Frank, “Utility.com Turning Off 30,000 Pennsylvania Customers,” *Post-Gazette* (January 24, 2001); Turfa, Pam, “PG Energy Announces an End to Its Electricity Service,” *Wilkes Barre Times Leader* (February 7, 2001).

¹⁰⁸ Collins, Donnie, “Few Exercising Choice,” *Scranton Times* (January 29, 2001).

¹⁰⁹ OCA, *Annual Report, 1999-2000*, properly counts as one of its successes the ability to extend the caps or to wring out additional regulated rate reductions.

¹¹⁰ *Petition of Metropolitan Edison Company and Pennsylvania Electric Company for Interim Relief Pursuant to Section F.2 of Their Approved Restructuring Plan*, Before The Pennsylvania Public Utility Commission Docket Nos P-00001860, P-00001861.

¹¹¹ Supplemental Petition, before the Pennsylvania Public Utilities Commission, *Petition of Metropolitan Edison Company and Pennsylvania Electric Company for Relief Under Their Approved Restructuring Plan and the electricity Generation Customer Choice and Competition Act* Docket Nos P-00001860, P-00001861, November 20, 2000.

¹¹² “Pennsylvania PUC Blasts GPU for Comparison to California,” Press release (January 19, 2001).

¹¹³ Hirst, Erik, *Expanding U.S. Transmission Capacity* (Edison Electric Institute, July 2000) shows that PJM has the smallest number of miles of transmission lines per megawatt of peak demand .

reserve requirement,¹¹⁴ and protects its native load customers by shutting down flows when things get tight.¹¹⁵ States at the end of the line or lacking these resources do not have this luxury and beggar thy neighbor policies are not sound national policies (unless the Canadians and Mexicans can be induced to get caught holding the bag). The spot market exhibits the same volatility in the East as it does in the West.¹¹⁶ It is plagued with the same complaints about the exercise of market power¹¹⁷ and outages.¹¹⁸

PJM also uses a form of transmission pricing, locational marginal pricing (LMP), that lets transmission owners capture the scarcity rents associated with load imbalances.¹¹⁹ In the tight geographical area with relatively short distances, this burden may be bearable, but in the west and southwest, this approach would be murder on consumers.¹²⁰

A debate is now brewing about the bottom line for consumers. A good case can be made that, given the market conditions that developed, consumers would have saved as much

¹¹⁴ *Storm Warning*, PennFuture's E-Cubed, February 20, 2001.

¹¹⁵ NERC statistics for 1998, show substantial interruptions in 1998.

¹¹⁶ Bowring, et. al., Rose, *Other States*; Stoft, Steven, *PJM's Capacity Market in a Price-spike World* (May 2000).

¹¹⁷ *Storm Warning*, PennFuture's E-Cubed, February 20, 2001.

¹¹⁸ DOE, outages.

¹¹⁹ For a critique, see Tabors and Galindo.

¹²⁰ The population density of the PJM region is 400 people per square mile of land. In the rest of the country, the population density is about 70. Similarly, in New York where LMP has been applied the population density is just under 400. The economic costs of low density markets are a fact of life that cannot be avoided, but locational marginal pricing does not use the economic cost of transmission, it charges the opportunity or scarcity costs. As a result, severe efficiency and equity problems arise. In fact, LMP should really be referred to as LMR, Locational Marginal Rents.

Since transmission is a virtually fixed asset in the short and mid-term, LMP creates massive transfers of inframarginal rents from consumers to transmission owners. Since these are scarcity rents, they do not contribute to economic efficiency. Even the defenders of locational marginal pricing grudgingly admit that the rents could be taxed away (Hogan, William W., *Coordination for Competition: Electricity Market Design Principles* (February 15, 2001)).

Moreover, to a significant extent that scarcity is the result of strategic behavior by transmission owners – particularly integrated generation/transmission owners – to keep markets tight or defend their market power by raising barriers to entry, allowing them to collect the windfalls of inframarginal scarcity rents rewards anticompetitive behavior.

There are also problems with this pricing scheme at the margin. To the extent that the inability to expand capacity is a social problem – grounded in environmental and health concerns – throwing money at the problem (i.e. raising the marginal rate of return) does not help solve it. Again, the result is a wealth transfer with little efficiency pay off.

There is no competitive market to supply transmission services, since transmission networks appear to be natural monopolies resting on government powers of condemnation and rights of way where building of competitive redundant networks is uneconomic. Rewarding transmission owners with increased incentives do not necessarily produce the least cost additions to supply.

Under these circumstances, the wealth transfers associated with scarcity pricing vastly exceed the efficiency gains. To the extent that one wants to induce generators not to take transmission for granted and locate in places that save on this scarce resource, it is possible to show producers the scarcity values in the prices they pay and then tax away the windfalls (distributing them to consumers, whose locational decisions are not the cause of the scarcity, and with the exception of a few very electricity intensive industries, nor are they dictated by the cost of electricity). If the point is to identify congested lines and load pockets to induce generators to take congestion into account in the location of new facilities, an administrative incentive scheme could be just as effective without creating the massive transfer of wealth.

or more under effective regulation, without exposing consumers to this risk.¹²¹ The primary cause of high costs for Pennsylvania utilities (as elsewhere) was primarily nuclear power plants and the solution did not have to be deregulation.¹²²

First, the high cost Pennsylvania utilities had substantial excess capacity that they were selling “off-system” at very low rates. As the market tightened, and certainly as natural gas prices rise, that excess capacity would have fetched a higher price. Captive ratepayers, saddled with high costs, should have benefited as increased revenues lowered their burden.

