Consumer Federation of America

ELECTRICITY DEREGULATION AND CONSUMERS:

LESSONS FROM A HOT SPRING AND A COOL SUMMER

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EXECUTIVE SUMMARY

PERVASIVE PROBLEMS IN RESTRUCTURED ELECTRICITY MARKETS

While the near meltdown in California and its miraculous escape from a summer of impending blackouts attracted a great deal of national attention, other restructured electricity markets across the country have been struggling with rising prices and service problems.

New York and Massachusetts have suffered double digit price increases and have scrambled to keep the lights on. Industrial consumers in Montana have suffered a quadrupling in price while residential consumers are facing a 50 percent increase. Competition has suffered a dramatic reversal in Pennsylvania and prices have rising with the end of regulated-mandatory price cuts. In most other states where "customer choice" has been offered, few competitors have entered the market and almost no residential consumers have switched companies.

Disaster has been avoided, not by reliance on market forces, but by vigorous government intervention to correct the market, including the implementation of price caps, strengthened obligations to sell power, highly publicized conservation programs, and, in many cases, a lucky break with the weather.

MARKET FUNDAMENTALS AND MARKET FAILURES

Market Power: Policymakers are slowly learning a tough lesson: the fundamental conditions of supply and demand in the electricity industry are so unique and severe that it is difficult to make this market work properly. The elasticity of supply and demand is so low, that market power problems are inevitable. The supply of electricity cannot be increased quickly because it is expensive and time-consuming to produce, while consumer demand for electricity is fairly constant and is not significantly affected by price increases. These conditions make it easy for electricity producers to manipulate the market and drive up prices when overall demand increases.

In all of the major electricity markets, the abuse of market power – withholding supplies (hoarding) to drive prices up or demanding prices that are far above costs (price gouging) – has been alleged. Detailed econometric analysis shows overcharges of 25 percent or more in market after market.

Electricity markets can only perform well **if all generators are equal in size and if total demand for electricity is significantly less than the amount that these generators can produce.** The need for excess capacity and the need to deconcentrate markets are great, but policymakers have failed to insist on these requirements as the precondition for restructuring.

Coming to grips with market power raises a second and even more troubling problem. The cost of creating these preconditions through market forces may be so high that the price of electricity in deregulated markets will inevitably be higher than in a well-regulated market. Potential efficiency gains from introducing retail competition may be overwhelmed by the increased costs of preventing the abuse of market power. Making spot markets function to efficiently and equitably determine electricity supply requires the production of additional excess

capacity, results in huge scarcity rents, causes a sharp rise in the cost of capital, and increases transaction and coordination costs.

Excess Capacity: The experience with restructuring underscores the need for large reserve margins. Operational reserves that have been required to simply to keep the lights on are not sufficient to also prevent the abuse of market power. Additional reserves are needed.

Bidders in electricity markets must know that a substantial part of their capacity will not be called upon a significant part of the time if they bid high. Based on restructured market performance, reserve margins need to be well above traditional levels of 15 to 20 percent, perhaps as high as 30 to 40 percent to prevent the abuse of market power.

Excessive Scarcity Rents and Windfall Profits: The inelasticity of supply gives rise to excessive scarcity rents. That is because supply cannot be expanded quickly in response to increasing demand, price rise sharply and producers collect excess profits, without eliciting the typical competitive market response (quick production of more supply.) New supplies and suppliers are unable to enter the market to quickly drive prices down Supply is so inelastic that the scarcity rents make up the vast majority of the market price, as demand moves toward the peak.

Raising the Cost of Capital: The electricity industry is extremely capital intensive. It has long-lived assets (such as power plants) that are sunk, inflexible parts of an integrated network. A regulated utility approach to supplying electricity lowers the cost of capital. It lengthens the time horizon for investment, to match the lives of the assets. It brokers the relationship between the supply and demand sides to lower risk.

Merchant power plants have a different set of financial requirements. The merchant-generators claim that they must be compensated for the risk of development in an uncertain market. Under market conditions, there is no long-term assurance that demand will exist, so merchant-generators seek to recover their capital as quickly as possible. They insist on higher rates of return and must put more equity into projects (use higher cost debt) to get them financed and the result is to raise capital costs.

The problem was recently affirmed in a Department of Energy analysis that sought to discredit “cost-plus” regulation for peaking facilities. The Department of Energy focused its attention on a financial scenario in which merchant generators insisted on a three-year cost recovery period (even though the facilities last twenty or thirty years). The resulting capital costs are 60 percent higher than a plant financed by a regulated utility. Ironically, the DOE financial analysis describes the market in California, where merchant-generators have recovered all of their capital in approximately three years by abusing their market power.

De-integration Increases Transaction Costs: Introducing competition into retail transactions not only undermines the base for long-term utility financing, but it also weakens the base for coordination and integration of supply and demand. Empirical studies show strong economies are achieved by coordinating electricity supply and demand. Creation of markets for electricity services leads to a huge growth in transactions and retards cooperation in the industry. This increases administrative burdens, requires additional physical facilities, and imposes many new transaction costs to support the trading of electricity.

In retrospect, claims of efficiency gains and price reductions of 40 percent or more for electricity restructuring seem silly. In fact, careful analysis showed that under the best of circumstance efficiency gains in generation could only be a fraction of that, while efficiency losses and new costs are far larger. It may well be that inefficiencies introduced into what had been a reasonably well-managed network have increased overall costs by over 10 percent.

PRAGMATIC, CONSUMER-FOCUSED POLICIES

With the country stuck almost exactly halfway in the transition to a restructured market, we recommend a pragmatic, consumer-focused shift in policy that starts with a moratorium on new restructurings while federal authorities attempt to create a workably competitive wholesale market.

Without effectively competitive wholesale markets, state restructuring is doomed to fail. Since wholesale markets cross state borders and almost all states are too small, individually, to constitute effective wholesale electricity markets, the first steps in creating the conditions for competitive markets must come at the Federal level.

Creating Effectively Competitive Wholesale Markets Requires Much Less Concentration of Generation Assets: For most electricity markets, this means that the generation assets owned by individual companies in specific markets must be much smaller than they are today. FERC must abandon its current approach to granting market-based rates and immediately open a proceeding to adopt a new methodology that is more in tune with economic reality. Federal authorities should declare a moratorium on mergers until market institutions are firmly established.

Creating Effectively Competitive Wholesale Markets Requires Much More Oversight: Law enforcement must be a centerpiece of any market-opening program. Abuse of market power and collection of huge rents by merchant generators and transmission owners must be disciplined if "market" incentives are to work. Much more vigorous market monitoring and data collection is needed. It may be necessary to identify a broader range of practices that are per se illegal, or at least trigger heightened scrutiny and to have a broader range of disciplinary measures, including criminalization of the abuse of market power, to reflect the especially vulnerable and volatile nature of this vital commodity. A joint state-federal task force of law enforcement authorities should be created to help restore confidence in electricity market oversight, at least until effectively competitive markets are firmly established.

Creating Adequate and Open Highways of Commerce: The failure to recognize the important role of the continuing monopoly in the transmission of electricity resulted in the underregulation of the wires segments of the industry. This is a highway system, not a market. The right model for transmission is an independent (public or private) entity imbued with the public interest and fully accountable to public authorities. This entity would be dedicated to ensuring that electricity transmission meets certain public goals, such as reliable service and nondiscriminatory market transactions in the widest area possible. Rates should be governed by the just and reasonable standard. Transactions must be standardized and transparent, with the creation of an exchange in which all rates terms and conditions can be identified. Brokers must be subject to rules that are similar to those applied to financial transactions like stock sales.

To the extent that states must move forward by legislative mandate, competition on the wholesale side, through competitive bidding, is a reasonable starting point. All states should keep control over strategic assets (generation and transmission) and powers as long as possible, including the right to require utilities to build power plants.

Ensure Reserve Margins And Excess Capacity: Reserve margins and excess capacity emerge as a critically important policy issue for the states, which have traditionally had responsibility for maintaining reliability. State authorities should require reserve margins that meet their local needs. In addition to the normal operating reserves that the industry maintains, there must also be a competitive, or economic reserve whose primary function is to restrain pricing abuse. The total size of the reserve will vary depending on the nature of demand (peakiness) and supply side characteristics (concentration, cost curve). Energy service companies (load serving entities) should be required to demonstrate ownership, as well as the control and deliverability of supplies to meet their projected peak demand with a significant operating and economic reserve margin. The obligation to serve must be backed by a duty to build, if the market does not demonstrate its ability to create adequate reserves. Demand responsiveness programs, targeted at large industrial and commercial customers are an economically attractive way to lower demand at the peak, could meet part of required reserve margins.

Controlling Excessive Scarcity Rents and Windfall Profits: State regulators should also prevent large windfalls during the transition to competition. Generation plants, whose book values are far below their market values because they were financed with utility ratepayer dollars and under utility financed cost-of-capital, should remain with the regulated distribution entity to provide a base of low-cost power to meet consumer needs. Capturing windfalls and returning them to ratepayers is a second option that controls the transfer of rents, but it exposes consumers to volatile market prices.

Dampening the Increase in the Cost of Capital: Long-term contracts should be used for a substantial part of utility needs. These should reflect the lower cost of longer-term financial commitments. Longer-term contracts may share fuel price risk. Obviously, states should avoid negotiating long-term contracts from a position of weakness. Negotiating in a crisis, as in California, or after assets have been transferred with the threat of the lights going out, as in Montana, makes little sense. States should institute competitive bidding for supply under long-term contracts long before they consider retail competition. To the extent that regulated load-serving entities (incumbent utilities in states that have not restructured or the default-distribution companies in states that have) need additional generation resources to meet new demand or to replace an existing plant as it is taken out of service, they should do so through to a competitive bidding process.

I. RESTRUCTURED ELECTRICITY MARKETS: PROBLEMS HERE, PROBLEMS THERE, PROBLEMS EVERYWHERE

An All Too Familiar Scenario

Consider the following sequence of events recently depicted in a leading national newspaper.

- The electricity market was deregulated in the face of tight supplies. Neither merchant-generators nor utilities built power plants over an extended period of time. The utility planning process was abandoned and conservation programs were slashed. The result was more demand than would have been expected and supplies that had stagnated.

- Transmission capacity was not expanded to accommodate either the new transactions made necessary by a competitive market or to eliminate load pockets – regions with a severely limited ability to import electricity

- Utilities divested their power plants, but they were sold to a small number of suppliers. This created market power problems that were manifested in repeated instances of price manipulation, costing consumers hundreds of millions of dollars.

- When market power problems began to develop, authorities were slow to react, preferring to rely on market forces to handle take care of things.

- When state authorities finally did respond, it was with a mixed bag of innovative, economically questionable and environmentally suspect solutions, but federal authorities continued to resist measures that would affect the market.

- When government intervened to keep the lights on and hold prices down, it drew the ire of merchant-generators.

