DEREGULATION, PHASE II

Recent electricity pricing argues for faster, more extensive deregulation.

By Sean Casten

Recent electricity price increases have prompted disparate organizations to issue self-serving declarations about whether deregulation is to blame. The Electric Power Supply Association, representing competitive power suppliers, claims market-oriented reforms have benefited consumers, while the American Public Power Association, representing municipal utilities that want to maintain their control of local markets, argues the opposite.

Fortunately, prices provide a dispassionate analysis. They illustrate that restructuring was poorly designed and badly executed, and it focused on the wrong part of the grid. An analysis of prices also suggests new directions for electricity market regulation (*see sidebar, "A Model for Reform"*).

Restructuring Started to Work

Some state officials have blamed price spikes on deregulation, giving us a readily testable proposition: Have price increases in restructured states exceeded those in states that chose not to restructure?

The National Regulatory Research Institute (NRRI) at Ohio State University has characterized the status of electric restructuring according to the map shown in Fig. 1 (*see "Restructuring in the States"*). This map provides us with two differentiable populations to compare: The states that fully restructured (as the NRRI defines the term) and the states that remained traditionally regulated.

New Hampshire, California, New York, Rhode Island, and Pennsylvania in 1996 were the first state legislatures to pass restructuring bills. However, wholesale access began in 1992 with that year's Federal Energy Policy Act. Political discussions at the state level over the next several years gave regulated utilities time to contemplate and plan for a restructured future, even before state legislation was official. Therefore, an analysis of changes in retail-power prices will focus on the period from 1992 to 2005 (the most recent year for which complete data is available). If deregulation caused prices to increase, we would expect to see a greater increase in prices in states that restructured their utility industries.

However, the data shows exactly the opposite (*see Fig. 2, "Retail Prices: Regulated vs. Restructured States, 1992-2005"*). Note first that in both regulated and restructured states, electric prices have risen at a slower rate than inflation. This is consistent with broader U.S. power trends from 1982 to 2000, where inflation-adjusted electricity costs have fallen every year. But specific to our comparison, the regulated states actually show a 30 percent greater increase in power prices than those that restructured.

This is all the more remarkable given the restructured (largely Northeastern) states long have been more dependent on natural gas than many Central and Southern states that remained regulated. Thus, price increases have been lower in the restructured states in spite of greater increases in power-plant fuel costs.

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Specifically, as of 2005, about 25 percent of all electricity generated in restructured states came from natural gas, while in regulated states only 11 percent of generation was fueled by

natural gas. The precise percentages vary from year to year, but the 2-to-1 ratio holds fairly steady throughout the 1990s.

Given volatility in energy prices, long-term trends are more meaningful than single-point comparisons. Furthermore, inflation also can show year-on-year variation (*see Fig. 3, "Inflation-Adjusted Retail Prices: Regulated vs. Restructured States"*).

Recognizing the two sets of states had different average power prices at the start of the period—and both sets were under essentially identical regulatory paradigms in 1992—an analysis of inflation-adjusted prices normalizes the data in both areas such that the region-specific 1992 power price is 100. (Thus, an electricity price of 90 indicates a 10 percent reduction, relative to the 1992 price.)

In all regions, the inflation-adjusted price of power has fallen since 1992, when the country first began restructuring the electric grid. From 1992-1997, there was little difference (on a percentage basis) between those states that ultimately restructured and those that did not—consistent with the fact that no states had yet restructured. However, in 1997, Rhode Island became the first state to implement the deregulatory proceedings approved by its Legislature the year before, and a flood of states followed shortly thereafter. And almost immediately, two things happened:

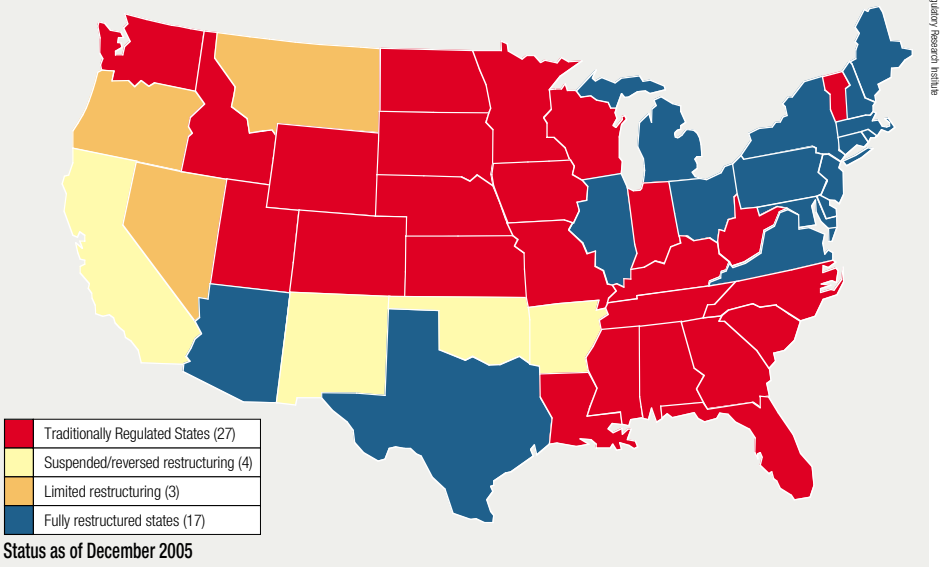
- In the restructured states, the rate of decline in real electricity prices accelerated.
- In the regulated states, the 30-year decline in real electricity prices stopped.

The resulting gap widens and only started to close in 2005, likely due to rising natural-gas prices in the more gas-intensive restructured regions. However, the fact the gap exists at all in spite of higher gas dependency in the restructured states is a remarkable testament to the power of markets. And it's exactly opposed to the popular view (although exactly in keeping with economic theory).