Second, by writing off some of the stranded costs, immediate rate reductions were granted and used to jump start competition. Of course, as these plants depreciated, those costs would have declined anyway.¹²³ Regulators allowed utilities to pump up their claims of stranded costs by using ridiculously low estimates of the market-clearing price of electricity, then wrote off fictitious stranded costs.¹²⁴ Consumers enjoyed the time value of money, but since it has taken less than two years for utilities to start breaking the cap, there is not much gain here.

Consumers now face claims that larger reserve margins, higher capital costs, and faster depreciation are necessary to make the market work, in addition to additional transaction costs that have been incurred as a result of the creation of new institutions and markets. Promises of efficiency gains to offset these costs have vanished.

Consumers in California and Pennsylvania paid utilities over \$2,500 per end use customer in stupidity rents of the old system as the price for transitioning to the new restructured environment.¹²⁵ They now find themselves being asked to ante up for the stupidity, monopoly and scarcity rents of the new system, with little realistic chance of gaining much in the long term. Pennsylvania has muddled through the first two years with vigorous regulation, not price cutting competition, but where it will end up remains murky. Under the best of circumstances, for residential consumers electricity restructuring was a solution to a high cost problem that has not worked very well, under the worst of circumstances it threatens to make them much worse off.

TEN CONSUMER COMMANDMENTS OF ELECTRICITY RESTRUCTURING

Policymakers do not have the luxury of engaging in mythology or theology. State policymakers cannot even withdraw behind the borders of their states and hope for the best. With the exception of Texas, which, by choice, is not part of the union for purposes of

¹²¹Rosen, Sverrisson and Stutz, lay out this argument. Consumer advocates argued that declining nuclear costs and expiring Standard Offer contracts in California would have produced savings as large as legislators ordered as part of restructuring (Cooper, *Economics*).

¹²² Cooper, *Economics*, pointed out that a similar argument was made with respect to standard offer PURPA contracts in California.

¹²³ In California, a combination of depreciation of nuclear power plants and expiration of standard offer PURPA contracts would have had the same effect, as many consumer advocates argued before restructuring (see Cooper, *Balancing*).

¹²⁴ Consumer advocates in most stranded cost cases proved to be much better prognosticators of market costs than utilities, since they did not have an interest in inflating stranded cost estimates.

¹²⁵ Kaloko, identifies California stranded costs at \$28.5 billion and Pennsylvania at \$12.2 billion; while California had 10 million customers of investor owned utilities and Pennsylvania had 4.8 million (Energy Information Administration, *Electric Sales and Revenues: 1999*, Table, 9).

electricity, and Alaska and Hawaii, which are not part of the lower 48 states, all other jurisdictions are interconnected in the national grid. The fate of each state is tied to that of its neighbors.¹²⁶ Moreover, there appears to be a great deal of cross-border proselytizing going on by defenders of deregulation.

The consumer voice needs to be heard, not just the cries of pain from California, but an objective assessment of what has happened and what needs to be done. The harsh reality of electricity restructuring should lead to a very stern admonition for policymakers – perhaps even ten consumer commandments of restructuring.

1. Don't fix it, if it ain't broke: At this stage of the game there are about 30 jurisdictions that have not fully committed to restructuring and several others who could change direction. It is hard to justify going down this road without knowing where it is heading.

2. Do wholesale competition first: If you must demonstrate your devotion to the deregulatory religion, then practice it on the wholesale side, not the retail side and don't sell your soul too soon. Keep control over your strategic assets as long as possible, including the right to require utilities to build power plants.

3. Focus on structure not on behavior: No amount of consumer protection can compensate for a flawed market structure and oversight authorities have a great deal of difficulty policing behavior.

4. Do not deregulate the market until after open, adequate highways of commerce are in place: The transmission system is an interstate highway, that must be independent of generation owners and be imbued with the public interest, by being dedicated to the public functions of reliability and nondiscriminatory access. The fate of each state is tied to that of its neighbors, which means they are dependent on federal policymakers. States should urge federal authorities to do the right thing, but they should not expect too much. It has been over eight years since the passage of the Energy Policy Act of 1992 created the impetus to reforming the interstate market.

5. Do not deregulate until there is an effectively competitive generation market with adequate supplies: Careful market power analysis requires narrowly defined product, geographic and temporal markets to reflect the situational market power of a volatile market for a vulnerable commodity. At the start of the market, there should be vigorous competition and adequate surplus capacity. Deregulating markets that are tight for a commodity like electricity is more likely to produce perverse and exploitative outcomes than efficient supply responses.

6. Require reserves margins to lower the risk that consumers will be forced into volatile spot markets: Financial hedges are useless when keeping the lights on is all that matters. Negotiations between those who have an obligation to serve and those who simply want to make money generally favor the latter at the expense of the former. Dependence on short term, spot market purchases should be avoided like the plague.