Anyone who has been following the developments in California over the past year or so will certainly recognize this as a familiar scenario. But it does not describe California; it is drawn from front-page stories in the *New York Times,* including one entitled "A Failed Energy Plan Catches Up to New York." [1] Without attracting much national attention, the customers of New York's largest utility have experienced an almost 40 percent increase in summer rates. Eventually, however, the grim reality came to light as New York state authorities battled the Federal Energy Regulatory Commission (FERC) to secure a price cap for the summer 2001 season.[2] The responses required were anything but, "let the market take care of it."[3]

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[1] Banerjee, Neela and Richard Perez-Pena, "A Failed Energy Plan Catches Up to New York," *New York Times*, June 1, 2001, p. A1.

[2] Lobensez, George, "Con Ed: FERC Leaving New York City Consumers at Mercy of Market Power," *Energy Daily*, June 19, 2001; Caffrey, Andrew, "Federal Energy Panel Approves Power Price Controls for New York," *Wall Street Journal*, June 29, 2001.

[3] Johnson, Kirk, "New York Turns Into a Lab on the Future of Electricity," *New York Times*, July 25, 2001.

Problems in Pennsylvania: The Poster Child Stumbles

Another state that has had a rough time of it without attracting much national attention is Pennsylvania, the poster child for restructuring.[4] Regulators originally mandated temporary rate reductions and price caps on residential rates remain in place, but the temporary reductions did not last very long.[5] For a while, industrial ratepayers enjoyed larger rate reductions for a period of time,[6] but these benefits did not last very long either.

Data for recent months indicates that rising capacity costs and natural gas prices, as well as the end of regulatory-mandated rate cuts have pushed prices up. Residential rates in Pennsylvania remain about 25 percent above the states that have not restructured.[7] Before restructuring, residential rates in Pennsylvania were about 10th highest in the 48 contiguous states on a statewide basis and today they are eleventh.[8]

As a result of rising prices, the growth of competition has reversed.[9] In the first half of 2001, approximately three-quarters of the firms offering alternative service, companies serving almost ten percent of the customers who had switched to another electricity supplier exited the market.[10] By July, from a peak of 560,000 customers who had voluntarily left their incumbent supplier, the number of consumers served by competitors has declined to 340,000 (another 250,000 were switched with a negative option).[11] Econometric evidence suggests that the PJM power pool, in which Pennsylvania is located, has suffered the abuse of market power similar to the early days in California.[12]

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[4] National Energy Policy Development Group, *National Energy Policy*, May 2001, p. 5-12.

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

[6] As described in Cooper, Mark, *Residential Consumer Economics of Electric Utility Restructuring* (Consumer Federation of America and Consumers Union, July 1998) (hereafter, Cooper, *Economics)*, and Coyle, Eugene, *Price Discrimination, Electronic Redlining, and Price Fixing in Deregulated Electric Power* (American Public Power Association, January 2000), price discrimination has traditionally been a concern in this industry because of its cost characteristics.

[7] EIA, *Estimated U.S. Electric Utility Average Revenue Per Kilowatt-hour to Ultimate Customers: April 2001*.

[8] Energy Information Administration, *Electric Sales and Revenues*, various issues. I use 1995 since restructuring was enacted in both California and Pennsylvania in 1996 (see Energy Information Administration, *The Changing Structure of the Electric Power Industry 1999: Mergers and Other Corporate Combinations*, (December 1999) Table 11).

[9] 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, to a dramatic decline in 2001. Moreover, 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, Janaury16, 2001, gives the numbers for green power). 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.

[10] Collins, Donnie, "Few Exercising Choice," *Scranton Times* (January 29, 2001); 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).

[11] "Pennsylvania Electric Deregulation May be Headed for Failure," *CNNfn*, June 6, 2001; Panepeto, Peter, "Consumers Flee from Electric Choice Program in Pennsylvania," *Erie Times-News*, July 6 2001; Parker, Akweli, "Electric Market Sputters in Pennsylvania," *Philadelphia Enquirer*, July 8, 2001.

[12] Bowring, Joseph, et. al., *Monitoring the PJM Market: Summer 1999*, UCEI Power Conference, March 17, 2000; Stoft, Steven, *PJM's Capacity Market in a Price-spike World* (May 2000); Mansur, Erin, T., *Pricing Behavior in the Initial Summer of the Restructured PJM Wholesale Electricity Market* (University of California Energy Institute, Program on Workable Energy Regulation, April 2001)

Other Problems Areas Receive Little Attention in the National Policy Debate

The list of problems, here and abroad is growing.

The United Kingdom: The longest running major electricity restructuring in the world,[13] the UK, completely overhauled its approach to setting prices last year.[14] Ironically, the system it abandoned – heavy reliance on spot market prices set in an auction in which all bidders are paid the highest bid of the last generation unit needed to satisfy demand ("one price auction") – was exactly the approach that had gone haywire in California. The UK did not change because of a fear of a California-style meltdown, however. It did so after a decade-long failure to eliminate the abuse of market power in its own market.[15] In fact, just as in the UK, the California market has been plagued by problems of the exercise of market power from the outset.[16]

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[13] Green, Richard, *England and Wales – A Competitive Electricity Market?*, (University of California Energy Institute, Program on Workable Energy Regulation, September 1998) (hereafter *Competitive Electricity*) notes that Chile started much earlier but its experiment has attracted almost no attention on the world stage.

[14] Office of Gas and Electricity Markets (OFGEM, originally electricity was regulated by the Office of Electricity Regulation, OFFER), *Review of Electricity Trading Arrangements: Proposals*, (1998); *The New Electricity Trading Arrangements* (1999); *Consultation on Rises in Pool Prices in July*, 1999; *Rises in Pool Prices in July: A Decision Document*, 1999.

[15] Green, *Competitive Electricity* and Wolfram, Catherine D., "Electricity Markets: Should the Rest of the World Adopt the United Kingdom's Reforms?," *Regulation*, 1999 (22) (hereafter *Reform*), note that in eight years, the UK regulator had issued ten reports that expressed concern about market power. Beyond the regulator's concerns, the academic literature on the exercise of market power in the UK is extensive. Given the fact that the spot market went on line in early 1991, the speed with which the market power problem found its way into the academic literature is notable (Bolle, Friedel, "Supply Function Equilibria and the Danger of Tacit Collusion: The Case of Spot Markets for Electricity," *Energy Economics*, April 1992; Green, R.J. and D. M. Newberry, "Competition in the British Electricity Spot Market," *Journal of Political Economy*, 100:5, 1992; ; von der Fehr, N.H.M. and D. Harbrord, "Spot Market Competition in the UK electricity Industry," *Economic Journal*, 103 1993; Powell, Andrew, "Trading Forward in an Imperfect Market: The Case of Electricity in Britain," *The Economic Journal*,1993 (103). The market power problem crops up continuously in the literature on the UK, see Newberry, David, M., "Power Markets and Market Power," *The Energy Journal*, 1995 (16): Wolak, Frank A. and Robert H. Patrick, *Impact of Market Rules and Market Structure on the Price Determination Process in the England and Wales Electricity Market* (University Of California Energy Institute, Program On Workable Energy Regulation, February 1997); Newberry, David M., "Competition, Contracts, and Entry in the Electricity Spot Market," *Rand Journal of Economics*, 29:4, 1998; Wolfram, Catherine, D. "Strategic Bidding in a Multi-unit Auction: An Empirical Analysis of Bids to Supply Electricity in England and Wales," *Rand Journal of Economics*, 29, 1998; Newberry, David, "Viewpoint: Freer Electricity Markets in the UK: A Progress Report," *Energy Policy*, 26:10, 1998; Green, Richard, "The Electricity Contract Market in England and Wales," *The Journal of Industrial Economics*, 47:1, 1999; Wolfram, Catherine, "Measuring Duopoly Power in the British Spot Market," *American Economic Review*, 89: 1999; "Interview – UK Power Pool Says Reduces Price Surges," *Reuters*, April 16, 1999; Brunekreeft, Gert, "A Multiple-unit, Multiple-period Auction in the British Electricity Spot Market," *Energy Economics*, 23, 2001).

[16] "Official" analyses of problems in California before 2000 can be found in 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) (Cal First Report) and *Second Report on Market Issues in the California Power Exchange Energy Markets* (March 9, 1999) (Cal Second Report). Early "official" analyses of the summer 2000 problem can be found in, Klein, Michael and Loretta Lynch, *California's Electricity Options and Challenges* (August, 2000); 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); *ISO filing Analysis of Market Power;* November 22 ISO filing in Docket NO. EL00-95-012, Attachment A: Analysis of Market Power in California's Wholesale Energy Markets; California ISO.

As with the development of markets in the UK, academics were quick to identify market power problems (see Borenstein, Severin and James Bushnell, "An Empirical Analysis of the Potential for Market Power in California's Electricity Industry," *Journal of Industrial Economics*, 47:3, September 1999. 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*

Other U.S. Markets: In addition to the disaster in California and the difficulties in Pennsylvania and New York, there have been numerous other problems over the past several years in the U.S. There were earlier market power problems in California[17] and the Midwest,[18] and outage problems in the Midwest and the East in 1999.[19]

More recent concerns about market power in New England[20] are reinforced by a sharp increase in the price of electricity in Massachusetts.[21] Rate increases as high as 70 percent in a year are reported, with recent blackouts occurring as well.[22]

Indeed, once mandatory, regulated price cuts have run out, prices have risen sharply, a problem experienced not only in California and Massachusetts. For example, policymakers are struggling to avoid a similar problem in Montana.[23] As recently as April 2000, Montana was a very low cost state, with the price of electricity forty percent below the national average. However, industrial customer prices went "to market" very quickly and their rates almost quadrupled, driving the statewide average price above the national average.[24] While the legislature made a deal with the merchant generator who bought most of the capacity in the state to keep residential rate increases "down" to *only* 50 percent when they "go to market" next year,[25] the public utility commission is battling to keep prices at just and reasonable levels.[26]

(October 1999); Bushnell, James and Frank A. Wolak, "Regulation and the Leverage of Local Market Power in California's Electricity Market" (University Of California Energy Institute, Program On Workable Energy Regulation: July 1999); Borenstein, Severin, James Bushnell and Frank A. Wolak, *Diagnosing Market Power in California's Restructured Electricity Market* (University Of California Energy Institute, Program On Workable Energy Regulation, 1999); Puller, Steven L., "Pricing and Firm Conduct in California's Deregulated Electricity Market" (University Of California Energy Institute, Program On Workable Energy Regulation, November 2000).

[17] See note 17 and Cooper, Mark, *Electricity Restructuring and the Price Spikes of 1998* (Consumer Federation of America and Consumers Union, June 1999) (hereafter, Cooper, *Spike).*

[18] 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)*; 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); 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*).

[19] Department of Energy, *Interim Report of the U.S. Department of Energy's Power Outage Supply Study Team*, January 1999 (hereafter, DOE, *Outages*).