7. Encourage resource diversity, including distributed generation: Short-term profit maximization will focus on the fuel *du jure* resulting in excessive dependence on a narrow range of supply alternatives, which fails to internalize the value of resource diversity and renders consumers more vulnerable to short-term shocks. Distributed generation, which

¹²⁶ Stoft makes the point that PJM cannot insulate itself from neighboring markets.

creates demand side flexibility and saves on generation and transmission resources, both of which are in short supply, should receive especially favorable treatment.

8. Have extensive demand management programs in place: Saving megawatts – referred to as negawatts -- is vastly more valuable in an electricity market than we ever dreamed it was in the regulated system. Demand reduction programs should be long-term, to conserve on scarce generation and transmission resources. These long-term programs should target residential customers who lack resources and expertise and in many cases do not make the capital investment decisions about energy consumptions (builders and landlords do). Demand reduction should also be responsive, short-term, to reduce price spikes. These short-term demand reduction programs should target the industrial and commercial classes, since they represent large, concentrated quantities of load control, have a much greater ability to control usage and they respond to incentives to cut back because they are purely economic actors.

9. Do serious law enforcement: Abuse of market power and collection of huge rents by merchant generators and transmission owners must be disciplined if “market” incentives are to work. It may be necessary to turn law enforcement over to agencies that have no stake in the day-to-day operation of the industry. It may also be necessary to identify a broader range of practices that are per se illegal, or at least trigger heightened scrutiny. It may be necessary to have a broader range of disciplinary measures to reflect the especially vulnerable and volatile nature of the commodity.

10. Establish real responsibility: Make it clear that utilities must bear financial responsibility for their mistakes, independent generators must play by the rules of the game and legislators must take responsibility for final rules and market outcomes. Capitalism without bankruptcy is like Catholicism with out hell, and democracy without elections – they lose their moral authority to compel the appropriately compliant behaviors if transgressions are not punished.

EXHIBIT 1:

CAUSES OF ELECTRIC UTILITY INDUSTRY MARKET FAILURE DEMONSTRATED BY THE FIRST THREE YEARS OF U.S. DEREGULATION

BASIC CONDITIONS: SUPPLY

Technology	Long lead times 5(7) 6(1), Delayed replacement 6(16) 11(2) Inability to store electricity 5
Product durability	Generation Outages 1(2-11, 4-6) 3(15) 5(40) 10(1-2), Transmission shutdowns 1(4-10), Failures take time to repair 6(9) Summer impairment of performance 6(7, 18, 22)

BASIC CONDITIONS: DEMAND

Price elasticity	Extremely low short run 2(24) 5(39) 11(2) Limited conservation 6(2,19, 23)
Substitutes	Lack of substitutes, Restriction on self-supply 8
Cyclical/seasonal	Weather-related demand 1(4-6) 2(37) 10(1-2), Inadequate reliability criteria 6(21)
Purchase method	Obligation to serve 1 (4-1) 2(25), Lack of incentive to cut back 1(4-4) 4(46)6(2, 19)

MARKET STRUCTURE

Number of sellers	Few sellers 2(ii) 3(21) 4(49-56) 5(6,7) 7
Number of buyers	Constrained demand by utilities 1(4-1) 2(25) 5(30,31), Constrained distribution 6(30) Limited end-user choice 5(42,57)
Barriers to entry	Transmission constraints 1(2-15,5-7)5 (11,12) Load pockets, inadequate system 6(10,32) Self-supply blocked 8()Emergencies 1(2-15), Substation inflexible 6(31)
Cost structures	High fixed
Vertical integration	Affiliate relations distort market 2(38) 6(38), Integration restricts entry 11(3)
Diversification	Utilities Add Brokerage 2(24,28) Inadequate Planning/Spending for maintenance 6(29,34 - 37)
Inadequate Market	Lack of timely, objective 1(5-3) 2(ii), Load projections 6(8), Unit ratings 6(11)
Information	Planning tools 6(13), Cable condition, incipient failure 6(5,14) Refusal to share best practices 6(15), Forecasting 6(17, 28) Inadequate notice 6(20) Dispatch software 6(27) Inadequate coordination Breakdown of coordination 1(2-37, 3-3), ISO lacks authority 6(4), Lack of data 6(6)

CONDUCT

Pricing behavior	Hoarding, gouging 4(65) 5(3,38) Above cost 10(1-4) 11(17) Reliance on nonfirm power 6(24) 10(2-1) 11(3)
Legal tactics	Defaults, abrogation of contracts, daisy chains, two-way deals1 (4-10, 5-2) 2(4) Refusal to provide market monitoring information 5(4)
Regulation	Inefficient short term sales 6(25), Records not preserved 6(33) Transmission rules create problems 1(4-40) 2(20) 11(3) Market rules not developed 6(3)

SOURCES:

The analytic categories are from Scherer, F. M. and David Ross, *Industrial Market Structure and Economic Performance* (Boston, Houghton Mifflin: 1990).

The substantive references are as follows:

1 = Federal Energy Regulatory Commission, *Staff Report to the Federal Energy Regulatory Commission on the Causes of the Pricing Abnormalities in the Midwest During June 1998* (Washington, D.C.; 1998)

2 = Public Utilities Commission of Ohio Report, *Ohio's Electric Market: June 22-26, 1998, What Happened and Why: A Report to the Ohio General Assembly* (Columbus, Oh; 1998)

3 = Bohn, Roger E., Alvin K. Klevorick and Charles G. Stalon, Market Monitoring Committee of the California Power Exchange, *Report on Market Issues in the California Power Exchange Energy Markets* (August 17, 1998)

4 = Bohn, Roger E., Alvin K. Klevorick and Charles G. Stalon, Market Monitoring Committee of the California Power Exchange, *Second Report on Market Issues in the California Power Exchange Energy Markets* (March 9, 1999)

5 = Klein, Michael and Loretta Lynch, *California's Electricity Options and Challenges* (August, 2000)

6= Department of Energy, *Interim Report of the U.S. Department of Energy's Power Outage Supply Study Team, January 1999; Horizontal Market Power in Restructured Electricity Markets, March 2000*

7 = Department of Energy, *Horizontal Market Power in Restructured Electricity Markets, March 2000*

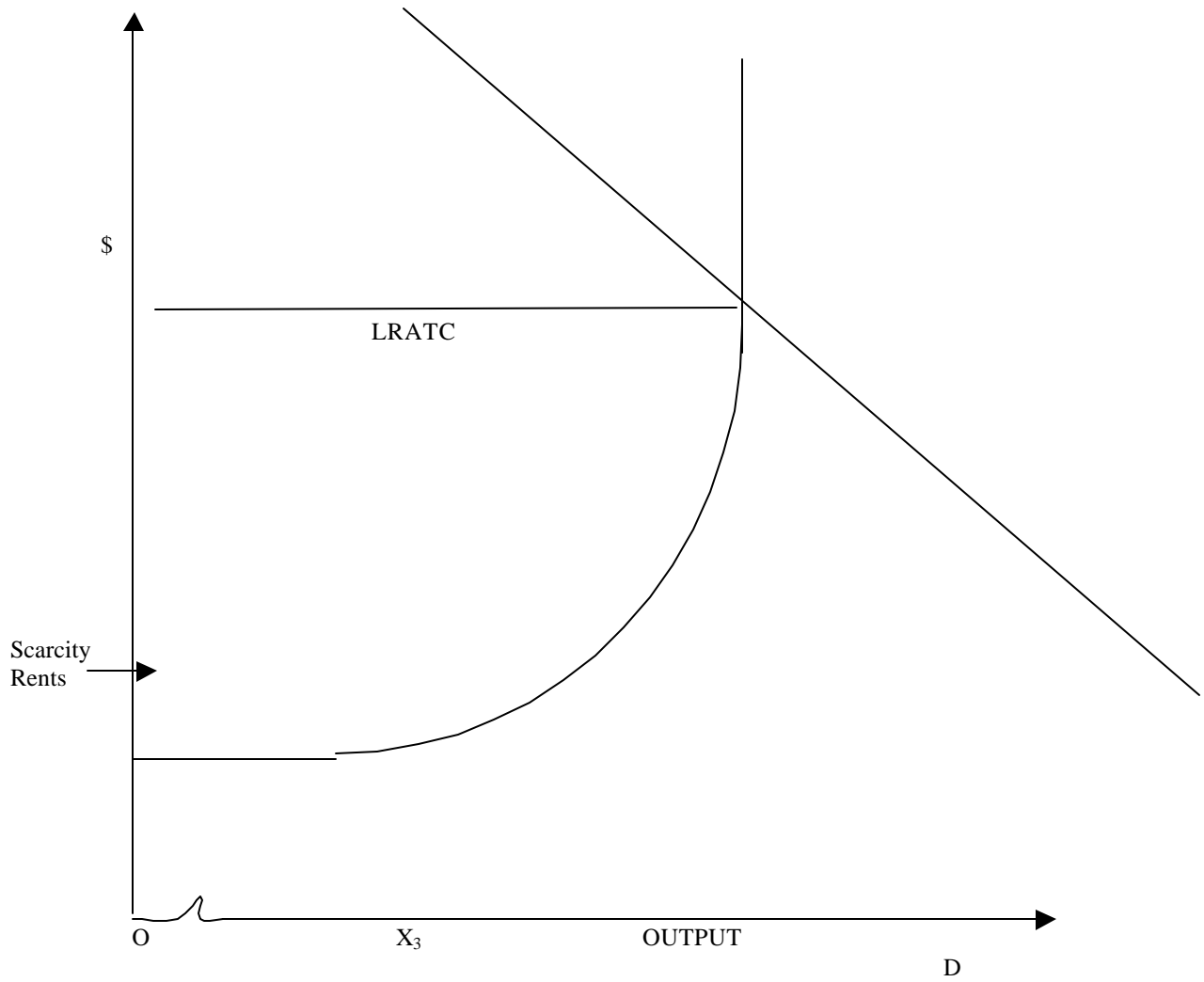
8= Alderfer, R. Brent, et al., *Making Connections: Case Studies of Interconnection Barriers and their Impact on Distributed Power Projects* (National Renewable Energy Laboratory, May 2000)