[20] Allen, Daniel, Bruce Biewald and David Schlissel, *Generator Outage Increases: A Preliminary Analysis of Outage Trends in the New England Electricity Market* (Union of Concerned Scientists, January 7, 2001; Rosen, Richard, Freyr Sverrisson and John Stutz, *Can Electric Utility Restructuring Meet the Challenges It Has Created* (Tellus Institute, November 2000; Caffrey, Andrew, "No Evidence is Found that Operators Contrived Plant Closings in New England," *Wall Street Journal*, June 18, 2001, p. b4.

[21] The EIA, *Electricity Sales and Revenue*, shows an increase of almost 26 percent for Massachusetts from 1999 to 2001. The Bureau of Labor Statistics, *Consumer Price Index*, shows an increase 27 percent for the Boston area.

[22] *Boston Globe*, August 11, 2001; Reuters, August 10, 2001.

[23] NRECA Energy Policy Department, *Retail Wheeling Report* (July 2001).

[24] EIA, *Electricity Average Revenue April 2001*.

[25] Ochenski, George, "Power Play," *Missoula* Independent, April 26, 2001; NRECA, *Retail Wheeling*, p. 33.

[26] Davis, Tina, "PPL Challenges Montana Limits on Power Rates," *The energy Daily*, July 11, 2001.

California: The Great Escape

The most interesting thing about California may ultimately be what did not happen – the blackouts and price spikes of summer 2001 that did not take place. Understanding how California got into and out of trouble is essential to developing a pro-consumer electricity industry.

The Perfect Storm: It is clear that California got into to trouble as the result of the convergence of several factors,[27] similar to, but more powerful than, those that affected New York.

- Greed on the part of merchant generators and incumbent utilities kept supplies tight, which opened the door to pervasive abuse of market power.
- Mismanagement on the part of state regulators, who designed flawed markets, and federal regulators, who deregulated markets that were not effectively competitive, created the opportunity to drive prices up.
- Irresponsibility, particularly on the part of federal regulators who consistently failed to police and prevent the abuse of market power in both the electricity and natural gas markets, sent a signal that there would be no consequences from abuse behavior.
- Bad luck, a drought in the West and a winter spike in natural gas prices, further tightened markets and provided a higher platform for prices to escalate.

This "perfect storm" quadrupled the average wholesale price of electricity from 1999 to 2000, with expectations that it would double again in 2001.[28] The eye of the storm was the abuse of market power in both the electricity and natural gas markets. The California Independent System Operator has documented price gouging (economic withholding) or hoarding (physical withholding) in virtually every hour of every day for almost a year.[29] Well

[27]Cooper, Mark, *Behind the Headlines of Electricity Restructuring*, (Consumer Federation of America, March 20, 2001).

[28]Projections from the early part of the year put the 2001 bill at over $50 billion, up from $28 billion in 2000 and just $7 billion in 1999."The Pros and Cons of Power Price caps," *Wall Street Journal*, June 4, 2001, gives figures of $7.4 billion for 1999, $27 billion for 2000, and an expected $50 billion for 2001. Woychik, Eric Charles, *Nine Lessons From California's Energy Blunderland? Don't Markets Provide Infrastructure?* (Strategy Integration Inc., June 26, 2001), p. 6, asks the question "2001 CA wholesale cost: $60 B or more?"

[29] After the CAL-ISO was reconstituted, efforts to demonstrate market failure increased, see *Report on Real Time Supply Costs Above Single Price Auction Threshold: December 8, 2000 – January 31, 2001* (February 28, 2001).; Sheffrin, Anjali, *Market Analysis Report* (Memorandum to ISO Board of Directors, March 23, 2001);.Hildebrandt, Eric, *Further Analysis of the Exercise and Cost Impacts of Market Power in California's Wholesale Energy Markets* (Department of Market Analysis California Independent System Operator, March 2001), *Impacts of Market Power in California's Wholesale Energy Market: More Detailed Analysis Based on Individual Seller Schedules and Transactions in the ISO and PX Markets* (Department of Market Analysis, California Independent System Operator, April 9, 2001); Sheffrin, Anjali, *Empirical Evidence of Strategic Bidding in California ISO Real Time Market* (Department of Market Analysis, California Independent System Operator, March 21, 2001); Hildebrandt, Eric, "Analysis of Payments in Excess of Competitive Market Levels in California's Wholesale Energy Market: May 2000 – 2001," *FERC Settlement Conference*, July 9, 2001). As if to underscore the determination of power suppliers to squeeze every penny out of the market, the ISO found thousands of above market transactions on May 30 and 31, just before the price mitigation measures went into effect (*San Jose Mercury News*, August 8, 2001).

over half of the increase in electricity prices may be attributed to this abuse in both the electricity and natural gas transportation markets.[30]

For a substantial part of the year, the higher prices got, the less supply was offered. [31] In the slack months of winter and spring, prices were as much as ten times the previous year, while as much as one-third of total capacity was unavailable.[32] With blackouts and $300 per Megawatt hour (MWH) electricity during the off-peak, winter months, it was hard to see how California would escape an even bigger disaster in the summer.

Breaking the Market Power of the Merchant-Generators: Just as it took a powerful combination of events to create the storm, it took a combination to break up it eye. The key factor was a combination of good management, responsible exercise of authority, and good luck that undermined the ability of the merchant generators to abuse their market power.

California took the state out of the spot market. [33] The colorful language that has developed in the electricity literature of spot markets, it drained (power) pool.[34]

- It signed more long-term contracts than anticipated.[35]
- The state brought other source of electricity on line more quickly than expected including Qualifying Facilities and generator who had been restricted by

[30] Consumer Federation of America, et al, "Motion To Intervene And Request For Rehearing," "Reply Comments," *San Diego Gas & Electric Company, Complainant, v.Sellers of Energy and Ancillary Service Into Markets Operated by the California Independent System Operator and the California Power Exchange, Respondents Investigation of Practices of the California Independent System Operator and the California Power Exchange California Independent System Operator Corporation Investigation of Wholesale Rates of Public Utility Sellers of Energy and Ancillary Services in the Western Systems Coordinating Council,* Federal Energy Regulatory Commission, Docket Nos. EL00-95-012, EL00-98-000, RT01-85-000, EL01-68-000, demonstrates that price ceilings in California would be cut in half if high spot market prices are not used. The implications are that abuse pricing of natural gas doubled the cost of electricity. The implication is that as much as three quarters of the increase in electricity costs could be the result of abuse.

[31] When windfalls and monopoly profits become as massive as they have been in California, they distort economic incentives. Producers make more by withholding supplies (exhibiting a backward bending supply curve) than by increasing output. That the concept of a backward bending supply curve is routine is attested to by its inclusion in introductory texts, see for example, Taylor, at 327-329. 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). Newberry, *Competition,* at 729, notes that Bolle's analysis, which seems to capture the essence of the California market, allows a backward bending supply function.

[32] Krugman, Paul, "Turning California On," *New York Times*, June 27, 2001, A-25, uses this figure.

[33] Summing up the "unexpected" shift in the supply demand balance we find 7,000 MW more resources available in a system that typically peaks at around 48,000 MW.

[34] Green, Richard, "Draining the Pool: The Reform of Electricity Trading in England and Wales," *Energy* Journal, 2000. Other important terms are Megawatt laundering and Hockey Stick Bidding (see "Order on Rehearing of Monitoring and Mitigation Plan for the California Wholesale Electric Markets, for the California Wholesale Electric Markets, Establishing West-Wide Mitigation, and Establishing Settlement Conference, 95 F.E.R.C. ¶ 61,1418 (2001)(June 19 Order; Rothkopf, Michale H., *Control of Market Power in Electricity Auctions*, 2001, (January 13);)

[35] Between April and June, 2001, the state added Approximately 1200 MW to its long term contract portfolio (see "California Agency's Power Costs to Drop Sharply," *Energy Daily*, June 13, 2001.

environmental constraints.[36] These generally small electricity producers were important because they are not likely to able to game the market, as the large merchant-generators tend to.

- The combination of a public-spirited conservation campaign and a recession reduced demand.[37]

- With weak demand and a "flood" of supply, the state created demand uncertainty for the merchant-generators. Uncertainty is critically necessary to make bidders behave honestly in these markets, since it undermines the ability of merchant-generators to withhold capacity or demand high prices that drives the spot market to higher levels.

The Federal Energy Regulatory Commission finally accepted some responsibility by sending a signal that there might actually be negative consequences for the abuse of market power. [38]

- It imposed some price controls and opened a serious investigation into past overcharges.

- It created an obligation to sell electricity, shifting the responsibility for offering power into the market onto the generators, and gave the ISO more authority to enforce this obligation.

- It banned the practice of megawatt laundering, which transferred ownership of electricity to out of state brokers who would then sell the power back into the state at inflated prices.

- It got serious about tackling the abuse of market power in the natural gas transportation market.[39]

Luck helped too.

- The weather was cool.

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[36] *San Jose Mercury News*, June 11, 2001, puts the capacity made available at 1200 MW as a result of the easing of air quality restrictions. The CPUC simultaneously ordered payment to small generators, (Reuters, June 13), making another 1500 MW of capacity available.

[37] Conservation, adjusted for weather, has been put at 5 to 10 percent (see Sanchez, Rene, "California Residents Answer State's Call to Cut Power Use," *Washington Post*, June 5, 2001; Sheffrin, Anjali, *Market Analysis Report for May 2001* (California ISO, June 15, 2001). The reduction in peak use is between 2,000 and 4,000 MW.

[38] Federal Energy Regulatory Commission, Order Directing Remedies for California Wholesale Electric Markets, 93 FERC, ¶61,294 (December 15, 2000); "Order Directing Seller to Provide Refunds of Excess Amounts Charged for Certain Electric Energy Sales During January 2001 or, Alternatively, to Provide Further Cost or Other Justification for Such Charges, 94 FERC ¶61,245 (March 9, 2001); "Order Establishing Prospective Mitigation and Monitoring Plan for the California Wholesale Electric Markets and Establishing an Investigation of Public Utility Rates in Wholesale Energy Markets, 95 F.E.R.C. ¶ 61,115 (April 26, 2001); June 19th Order..

[39] Beattie, Jeff, "FERC Judge Takes Swing at El Paso on California Gas Market Manipulation," *Energy Daily*, August 7, 2001, "FERC to Investigate Enron California Pipeline Deals," *Energy Daily*, July 26, 2001.

- The price of gas at the wellhead declined.

- The contract that El Paso Corporation used to control a large part of pipeline capacity coming into the state expired.[40]

Three observations on this remarkable series of events are in order from the consumer point of view.