9 = Energy Information Administration, *The Changing Structure of the Electric Power Industry 1999: Mergers and Other Corporate Combinations, December 1999*

10 = Staff Report on the Federal Energy Regulatory Commission on Western Markets and the Causes of the Summer 2000 Price Abnormalities (November 1, 2000)

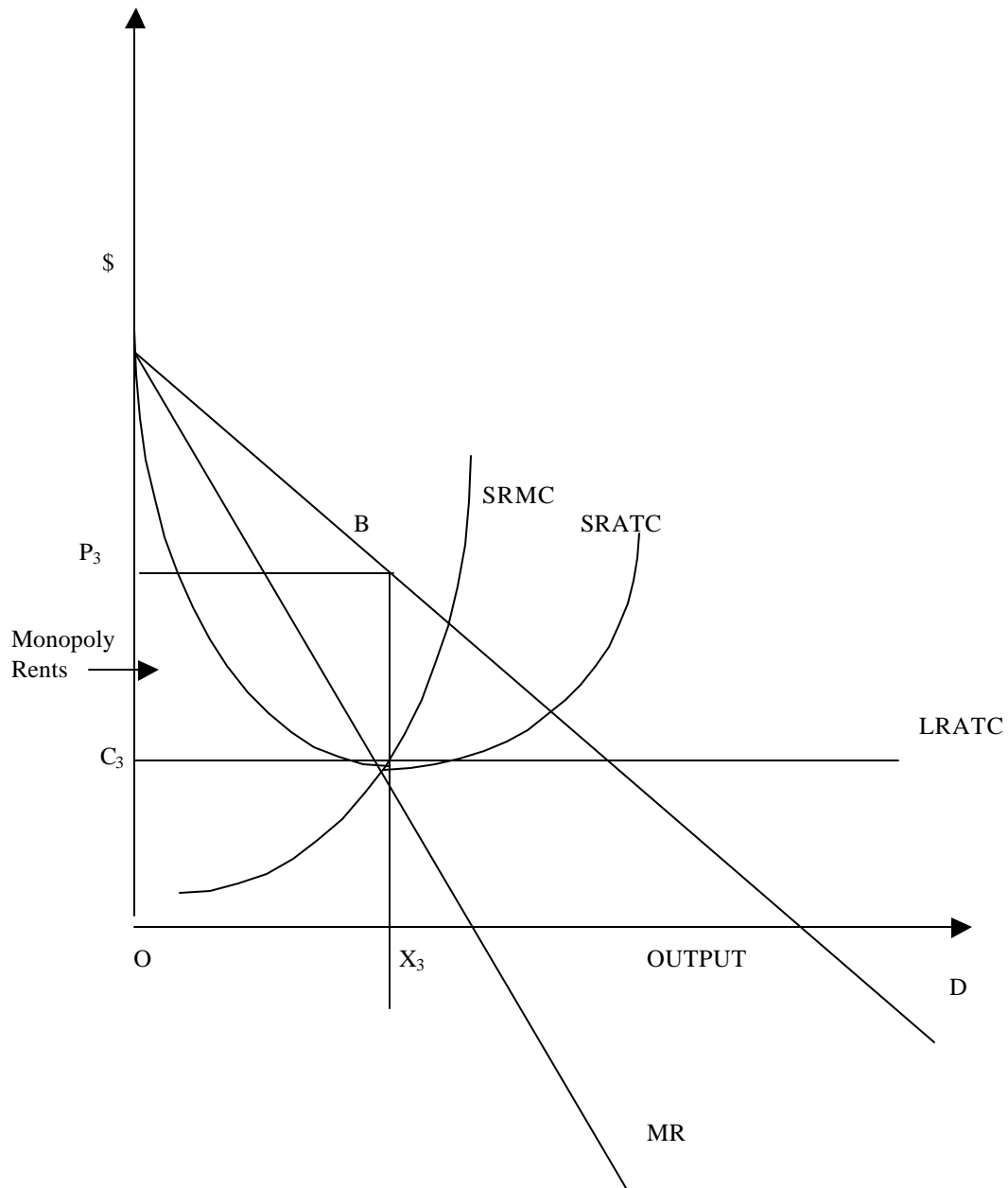
11= Wolak, Frank A., et al., "An Analysis of the June 2000 Price Spike in California ISO's Energy and Ancillary Service Market," *Market Surveillance Committee of the California Independent System Operator* (September 6, 2000)

EXHIBIT 2
SCARCITY RENTS



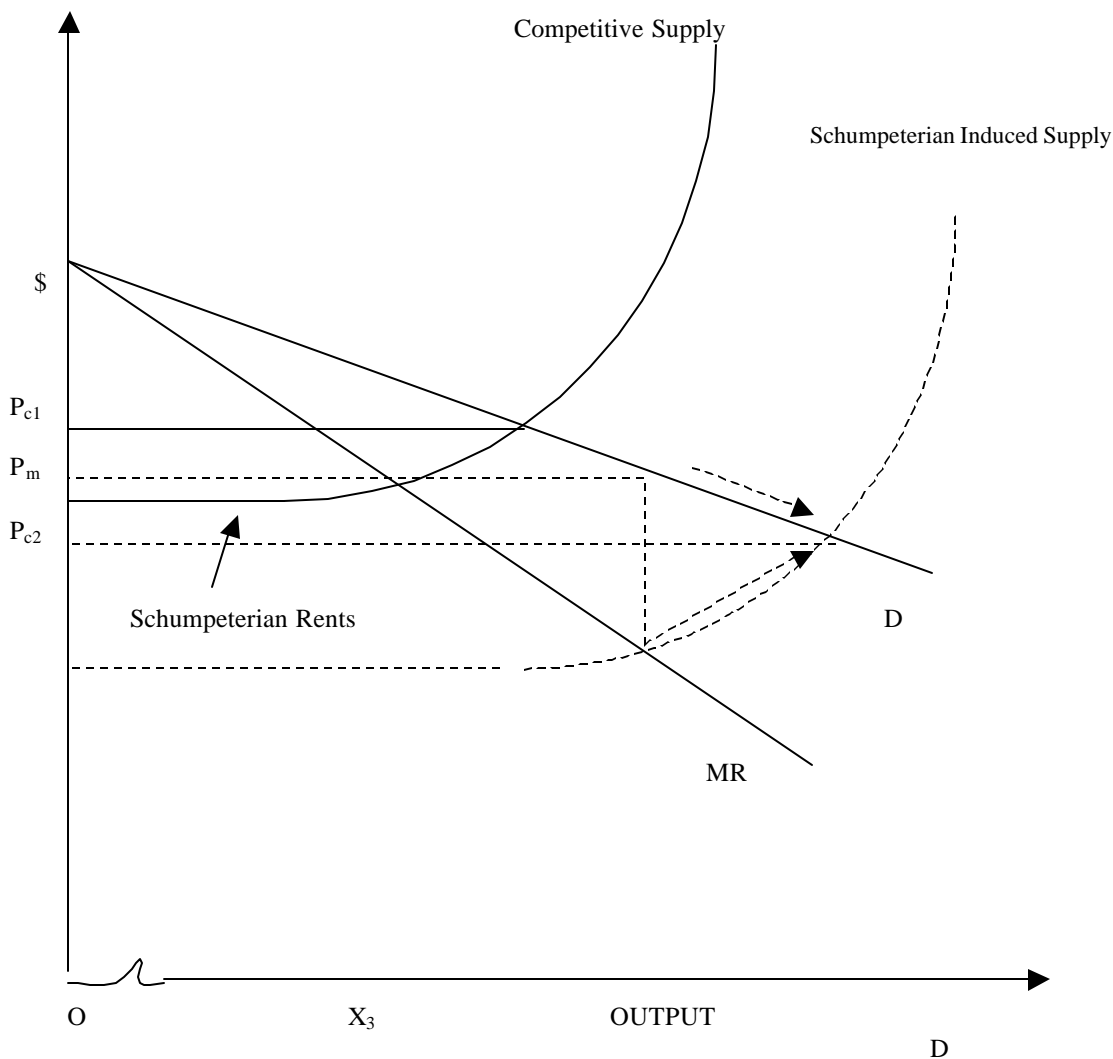
Scarcity rents adapted from Rutherford, Donald, *Dictionary of Economics* (Routledge: London, 1992), p. 138 and Taylor, John, B., *Economics* (Houghton Mifflin, Boston, 1998), p. 350).