First, the unwillingness of the people of California to simply accept abusive pricing that drove their electricity bills through the roof was also critical factor. Rather than simply accept the claim that this is how the market works, the state fought back. As Paul Krugman argued in his column in the *New York Times*,

> And so, sooner than anyone expected, it seems that the worst is over...
>
> The big loser from all this – for somebody always gets hurt even by good news – is, of course, Dick Cheney, the architect of the Bush administration's drill-and-burn energy plan. Remember that Mr. Cheney sneeringly dismissed conservation as a mere "sign of personal virtue," and was scathing about people who though price controls would help. Now things are suddenly looking up – partly because of conservation, and partly because price controls and the threat of further government intervention have deterred energy producers from manipulating the market.
>
> It turns out, in other words, that Mr. Cheney – who prides himself on his tough-mindedness – was naively out of touch with reality. And the real realists were those silly people who thought that California could solve its crisis by saving energy and suing energy producers.[41]

Second, 20-20 hindsight is a two-edged sword. Using 20-20 hindsight, some have suggested that California made a mistake.[42] By comparing the spot price of electricity after the end of manipulation to the long-term contract prices, they argue that California paid too much, incurring $30 million of trading losses – selling power for less than it paid – in July 2001.[43] Whether this is good or bad depends on what the analyst sees in the rear view mirror using 20-20 hindsight. If one assumes that the manipulation of prices would have ended with the state still heavily in the spot market, the contracts appear very costly.

However, if the baseline is the cost of energy in April 2001, then the long-term contracts will pay for themselves in two years. Put another way, if the CAL-ISO is even half right in its estimate of market power abuse ($4.5 billion), it would take over 12 years of trading losses at

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[40] Opel, Richard, A. "California Gets a Reprieve as Natural Gas Prices Drop," *New York Times*, June 11, 2001.

[41] Krugman, Turing California On. Krugman had consistently identified market power as a central element in creating the California mess, see "The Unreal Thing," *New York Times*, February 18, 2001.

[42] *San Jose Mercury News*, June 16, 2001

[43] Smith, Rebecca, "Electrical Switch: Now Cheaper Power Is Causing Hefty Losses for California," *Wall Street Journal*, July 31, 2001. Over a longer period, trading losses were running at about $20 million a month, see *San Jose Mercury*, August 9, 2001.

the $30 million per month level to equal the sum extorted from Californians in just one very bad year, and the contracts last for only ten years.

These contracts should be revisited.[44] California was forced to negotiate from a desperate position with energy suppliers who had created the problem through illegal actions – the abuse of market power. However, breaking the market power of the merchant-generators by draining the pool and restricting the role of a spot market that was in the grasp of merchant generators were essential elements in stabilizing the situation, especially when confronted with federal authorities who refused to take meaningful action even in the face of a tenfold increase in the price of energy.

Third, the role of weather should not be underestimated, nor should it become an excuse for ineffective policy. A severe drought set the stage for the first act of the drama and a cool summer was the backdrop for the second act. There may not be anything that public policy can do about the weather, but there certainly are many things that public policy can do to protect the public from the "luck" of weather. The health, welfare and economic well being of the public should not be dependent on the luck of the weather. If it is, policymakers have failed to do their job.

Learning From History To Avoid Repeating It

Policymakers Start to Get the Message: Pat Wood, III, former Chairman of the Texas Public Utility Commission and currently Chairman of the Federal Energy Regulatory Commission (FERC), offered the following first principles to the *New York Times* in reaction to his nomination.[45]

> "On our best day as regulators, we cannot deliver benefits to customers as well as a functional market can, but the market must work right first."

The statement is quite right, but restructured utility markets have taught us that the obverse, a second principle, is equally, if not more, true.

- **A dysfunctional market can impose infinitely more harm on consumers than regulators on their worst day.**

Policymakers are slowly learning something that consumer advocates have known and written about for about two decades,[46] good public policy demands that decisionmakers give the qualifier "the market must work right first" a lot more credence than they have to date.

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[44] Consumer Federation of America, *Reply Comments*,

[45] *New York Times*, March 27, 2001.

[46] 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. 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) (see also American Association of Retired Persons and the Consumer Federation of America, *A Consumer Issue Paper on Electric Utility Restructuring*, January 1997) stated the concerns as the policy of

The succession of stiffening mitigation orders issued by the FERC and statements about natural gas and market power suggest that Federal authorities are starting to get the message. State policymakers are moving too, beyond the obvious changes in California, New York and Montana, mentioned above.

Of the twenty-four states that committed to restructuring, two turned back and five have made mid-course corrections,[47] while California continues to labor to find a set of long-term institutions to deliver electricity. Even those that are moving ahead, like Texas, suddenly find themselves confronting old problems, such as getting their pilot program started[48] and figuring out fuel cost adjustments,[49] as well as new issues that have been raised by volatile electricity markets,[50] such as figuring out whether and how to set reserve margins and get competition to customers.[51]

A clear pattern is visible in the decision making of the states (see Figure II-1).

- Virtually all of the states with costs substantially above the national average adopted restructuring early. They clearly had a problem.
- A few lower cost states followed suit, but the vast majority of low cost states did not. They did not have a problem.
- Now that restructuring has run into difficulties of its own, the states that are slowing down or changing their mind on restructuring have lower costs than the states pushing ahead. Why create a problem where one does not exist?

For the aficionados of market design the debate rages on,[52] since the new system in the

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restructuring was being formulated. Cooper, *Economics*, identified specific flaws in the restructuring policies that had been adopted.

[47] NRECA, *Retail Wheeling*.

[48] Dyer, R.A., "Electricity Price Spikes Called a 'Mistake," *Star-Telegram*, August 2, 2001, notes the delay in starting the pilot in Texas and the problems on the first day.

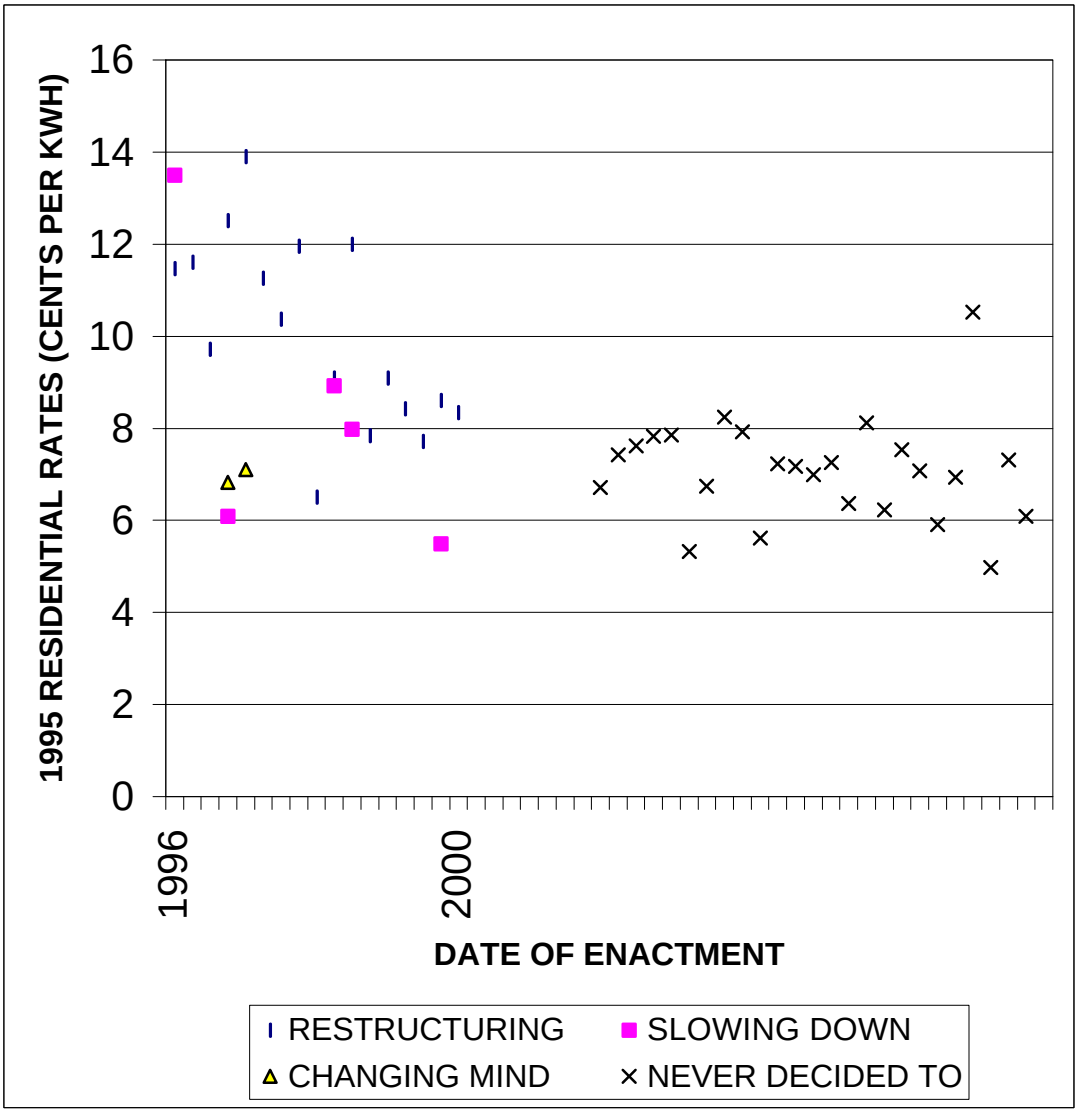
[49] Dyer, R.A., "Texas Will Face Deregulation Challenges of its Own, Officials Say," *Fort Worth Star Telegram*, July 24, 2001; Davis, Tina, "Price Spikes Give Texas Power Market that California Feeling," *Energy Daily*, August 6, 2001.

[50] Davis, Tina, "PPL challenges Montana Limits on Power Rates," *Energy Daily*, July 11, 2001.

[51] Davis, Tina, "RTO Politics Knocks Hole in Texas Power Deregulation Program," *Energy Daily*, August 10, 2001; Dyer, R.A., "Delays Hurting Power Providers," *Fort Worth Star Telegram*, August 24, 2001.

[52] Elmaghraby, Wedad and Shmuel Oren, "The Efficiency of Multi-Unit Auctions," *The Energy Journal*, 1999 (20); "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; "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. Rothkopf; 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; 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.

EXHIBIT I-1:
STATE ACTIONS ON RESTRUCTURING



SOURCE: Price = Division of Policy and Intergovernmental Liaison, *Key Aspects of Electric Restructuring and Their Relevance for Florida's Electricity Market* (Florida Public Service Commission, September 2000), pp. 41-42; Restructuring status = NRECA Energy Policy Department, *Retail Wheeling Report* (July 2001).

U.K.[53] has problems of its own,[54] and defenders of deregulation in California and elsewhere continue to argue that fixing market institutions will solve the problem.[55] However, many in the United States are learning a different lesson from the growing list of problems – retail competition for electricity may not be workable, certainly not for small residential and commercial customers.[56]

A More Troubling Long Term Problem: With a half a decade of experience, a 1997 analysis of UK markets offers a most interesting starting point to understand the fundamental problem in the restructured electricity industry that should have alerted U.S. policymakers.