EXHIBIT 3
MONOPOLY RENTS



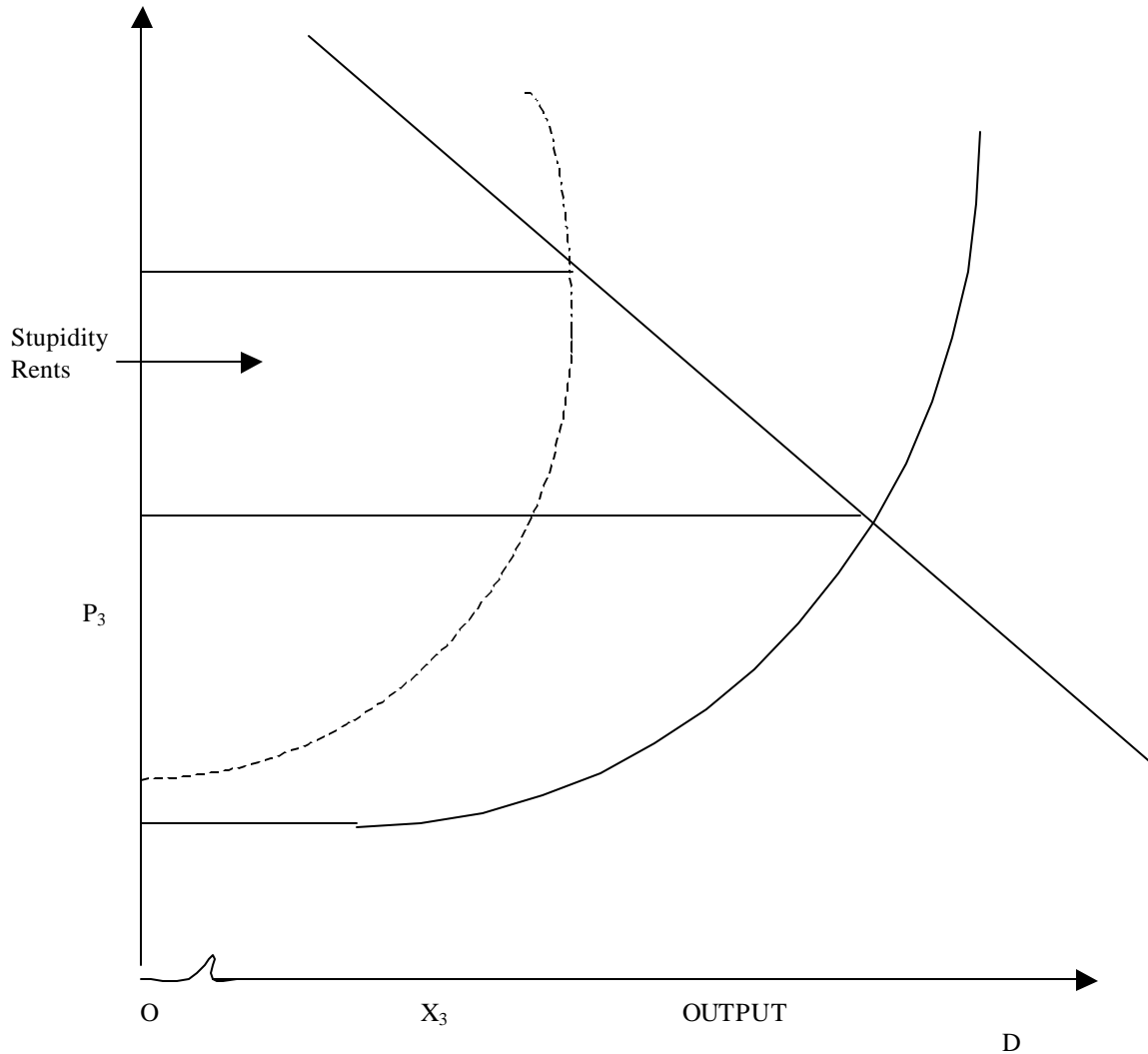
Monopoly rents from Scherer, F. M. and David Ross, *Industrial Market Structure and Economic Performance* (Boston, Houghton Mifflin: 1990), p. 22.

EXHIBIT 4
SCHUMPETERIAN RENTS



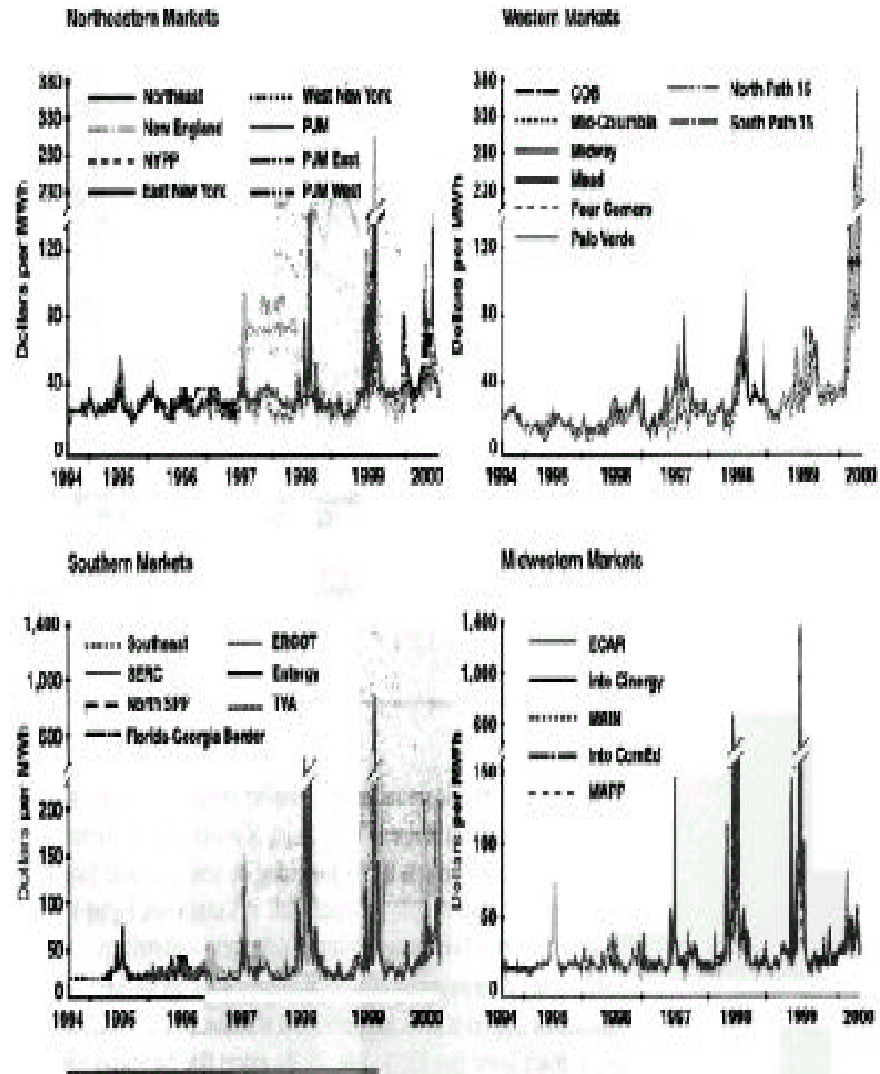
Innovation lowers the cost curve for a producer who enjoys rents. The monopoly price is lower than the competitive price because of the gains in efficiency (shift of the cost curve). The size of the rents depends on the quantity the innovator can produce and its pricing strategy. Rents persist until other producers catch up and compete away the rent, but that results in a lower price in the total market. Adapted from Asch, Peter, *Industrial Organization and Antitrust Policy* (New York, John Wiley and Sons: 1983), p. 27.