> The most basic lesson is that competition in name is just that. Whether or not setting up an electricity market... will deliver benefits to consumers in the form of lower prices, depends on the market structure and the details of the market rules governing its operation. Subtle differences in the rules of the market can dramatically enhance the ability of generators selling into the market to set prices substantially in excess of their marginal and average costs...

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[53]Wolfram, *Reform*, gives a concise description of the two approaches.

[54] Wolfram, *Reform;* Green, *Draining*; Bower, John and Derek W. Bunn, "Model-Based Comparison of Poll and Bilateral Markets for Electricity," *The Energy Journal*, 21 (2000); Macatangay, Rafael Emmanuel A., "Market Definition and Dominant Positions Abuse Under the New Electricity Trading Arrangements in England and Wales," *Energy Policy*, 2001 (29); Bossley, Liz, "Turning Up the Heat," *Petroleum Economist*, 2001 (June).

[55] 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 ("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; FERC *Staff Report*, p. 4-13). 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; CERA, *Beyond California's Power Crisis: Impact, Solutions, and Lessons* (March 2001).

[56]Cooper, Mark, *Reconsidering Electricity Restructuring* (Consumer Federation and Consumers Union, November 2000) (hereafter, Cooper, *Reconsidering*); Rosen, Richard, Freyr Sverrisson and John Stutz, *Can Electric Utility Restructuring Meet the Challenges It Has Created*, (Tellus Institute, November 2000); Watts, Price C., "Heresy? The Case Against Deregulation of Electricity Generation," *The Electricity Journal*, 2001 (March 3); Coyle.

It is clear that consumers have received little if any benefit from competition in terms of price reductions. Instead, whatever efficiency gains have been made have been pocketed by producers. Describing the early period of restructuring in the UK Newberry, D. M. And M. G. Pollitt, "The Restructuring and Privatisation of Britain's CEBG -- Was It Worth It?," *The Journal of Industrial Economics*, 45:3, 1997, pp. 297-298, note

> Our preferred case is pro-privatization…for which case the net present value of benefits is L9.6 billion, equivalent to a permanent cost savings of about 0.16p/kWh, compared to an average 1994/95 price of about 2.8p/kWh, or a cost savings of 5% forever...
>
> First, who benefited from the cost reductions that we found – was it taxpayers and shareholders as Yarrow [1992] suggests, rather than consumers? Our rather tentative answer is yes, given the large increase in profits and the relatively small decline in real final prices, and we have attempted to quantify these redistributive impacts, though they are subject to larger error margins than the simple efficiency gains.

Wolfram, *Reform*, extends the observation to the second half of the 1990s.

> Given the number of firms in the market and the market rules, what is important to limiting market power is reducing the size of the largest firm relative to all others. The key to the success of this capacity-withholding bidding strategy at obtaining high prices is that frequently the largest generator knows that a significant portion of its capacity will be called upon, regardless of the prices it bids. If all generators are equal in size and the total system load is significantly less than the sum of their capacities, then only very rarely, if ever, will the largest generator know with virtual certainty that a substantial fraction of its capacity will be required to serve the market... The larger is the extent of demand uncertainty faced by the largest firm relative to capacity, the less likely this capacity withholding strategy will be successful.[57]

The key observation is that particular market structural conditions are necessary for effectively competitive markets. Electricity markets can only perform well **if all generators are equal in size and the total system load is significantly less than the sum of their capacities.** The need for excess capacity and the need to deconcentrate markets are great, but policymakers have failed to insist on these requirements as the precondition for restructuring. As a result, a great deal of attention has been properly focused on the problem of market power because policymakers have deregulated where the abuse of market power is inevitable.

However, once policymakers start to come to grips with this basic problem, a second and even more troubling problem may arise. The cost of creating these preconditions through market forces may be so high that the price of electricity in deregulated markets may inevitably be higher than the price in a well-regulated market. In other words, as described in the next section,

Potential efficiency gains from introducing retail competition may be overwhelmed by the increased costs of controlling market power. In order to have spot market transactions determine electricity supply, in an efficient and equitable manner a variety of new costs must be incurred including

- **the additional amount of excess capacity needed,**
- **the creation of huge scarcity rents,**
- **a sharp rise in the cost of capital, and**
- **increases in transaction and coordination costs.**

In other words, the increasingly troubling experience with restructured electricity markets may require a second corollary to Chairman Woods' first principle:

- **Under the conditions of severe supply and demand fundamentals, good regulators can deliver more benefits to consumers than markets because markets cannot work very well.**

[57] Wolak and Patrick, 1997, p. 46.

While a laudable goal of public policy is to promote markets, markets are a means to an end, not an end in themselves. By placing the goal of "creating" electricity markets above that of the delivery of a reliable supply of electricity at just and reasonable rates – no matter how blatant the market failure becomes – policymakers have gotten it backwards. By failing to recognize the fundamentals of the electricity market, public policy has deregulated too much, too soon and responded with band-aids that are incapable of solving the problems in real world markets.

Economists should take great pride in the fact that the theory of oligopoly and the measurement of market power describe the problems that have emerged in the electricity market so well. Unfortunately, in the public policy debate, the standard seems to be not that theory and analysis correctly comprehend the real world, but that it pretends that the market is always right (or at least better), even when it is not.[58]

II. MARKET FUNDAMENTALS AND MARKET FAILURES

Demand

Electricity is a necessity that has no substitute on the demand side in the short and mid-term.[59] Electricity is like oxygen to the 21st century economy and way of life. The "e" in "e-commerce" stands for electronic. While the bits and bytes carry the information, they do not go anywhere if the electrons do not flow. The continuous flow of large quantities of electricity to meet highly seasonal demand is the central characteristic of the demand side of the market. Denial of access to this service results in deprivation.

Demand is not only driven by the weather, it is also geographically focused. Typically, many consumers can be affected by the same factors that increase demand at the same time. This makes the demand on local and regional networks and commodity markets extremely "peaky."

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.[60] Economic and institutional barriers make it difficult for small consumers to self-supply or to bargain effectively for supplies.

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[58] One frequently sees that caveat at the end of market power analysis that warns the reader to recall how "bad" regulation was without any demonstration that the inefficiency of regulation imposes greater harm than the abuse of market power.

[59] *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 for electricity.

[60] 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,

In sum, the elasticity of market demand is very low in the short-term and low in the long-term. The demand side cannot be counted on to discipline abusive pricing behavior. Inflexibility of demand and its sensitivity to weather renders the market volatile and vulnerable to abuse. [61]

Supply

Because of the basic physics of electricity, the production, transportation and distribution networks are extremely demanding, real-time systems. Electricity cannot be stored economically. This is the critical supply-side factor that creates volatility and vulnerability to the abuse of market power on the supply-side.[62]

Severin, *The Trouble with Electricity Markets* (University Of California Energy Institute, Program On Workable Energy Regulation: 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.

[61] Pillipovic, Dragana, *Energy Risk: Valuing and Managing Energy Derivates* (McGraw-Hill, New York: 1998), p. 3, cites a number of factors that distinguish energy from other commodities, but makes it quite evident that the need to physically consume the product on a real-time basis is the central factor.

> [T]he deliverables in money markets consist of a "piece of paper" or its electronic equivalent, which are easily stored and transferred and are insensitive to weather conditions. Energy markets paint a more complicated picture. Energies respond to the dynamic interplay between producing and using; transferring and storing; buying and selling – and ultimately "burning" actual physical products. Issues of storage, transport, weather and technological advances play a major role here.
>
> In energy markets, the supply side concerns not only the storage and transfer of the actual commodity, but also how to get the actual commodity out of the ground. The end user truly consumes the asset. Residential users need energy for heating in the winter and cooling in the summer, and industrial users' own products continually depend on energy to keep the plants running and to avoid the high cost of stopping and restarting them. Each of these energy participants – be they producers or end users – deals with a different set of fundamental drivers, which in turn affect the behavior of energy markets…
>
> What makes energies so different is the excessive number of fundamental price drivers, which cause extremely complex price behavior

[62] Pirrong, Stephen Craig, *The Economics, Law and Public Policy of Market Power Manipulation* (Kluwer, Boston, MA, 1996), pp. 10… 24… 59, identifies storage and transportation costs, as well as low elaticities of demand as critical factors making market manipulation more likely.

> Economic frictions (including transportation, storage, and search costs) which impede the transfer of the underlying commodity among different parties separated in space or time can create the conditions that the large trader can exploit in order to cause a supracompetitive price…
>
> Although the formal analysis examines transportation costs as the source of friction, the consumption distortion results suggest that any friction that makes it costly to return a commodity to it original owners (such as storage costs or search costs) may facilitate manipulation.
>
> The extent of market power depends on supply and demand conditions, seasonal factors, and transport costs. These transport cost related frictions are likely to be important in many markets, including grains, non-precious meals, and petroleum products.
>
> Transportation costs are an example of an economic friction that isolates geographically dispersed consumers. The results therefore suggest that any form of transactions costs the impedes the transfer of a commodity among consumers can make manipulation possible…

Addressing situation of excess supply, he makes the link between the lack of storage and the inelasticity of demand, an argument which applies equally to situations of shortage (p. 70).

These systems require perfect integrity and real time balancing much more than other commodities. The infrastructure to produce, transport and deliver electricity is extremely capital intensive and inflexible. It takes a long time to bring power plants and transmission lines into service. Thus, the ability to expand supply in the short and medium term is severely limited. [63]

Accidents have a special role in networks such as these.[64] Because of the demanding physical nature of the network, accidents are prone to happen. Because of the volatile nature of the commodity, accidents tend to be severe. Because of the integrated nature of the network and demanding real-time performance, accidents are highly disruptive and difficult to fix.

To keep things in balance, the system needs plentiful reserves close at hand, or ample amounts of transmission capacity readily available to move abundant supplies from far away, or a great deal of load that can be quickly shed. Most electricity markets do not have those luxuries today.[65]

In sum, the elasticity of supply is low. Short-term supply responses are constrained by the difficulty of storing electricity. Provision for reserve margins is uncertain in a competitive market because the provision of reserves is unattractive to business interests, unless peak prices are extremely high. Consequently, markets may be chronically tight or subject to extreme price volatility.

Weak Market Forces Make for Bad Markets: The Abuse of Market Power

The term market forces means the ability of consumers to cut back or shift their demand and the ability of producers to increase their output in response to price increases – supply and demand elasticities. If these elasticities are too small, market forces are weak and the exercise of market power will take place. Firms raise prices to increase their profits because they do not lose enough sales to competitors, or because consumers lack alternatives. This is the reality of the electricity industry.

In theory, because the efficient size of generation plants is much smaller than the size of the market, it is possible to have multiple generators serving individual markets.[66] In practice,

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This suggests that highly perishable goods may be acutely susceptible to short manipulation. All else equal, the lower the storage costs for a commodity, the more elastic its demand. This is true because the demand curve for a storable commodity is a derived demand equal to the sum of the demand curve for immediate consumption and the demand curve for future consumption (net of future production and storage costs). The ability of consumers and producers to respond to sudden increases in supplies through storage ant the adjustment of future consumption or production decisions (such as, increasing future consumption or reducing future shipment of the commodity to the delivery market) tends to dampen the price response to an increase in supply of a storable commodity.

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

[64] DOE, Outages.

[65] 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).*

[66] Wolfram, *Reform*, offers the observation that

this has proven to be an elusive goal. Indeed, while economic theory says that generation could be competitively supplied by many, small producers, energy producers argue and strive to be considerably larger than the economists anticipated. In California, the merchant generators accused of market manipulation are ten-times the minimum efficient scale. Many utilities are 50 times as large and would like to be 100 times as large. Given the geographic limits on markets, if the minimum efficient firm size is as large as some claim, then virtually no generation markets would be unconcentrated.[67]

As a result, restructuring turns supply into a strategic variable.[68] The ability of producers to withhold supply or to hold out for high prices creates the ability to drive prices above costs. Policymakers have consistently misdefined the relevant markets, underestimated the number of competitors necessary to ensure workably competitive markets, and failed to ensure transmission capacity to support competition.

In the UK,[69] California[70] and PJM[71] we now have a series of studies comparing bidding and cost. They clearly show bids far above economic costs. In the U.K., after a decade of problems with above-cost prices persisting in the market, the regulator in the United Kingdom decided to take another approach to price setting and is seeking more authority to act against pricing abuse.[72] In the UK, the mark-up of price over cost has been sustained at the 25 percent level over a long period of time.[73]

For the first year in California, 1998-1999, the exercise of market power has been estimated to have increased costs by 22 percent, driving prices up by about half a billion

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> It is generally recognized that economies of scale in the production of electricity are exhausted at the level of medium-sized generating plant. For instance, new combined cycle gas turbine plants have recently been built with as little as 200 to 300 megawatts of capacity, almost one-fifth the capacity of nuclear power plants. Competition in generation services is therefore workable.

Joskow, Paul L. and Richard Schmalensee, *Markets for* Power (MIT Press, Cambridge, 1983); Hammond, Christopher J., "Privatization and the Efficiency of Decentralized Electricity Generation: Some Evidence from Inter-war Britain," 1992 (May).

[67] Weiner, Michael, and Nitin Turner, Amanda Hickman, Huard Smith, "Value Networks--The Future of the U.S. Electric Utility Industry," Sloan Management Review, Summer 1997, p. 26,

> A half-dozen or so utilities will likely end up as mega-generators, controlling perhaps 80 percent of the total generation capacity. The remaining 20 percent will be sourced from many niche generators employing advanced generation technologies. In the current vertically integrated industry structure, the largest producer, Southern Co., has only a 3 percent share of the total U.S. market.

[68] Hasting, Justine, *Factors that Affect Prices of Refined Petroleum Products*, Federal Trade Commission Public Conference, August 2, 2001.

[69] See note 16.

[70] See note 17.

[71] See note 13.

[72] See note 15.

[73] Wolfram, *Reform*, notes the following

> From 1992 to 1994, on average prices were 25 percent above the cost of the last plant needed to generate electricity in a given period. That suggests prices would have been substantially lower had they been set competitively. Since 1994, fuel prices have come down but electricity prices have not fallen accordingly. That suggests profits have risen and provides further evidence that prices are not responding to competitive forces.

dollars.[74] Before the spring of 2000, the total had mounted to well over a billion dollars of excess charges above competitive levels. In California in 2000-2001, a higher mark-up of prices above competitive levels was estimated -- 30 percent – above a very high price of gas.[75] Consequently, to overcharges for 2000-2001 have been put as high as $10 billion.

In the PJM pool, the mark-up in the first year was estimated at 29 percent, increasing prices by half a billion dollars. [76] The empirical record shows similar problems across the country and in other nations as well. In one week in 1998 in the Midwest, $500 million changed hands;[77] $70 million was collected in New York in one day.[78]

Inadequate Reserves

The experience with restructuring underscores the need for large reserve margins. Operational reserves that have been required in this very demanding real-time system to simply to keep the lights on are not sufficient to also prevent the abuse of market power. Additional reserves are needed.

The abuse of market power in the UK was taking place with reserve margins of over 20 percent.[79] Simulations based on American cost and demand data, for systems with twenty percent excess capacity, lead to a similar conclusion. [80] In analyzing the California market, even at moderate levels of demand, a substantial market power threat exists.[81] These results

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[74] Borenstein, Bushnell and Wolak, Diagnosing Market Power, pp. 32-33,

> The aggregate $\underline{\wedge}$TC/TC is 22.4%, amounting to total payments in excess of competitive levels equal to $494 million..a/
>
> a/ Note that the percent increase in purchase cost, $\underline{\wedge}$ TC/(TC-$\underline{\wedge}$TC) was 29%.

[75] Hildebrandt, *Further Analysis*, P. 8.

[76] Bowring, et. al., Mansur; Rose, *Other States;* Stoft, *PJM's Capacity Market;* Allen, Biewald and Schlissel; Rosen, Sverrisson and Stutz.

[77] Cooper, *Spike*.

[78] Rosen, Sverrisson and Stutz.

[79] Wolak and Patrick, p. 30,

> The ratio of the difference between total system capacity minus the highest annual half-hourly TSL [Total System Load] divided by the total system capacity is currently more than 20%.

[80] Authors find that quadrupling the elasticity of demand to .4 has the effect of eliminating the abuse of market power under the modeling assumptions (see Bushnell, James, Christopher Knittel and Frank Wolak, *Estimating the Opportunities for Market Power in Deregulated Wisconsin Electricity Market* (Consumers First, ND); Sweetser, Al, *An Empirical Analysis of a Dominant Firm's Market Power in a Restructured Electricity Market: A Case Study of Colorado* (April 1, 1998); Rudkovich, Duckworth and Rosen, review data from Pennsylvania, Borenstein and Bushnell, apply the approach to California).

[81] Borenstein, Severin and James Bushnell, "An Empirical Analysis of the Potential for Market Power in California's Electricity Industry," *Journal of Industrial Economics*, 47:3, September 1999. A linear interpolation for the 372nd hour based on Table V., predicts an average price of about $80 per MWh in December. The actual price in December 2000 was $317 and February hit $363, but the model did not include the jump in the cost of gas and NOx. Under the FERC ceiling price calculation generators were allowed to add about $230/MWh, due to the cost of these two inputs, so the model predicts the exercise of market power well.

demonstrate the need for substantial reserve capacity to prevent the abuse of market power.[82] In Australia, where market power problems did not occur early in the process, the primary reason appears to have been the existence of excess capacity of 40 percent.[83]

In other words, economic reserves in excess of operational reserves are necessary. The problem is acute in electricity markets where participants enter repeatedly into auctions with multiple units and can easily game the bidding process.[84] Without these much larger reserves, suppliers simply will not face sufficient uncertainty about their plants being called upon to run.[85] The empirical evidence on the U. K.[86] and California[87] leads to the conclusion that the one-price spot auction is particularly vulnerable to the abuse of market power and that having numerous bidders is not enough to sole the problem. Demand must also be uncertain.[88]

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[82] Id., finds that market power disappears at just 33,000 MW of demand. With a maximum peak demand in the month of just over 41,000 MW this implies a peak capacity for the month of 44,000 MW. In other words, at the 300th hour where market power is eliminated, excess capacity is at least 29 percent.

[83] Simulations in advance of the opening of the Australian market identified both highly competitive and the possibility of strategic bidding, but excess capacity loomed large in the market (Brennan, Donna and Jane Melanie, "Market Power in the Australian Power Market," *Energy Economics*, 1998 (20). Wolak, Frank A., "An Empirical Analysis of the Impact of Hedge Contracts on Bidding Behavior in A Competitive Electricity Market," *International Economic Journal*, 2000 (14), analyzed the early pricing behavior in the market and found that excess capacity was a central driver of bidding behavior, p. 34,

> How did the major generators get themselves in a situation where aggressive bidding and low prices yield the maximum profit possible? Stated differently: Why did the generators sign contracts for such a large fraction of their capacity? … Clearly, a major factor in the decision of the large generators to sign these contracts is excess generation capacity to serve both the VPX and NSW SEM. Even in the absence of contract cover being held by any participants, the large amount of capacity available to serve each state market relative to that state's demand in the vast majority of half-hours of the year implies that all generators face a significant probability all of their capacity will not be dispatched if they do not bid aggressively.

[84] Klemperer, Paul, *The Economic Theory of Auction* (Nuffield College, July 2000), *y,* at 30-31 citing Newberry, *Competition,* and Wolfram, *Strategic Bidding,* identifies four characteristics of the electricity market that lead to concerns about "implicitly collusive bidding schedules," a small number of bidders, capacity constraints, frequent repetition of auctions, and difficulty of entry.

[85] Klemperer, *Economic Theory*, p. 30, stresses the important of uncertainty in avoiding tacit collusion, which is a particular problem in electricity markets with cites to general auction literature. Press accounts of producer complaints about their inability to know what the FERC June 19th mitigation plan will allow them to charge ("Federal Price Limits Backfire, Some Generators Withhold Power Rather than Abide by Rate Caps," *San Francisco Chronicle*, July 4, 2001) demonstrate the continuing exercise of market power. Under the theory of the one price auction that the Commission is operating (June 19th order, p. 6) bidders should be compelled to offer all their supplies at the marginal cost of each unit. If they are the marginal supplier who clears the market, they break even. If they are inframarginal, they earn scarcity rents. Under no circumstances, should they be guessing what the regulator will pay. Complaining about uncertainty of prices simply means they continue to game the market and withholding supplies. Complaining about uncertainty is equally wrong. Uncertainty is the essential discipline that is necessary to cause them to bid into the market at their marginal cost. They should be uncertain as to whether the plant will be called upon to meet demand. They must be uncertain about what the market-clearing price will be and therefore compelled to bid in at their marginal cost. Their need to recover fixed costs should compel them to bid their plants at all times. Clearly, none of these essential disciplines are operating in the California market.

[86] Klemperer, *Economic Theory, argues* that signaling and disciplining is more easily accomplished in a one-price auction. Interestingly, antitrust law makes it clear that coordinated activity need not be collusive.

[87] Puller, "Pricing and Firm Conduct," 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 and Lynch, Chapter III; Marcus, William and Jan Hamrin, *How We Got into the California Energy Crisis*, JBS Energy (2000).

[88]Bolle; see also "Necessary Conditions for Efficient Multiple-bid Auctions, in R. Nau, E. Gronn, M. Machina and O. Bergland, *Economic and Environmental Risk and Uncertainty: New Models and Methods* (Kluwer, 1997). Newberry, *Competition,* notes that behavior that Bolle allows poses a challenge for supply function analysis. Three auction "games" were

Excessive Scarcity Rents and Windfall Profits

The inelasticity of supply (the shape of the supply curve for electricity and the nature of investment) gives rise to another deviation from typical competitive market: excessive scarcity rents. An economic rent is "a payment to a factor in excess of what is necessary to keep it at its present occupation."[89] 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."[90] Scarcity rents accrue where changes in supply are slow or nonexistent, [91] exactly the circumstances that apply to electricity markets. The supply curve is so steep (supply is so inelastic) that the scarcity rents make up the vast majority of the market price, as demand moves toward the peak.