EXHIBIT 5
STUPIDITY RENTS

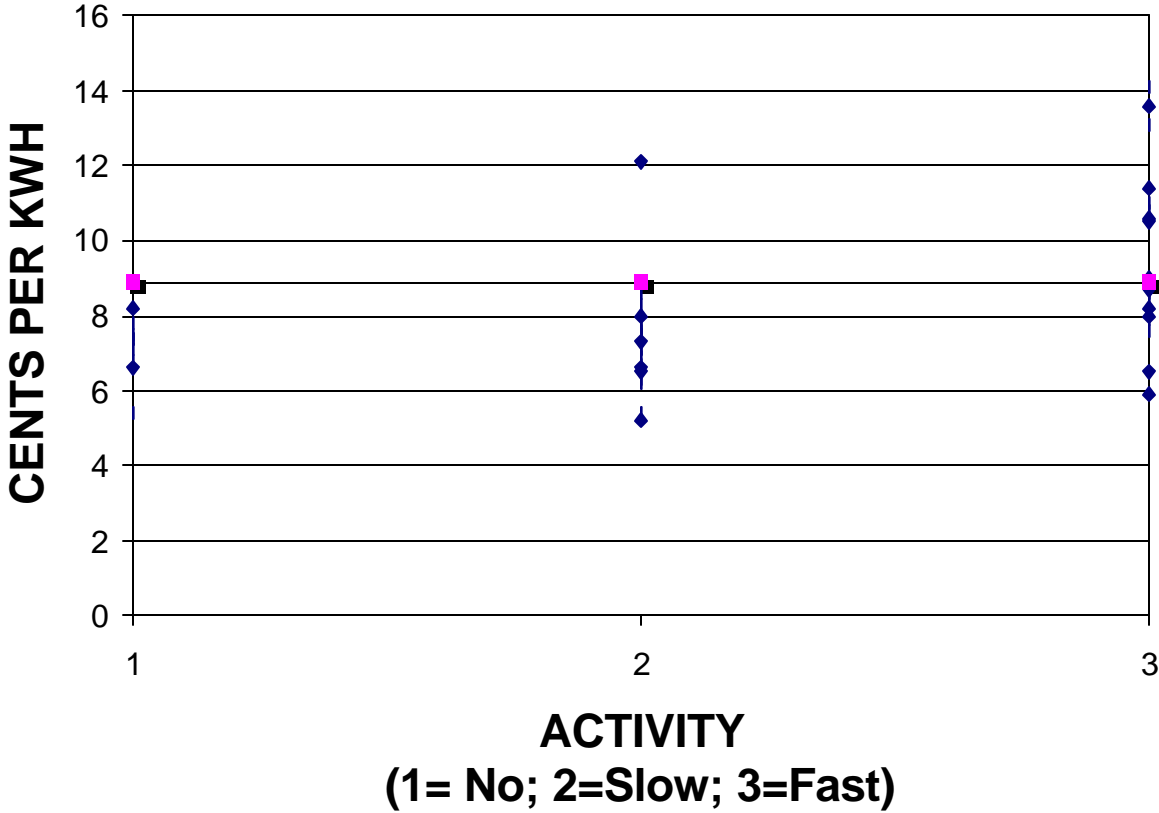


The cost curve shifts up and to the left due to inefficiencies introduced into the market (X-inefficiency from Asch, Peter, *Industrial Organization and Antitrust Policy* (New York, John Wiley and Sons: 1983), p. 97) and it bends backwards to the ability to game/withhold supply. (Backward bending supply curve from Aperjis, Dimitri, *The Oil Market in the 1980s: OPEC Oil Policy and Economic Development* (Ballinger, Cambridge, 1982, p. 173).

Figure I-3
On-peak Weekly Average Spot Electricity Prices



**EXHIBIT 7:
RESIDENTIAL RATES AND THE STATUS OF ELECTRICITY
RESTRUCTURING (PA = 8.9)**



Sources: Rose, Kenneth, *The Status of Electric Deregulation Following the California Meltdown* (NRRI, December 2000) (AZ is placed in the slow category due to a constitutional challenge); Energy Information Administration, *Electricity Sales and Revenue 2000*.