Scarcity rents also pose a transitional problem in electricity markets. Existing facilities have proven to be far more valuable than their book costs, which are all that can be reflected in regulated rates. If utilities capture those plants at book value, but can price them at market in the future, the cost of electricity increases. The assets that would earn these rents have gained their advantage from historic utility financing. Unless the market windfall is passed back to the consumers, electricity prices increase. If they are not passed back to consumers, they can be used by incumbents, as a cross-subsidy, to frustrate competition. Scarcity rents can be eliminated (e.g. taxed away or passed back to consumers) without harming economic efficiency.[92]

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modeled with an eye toward the U.K. electricity market. Game A leads to "arbitrarily high profits p. 98)." Game A describes California perfectly. Games B and C are saved by showing the consumers the spot market price and assuming they respond. In the best game, Game C, it is clear that if there is a supply-side response and a demand side response, the market could work

> When the consumers have to pay spot prices, an increasing number of producers implies that prices converge to marginal costs. This convergence is slow, however, if the fluctuations of demand are small (102).

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

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

[91] [91] Teece, David, J. and Mary Coleman, "The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries," *The Antitrust Bulletin* (Winter 1998), 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.

[92] 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 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.

It should be noted that the estimates of overcharges in the market power analyses discussed above invariably are built on top of scarcity rents. That is, they take the supply curve as given and look at how manipulation drives the price above the expected value based on the underlying cost curve. A substantial amount of scarcity rents are built into the competitive price to which market power abuses are added.

Raising the Cost of Capital

Another important impact of the supply side characteristics of the electricity markets is the importance of capital costs. Not only is the industry capital intensive, but also its long-lived asset are sunk, inflexible parts of an integrated network. The peak load problem and the externality nature of reliability render peaking facilities extremely important, but also risky.

A regulated utility approach to supplying electricity lowers the cost of capital. It lengthens the time horizon for investment, to match the lives of the assets. It brokers the relationship between the supply and demand sides to lower risk.

Indeed, the debate over stranded costs has been about the nature of that commitment. How far did the demand side go toward guaranteeing return of and on utility capital? What were the obligations of the supply side to act rationally and efficiently? Given recent market developments and the fact that only the first high-cost states that restructured had stranded costs, there are not likely to be many more stranded costs. However, the impact of institutional change on the cost of capital remains critical.

Merchant power plants have a different set of financial requirements than regulated utility plants.[93] The merchants claim that they must be compensated for the risk of development in an uncertain market, which comes in the form of a much higher capital cost. Under market conditions, there is no long-term commitment of demand, so merchant-generators demand higher rates of return, must put more equity into projects (use higher cost debt) to get them financed, and seek to recover their capital as quickly as possible. The result is to raise capital costs.

Contrary to the claims of some,[94] utility finance did not produce inadequate supply. In fact, if anything, the primary complaint against regulation was not that it resulted in too little capacity, but that it resulted in too much.[95] Regulators, who took the job of keeping the lights on very seriously, tended to authorize the building of too much capacity.[96] Merchant generators, who are primarily concerned with profit and do not care whether the lights go on, are likely to build too little and charge much more for what they do build.

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[93] Watts.

[94] Lawrence B. Lindsey, identified as "Mr. Bush's chief economic advisor," ("A Triumph of Politics," *Washington Post,* June 20, 2001, p. A-14, stated the claim as follows in describing the FERC decision to impose price mitigation measures in California and the West " What they are trying to do is achieve two incompatible missions – preserving what is called 'just and reasonable pricing' and assuring an adequate supply of electricity."

[95] Watts.

[96] Vasapoli, Joe, "Cost-Based Electricity Rates: Do They Cause Over- or Under-Supply?" *Energy Daily,* July 5, 2001, makes the obvious point that the long-term commitment to buy power is the key to inducing construction under cost-based rates.

The reactions to price spikes by defenders of deregulation tell the story. For example, soon after the price spikes of June 1998 in the Midwest, Enron sought to defend huge price spikes by putting forward an analysis that involved power plants that are essentially disposable. These are capital intensive facilities with 20 to 30 year lives that were to be used for a few hours and then abandoned. Enron and others argued that it was reasonable to build power plants that would be expected to run just ten hours over their useful life.[97] In order to justify building such a power plant, investors would have to project market prices for those very short periods of $10,000 to $25,000 per MWh.

The problem was recently affirmed in a Department of Energy analysis that sought to discredit "cost-plus" regulation for peaking facilities. The Department of Energy focused its attention on a financial scenario in which merchant generators insisted on a three-year cost recovery period (even though the facilities last twenty or thirty years).[98] The resulting capital costs are 60 percent higher than a utility-financed plant with a lower return on investment and a capital recovery period of 25 years.[99]

Ironically, the DOE financial analysis describes the abusive market in California. The CAL-ISO has estimated that a new generation unit being brought on line with heavy capital costs would be paid off in two to three years.[100] More to the point, perhaps, the total estimated revenues above costs, even using spot prices for gas and NOx costs, for Non-Utility Distribution Company generators subject to FERC jurisdiction since the start of restructuring in May 1998, is approximately $3.1 billion.[101] This is approximately equal to the total capital paid by merchant generators to acquire the fossil plants of the utilities.[102] In other words, by

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[97] Enron, p. 7.

[98] U.S. Department of Energy, Office of Economic, Electricity an Natural Gas Analysis, *The Impact of Wholesale Electricity Price Controls on California Summer Reliability* (June 2001)

[99] Staff Report, *Market Clearing Prices Under Alternative Resource Scenarios: 2000 –2010* (California Energy Commission, February 2000). The alternative analyses focus on a combined cycle plant, but the only difference in the financial assumptions is to increase the fixed charge factor for combustion turbines by assuming a higher rate of return on equity.

[100] Hildebrandt, *Further Analysis,* at 2.

> On an annualized basis, wholesale energy prices since January 2000 are exceeding the cost necessary for new investment by about 400%, and would allow recovery of an investment in new supply in a period of less than two years.

Hildebrandt's assumed capital cost recovery was 14 to 15 percent. Thus, with an estimate of actual cost recovery more than 400% larger than that, the annual recovery is at least 70%. Moreover, the 14 to 15 percent for annual capital cost recovery is based on a return on equity of 17% (see California Energy Commission, *Market Clearing Prices Under Alternative Resource Scenarios*, February 2000, at Table III-1). Similarly, the County of San Diego, p. 7, calculates that a five-year capital recovery would require a charge of $32/MWh. Thus, a one-year pay back would require capital cost recovery of $160/MWh. The cost of operating such a new plant would be just over $120 per MWh, including $32/MWh for capital cost recovery. Thus, at a ceiling price of $273, which implies a windfall of $150/MWh, the total capital cost recovery is over $180 per MWh, indicating a less than one-year payback or a return on investment of over 100 percent. Combining the results of Hildebrandt, *Further Analysis*, Tables 3-1, B-1 and B-2, we calculate annual recovery of capital costs under actual prices in effect in California in the past three years as follows:

	NP15	SP15
Low Cost plant ($500/MWh@ 14%ROI)	46	32
High cost plant ($600/MWH@16%ROI)	39	26

[101] Hildebrandt, *Impacts of Market Power,* at Table 2-4.

abusing their market power, these entities have, at a minimum, recovered all of their capital in approximately three years.[103]

De-integration Increases Transaction Costs of a Highly Integrated Network

Reform in the electric utility industry had its roots in the fact that regulators in several states had done very badly in overseeing one type of generation plant (nuclear power). These were the high cost states that restructured first. The response to that problem in the late 1980s and early 1990s was to require competitive bidding for new plants and open the wholesale market to competition.

Electricity restructuring as practiced in the late 1990s went much farther. Seeking to introduce competition into retail transactions, it threatens the economic fabric of the industry. Not only does retail competition undermine the base for long term utility financing, but it also weakens the base for coordination and integration of supply and demand.

Empirical studies show strong economies are achieved by coordinating electricity supply and demand.[104] Before restructuring, the electricity industry was a reasonably well-run, complex, integrated network that was under some stress.[105] Creation of markets for electricity services leads to a huge growth in transactions. This creates heavy administrative requirements in an industry that benefits from economies of coordination. Contracting to achieve real-time balance simultaneously in five, six or seven different markets over broad geographic areas[106]

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[102] Stanton, Sam, "Buy Out?," *Sacramento Bee*, May 6, 2001, cites PG&E plant sale revenue of $1.5 billion and SCE revenue of just under $1 billion. SDGE revenues were about $.5 billion.

[103] Reliant Energy, *Myths Debunked: The Real Story of Wholesale Power Costs in California* (July 6, 2001) argued that it is not earning excess profits only proves that the market is not working. Duke shows that it has taken about $600 million dollars of net operating income out of the California market in three years, a sum that equals or exceeds its total investment in the state. A three-year payback period is clearly an excessive rate of return. If the market were functioning properly, other bidders would have offered or entered the market to drive the price of electricity down.

[104] Restructuring, p. 7; 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.

[105] Cooper, Restructuring, p. 8; 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; Gegax, 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.

[106] 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*.

has proven a daunting task[107] that consumes substantial resources and may undermine economies of coordination and integration, while it imposes many new administrative and transaction costs to support the new commerce. Prior to the price spikes of 1998, the number of traders increased by over 50 fold; the quantity traded increased several hundred times.[108] It is clear that the introduction of competition has put a strain on an already stressed asset.[109]

Directly related to these transactions and managerial functions are facilities costs. Demands on network facilities are likely to increase as a result of the wide range of new transactions taking place. The physical facilities to support these transactions will have to be constructed and maintained. An increase in the number of transactions may require costly improvements to the transmission system in order to ensure reliability.

To make matters worse, the interstate highway system for the movement of electrons is inadequate and was not designed to handle these transactions.[110] Capacity is constrained and extremely difficult to expand for environmental and social, not economic, reasons.[111] Similar constraints on the availability of distribution have been noted.[112] Wires are difficult to repair or replace in response to outages.[113] This places a premium on flexibility of supply and reserve margins, but neither of these is well-accommodated in the industry.[114]

In retrospect, claims of efficiency gains and price reductions of 40 percent or more for electricity restructuring seem silly.[115] In fact, they were silly in prospect, but many policymakers simply ignored the evidence.[116] Careful analysis showed that efficiency could only be boosted

[107] Richard, Sverrisson, and Stutz, raise questions about the ability of any set of institutions to run the industry based primarily on external market transactions. Earle, et al., describe the process in a context that finds the potential for market power and inefficiency.

[108] FERC, 3-1, 3-2.

[109] Ohio Report, pp. 20-21.

[110] Ohio Report, p. 19; CERA, *High Tension.* Harris, Kiah, E., *Thoughts on Wild Prices*, July 1998, p.

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

[112] DOE Outages, Finding 30.

[113] DOE Outages, Findings 9, 31.

[114] DOE Outages, Findings, 1, 16.

[115] Maloney, Michael T., Robert E. McCormick and Robert D. Sauer, Customer Choice, Customer Value: An Analysis of Retail Competition in America's Electric Utility Industry (Citizens for a Sound Economy foundation, 1996); Crandall, Robert and Jerry Ellig, Economic Deregulation and Customer Choice: Lessons for the Electric utility Industry (Center for Market Process, 19997).

[116] Pharris, Dale, Who Really Benefits From Retail Competition? (National Rural Electric Cooperative Association, September 1996). Kahal, Matthew I., The CSEF Electric Deregulation Study: Economic Miracle or the Economists' Cold Fusion (Electric Consumers' Alliance, December 1996). Binz, Ronald J., Thomas Feiler and Michael J. McFadden, Navigating A Course to Competition: A Consumer Perspective on Electric Restructuring (Competition Policy Institute, 1997).

by 10 percent[117] under the best of circumstances and real world experience has achieved half that.[118]

Indeed, it may well be that inefficiencies introduced into what had been a reasonably well-managed network have increased costs by over 10 percent. In 1998, just as restructuring was being implemented in California, two consumer groups argued that based on econometric studies of economies of integration, restructuring could raise prices by 12 to 22 percent.[119] A recent estimate has placed the increase in transaction and capital costs at 15 percent.[120]

III. PRAGMATIC, CONSUMER-FOCUSED POLICIES

Policymakers may now be faced with a Hobbesian choice. They can either abide the abuse of market power heaped upon substantial scarcity rents; or they can impose the additional burden of greater excess capacity and the physical and transaction costs necessary to support atomistic competition. In either case, the costs will rise. In both cases, the policy challenges are substantial.

With the country stuck almost exactly halfway in the transition to a restructured market, we recommend a pragmatic, consumer-focused shift in policy. We recommend a moratorium on new restructurings while the federal authorities attempt to create a workably competitive wholesale market. This is the task that the Energy Policy Act of 1992 set for the FERC, a task that has not yet been accomplished. There should be no time limit set on how long it might take to create the conditions for a workably competitive interstate market, since it is possible that such a market cannot be brought into existence. Those states that are compelled to move ahead with restructuring by statute should reorient their thinking toward a wholesale competition model. The remaining states wait to see what happens.

As a general matter, jurisdiction in electricity has always been split between federal and state entities. Three major challenges – elimination and policing of market power and an adequate transmission system – must be met primarily at the federal level, since these are interstate matters and markets. The remaining three challenges – reserve margins, excessive scarcity rents and the cost of capital – reside primarily at the state level.

Federal

Without effectively competitive wholesale markets, state restructuring is doomed to fail. Since wholesale markets cross state borders and almost all states are too small, individually, to

[117] EIA, *Competitive Markets.*

[118] Newbery, and Pollitt, estimated efficiency gains of 5 percent. Casazza, John, A., "Electricity Choice: Pick Your Poison: A. Errant Economics? B. Lousy Law? C. Market Manipulation? D. All Three?," *Public Utilities Fortnightly*, 2001 (March 1), identifies efficiency gains in generation of 3 percent..

[119] Cooper, Restructuring.

[120] Cassaza, 2001. A guest editorial, a decade earlier by the same author, just as the UK was implementing restructuring, raised doubts about the economic benefits of restructuring (see Casazza, John A., Allan J. Schultz and Joseph C. Swidler, "A Brave New World: Let's Look Before we Leap," *Electricity Journal*, 1990 (November).

constitute effective wholesale electricity markets, the first steps in creating the conditions for competitive markets must come at the Federal level.

Creating Effectively Competitive Wholesale Markets Requires Much Less Concentration of Generation Assets: The FERC's approach to defining competitive markets – requiring the equivalent of only five equal sized competitors in large, statewide markets – is clearly flawed. Instead, the standard must be at least ten or more equal sized competitors in properly defined geographic markets, where physical transmission constraints are carefully taken into account. Simulations conducted on U.S. markets suggest that pricing abuse may continue to take place with as many as twenty equal size competitors, especially in light of the continuous and repeated nature of the bidding process. It is just too easy, and bidders have too much to gain, for them not to figure out how to game the market.

- For most electricity markets, this means that the generation assets owned by individual companies in specific markets must be much smaller than they are today.

- FERC must abandon its current approach to granting market-based rates. It must immediately open a proceeding to adopt a new methodology that is more in tune with economic reality.

- Federal authorities should declare a moratorium on mergers until market institutions are firmly established.

Creating Effectively Competitive Wholesale Markets Requires Much More Oversight: Law enforcement must be a centerpiece of any market-opening program. Abuse of market power and collection of huge rents by merchant generators and transmission owners must be disciplined if "market" incentives are to work.

- FERC must engage in much more vigorous monitoring of market, with the collection of data to detect market abuse on a real-time basis.

- 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, including criminalization of the abuse of market power, to reflect the especially vulnerable and volatile nature of this vital commodity.

- It may be necessary to turn law enforcement, after initial finding of abuse, over to agencies that have no stake in the day-to-day operation of the industry.

Because the fate of the states is deeply affected by the abilities of federal authorities to police the interstate market and the FERC has performed so poorly, states properly hesitate to cede their authority to the FERC.

- A joint state-federal task force of law enforcement authorities should be created to help restore the confidence in electricity market oversight, at least until effectively competitive markets are firmly established.

Creating Adequate and Open Highways of Commerce: The failure to recognize the important role of the continuing monopoly in transmission resulted in the underregulation of the wires segments of the industry. This is a highway system, not a market. It constitutes an essential, bottleneck facility with virtually no redundancy and is never likely to support head-to-head competition. One of its primary inputs is right-of-way, which relies on governmental power of condemnation. The biggest obstacle to the expansion of transmission capacity is a social externality – public concern about ugly wires and local health effects – not inadequate economic incentives.

Proposals to let the marketplace solve the wires problem are not likely to succeed, given the market power that the wire "owner" would possess and the non-market barriers to expanding capacity. Profit maximization on the transmission system would only result in the abuse of market power and the creation of artificial scarcity rents.

- The right model for transmission is a public or private entity imbued with the public interest and dedicated to ensuring that this essential facility fulfils its public functions – ensuring reliability and supporting nondiscriminatory market transactions in the widest area possible to achieve economies of coordination and maximum competitive effect.

- Given the monopoly nature of the wires business, charges should continue to be governed by a just and reasonable standard.

- It must be independent of market participants and directly accountable to public authorities for achieving those goals.

- Transactions must be standardized and transparent, with the creation of an exchange in which all rates terms and conditions can be identified. Brokers must be subject to rules that are similar to those applied to financial transactions like stock sales.

States

States that have not restructured should not. At this stage of the game there are about 30 jurisdictions that have not fully committed to restructuring that should not go down this path. It is hard to justify restructuring without knowing where it would lead.

To the extent that states must move forward by legislative mandate, competition on the wholesale side, through competitive bidding, is a reasonable starting point. All states should keep control over strategic assets (generation and transmission) as long as possible, including the right to require utilities to build power plants. This is the model that was developing in the late 1980s and early 1990s but was never fully implemented.

Ensure Reserve Margins And Excess Capacity: Reserve margins and excess capacity emerge as a critically important policy issue for the states. They have traditionally had responsibility for maintaining reliability. Consumers certainly complain to their state governments when things go wrong. State policymakers will feel the heat first if prices skyrocket because supplies are too tight.

Bidders into the market must face the prospect that a substantial part of their capacity will not be called upon a significant part of the time if they bid high. Based on restructured market performance, reserve margins need to be well above traditional levels of 15 to 20 percent and perhaps as much as 30 to 40 percent to prevent the abuse of market power. State authorities should require reserve margin requirements that meet their local needs.

- In addition to the normal operating reserve that the industry has required, there must also be a competitive, or economic reserve whose primary function is to restrain pricing abuse.

- The total size of the reserve will vary depending on the nature of demand (peakiness) and supply side characteristics (concentration, cost curve).

- Energy service companies (load serving entities) should be required to demonstrate ownership, control and deliverability of supplies to meet their projected peak demand with a significant operating and economic reserve margin.

- States should not give up the authority to order entities that have the duty to keep the lights on to build power plants. The obligation to serve must be backed by an obligation to build, if the market does not demonstrate its ability to create adequate reserves.

Demand responsiveness programs could meet part of the reserve margin. Demand responsiveness programs (DRP) targeted at large industrial and commercial customers are an economically attractive way to lower demand at the peak. Industrial and large commercial load presents good prospects for both self-supply (cogeneration and distributed generation) and short-term demand reduction. The economics of self-supply are much more attractive at industrial facilities, especially where large quantities of heat are used for industrial production. Large customers are also the best targets for short-term demand reduction programs. They represent large, concentrated quantities of load, have a much greater ability to control usage, and they respond to incentives to cut back because they are purely economic actors.

Controlling Excessive Scarcity Rents and Windfall Profits: Unconcentrated markets operating over an adequate, open transmission networks, with substantial economic and operational reserves policed by a fully empowered and committed federal-state task force should check market power and also shrink scarcity rents.

State regulators should reserve the right to intervene should signs of trouble emerge. Retaining the right to order capacity additions through competitive bidding should help to prevent excessive scarcity rents. State regulators should also prevent large windfalls during the transition to competition. They should not allow existing assets to be transferred to unregulated entities.

- Generation plants, whose book values are far below their market values because they were financed with utility ratepayer dollars and under utility finance cost of capital, should remain with the regulated distribution entity to provide a base of low cost power to meet consumer needs.

- Capturing windfalls and returning them to ratepayers is a second option that controls the transfer of rents, but it exposes consumers to volatile market prices.

Dampening the Increase in the Cost of Capital: Ironically, much of the fuel price risk has already been passed to consumers through fuel adjustment clauses. In short term energy markets, the fuel price risk is entirely passed onto consumers. In those markets they are also bearing the risk of high scarcity rents and the abuse of market power (to the extent that prices are not capped).

- Long-term contracts should be used for a substantial part of utility needs. These should reflect the lower cost of longer-term financial commitments. Longer-term contracts may share fuel price risk.

Obviously, states should avoid negotiating long-term contracts from a position of weakness. Negotiating in a crisis, as in California, or after assets have been transferred with the threat of the lights going out, as in Montana, makes little sense.

States should institute competitive bidding for supply under long-term contracts long before they consider retail competition.

- To the extent regulated load serving entities (incumbent utilities in states that have not restructured or the default-distribution companies in states that have) need additional generation resources to meet new demand or to replace an existing plant as it is taken out of service, they should do so through to a competitive bidding process. The public utility commission would oversee this competitive bidding.