So what caused the prices to fall? At the state level, a lack of sufficiently detailed data makes quantifying this answer difficult. However, the unbundling of utilities likely created cash flows to regulated arms, stalling rate-case filings in wires-only utilities. At the same time, these cash flows reduced the book value of generation assets and thus wholesale-power prices—since so many of the previously regulated generators sold at fire-sale prices. Additionally, independent system operators (ISOs) likely did a better job of dispatching the lowest-cost generators than integrated utilities did, if only because of the lack of direct economic incentives to control costs in the regulated paradigm.

Moreover, at the federal level, we can obtain macro data that—while not specific to the state-level differences—illustrates the changes electricity grid managers made in response to market pressure (*see Fig. 4, "U.S. Fleet Capacity Factor by Fuel Type," and Fig. 5, "Nuclear Load Factor by State"*).

FIG. 1 RESTRUCTURING IN THE STATES



Status as of December 2005

Source: National Regulatory Research Institute

In 1990, before the wave of restructuring that passed across the country, America's nuclear fleet operated with an average capacity factor of just 66 percent. As the 1990s progressed, capacity factors on nuclear plants steadily increased, up to nearly 90 percent in 2003. Why?

The most likely conclusion is the federal opening of wholesale-power markets. In a regulated, cost-plus environment, there was no particular incentive to shorten outages at nuclear plants or speed up maintenance, even though those facilities have relatively low marginal costs. Nor is there a competitive opportunity for strong operators to purchase poorly run nuclear plants at low prices and improve the up-time.

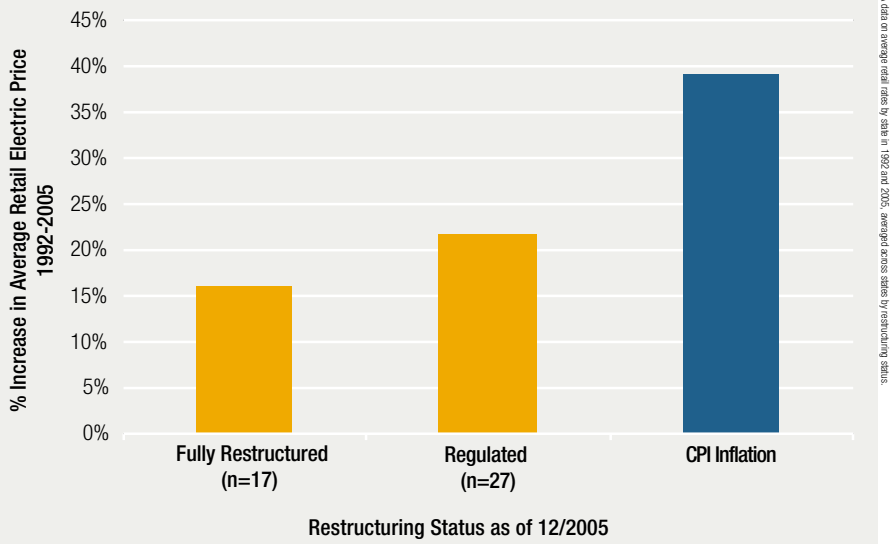
Before restructuring, fleet owners with multiple generation sources had no particular incentive to pay close attention to dispatch order, since all costs ultimately are reimbursed by ratepayers. Opening up wholesale markets favorably realigned

incentives for economic dispatch. Strong owners were given a financial incentive to run their low-cost plants longer, and weak owners found they could sell their poorly run plants to better operators.

The same is true for coal, where marginal operating costs always have been lower than for gas-fired plants. Coal owners—with new market incentives—also received a financial incentive to drive up their capacity utilization. These changes translate into direct savings at the retail level.

Note this cannot be extrapolated to explain fully the state-differentials in electric prices shown in Fig. 2. Wholesale market liberalization from the 1992 federal Energy Policy Act affected all states equally, and wholesale markets are national—or at least regional—in nature. So one cannot draw firm conclusions about state-level impacts from restructuring based on the dispatch of the fleet in a given state. However, national statistics illustrate the type of behavior that might be expected at the state level.

Fig. 2 Retail Price Changes: Regulated vs. Restructured States, 1992 - 2005



Source: DOE/EIA data on average retail rates by state in 1992 and 2005, averaged across states by restructuring status.

And so, contrary to conventional wisdom, U.S. consumers have enjoyed dramatic savings in real electricity prices as a result of state and federal deregulation. This suggests U.S. policy-makers should learn from, and expand, their hesitant first steps toward complete electricity market liberalization.

Poor Restructuring Policies

Any argument for deregulation is bound to be countered by the inevitable, "Yes, but what about California and Enron?" These questions are best addressed directly, in the spirit of learning lessons and moving forward.

Clearly, California's markets suffered from manipulation, but this can't be blamed on deregulation. Indeed, Fig. 3 shows that the backlash against deregulation that started in 2000 with the California power crisis is particularly misplaced. Power prices rose during 2000, but customers in restructured states still were better off than their neighbors in regulated states, relative to 1992 prices.

Deregulation is not the opposite of regulation, but rather is a process by which a market transitions from a socialist model of regulatory oversight, in the name of the public good, and toward a capitalist model wherein regulatory oversight is replaced with the competitive pursuit of profits for creating the public good. Alfred Kahn, former chairman of both the Federal Aviation Administration and the New York Public Service Commission, aptly observed, "Deregulation shifts the major burden of consumer protection to the competitive market, and therefore, in important measure, to the enforcement of antitrust laws."[1]

This is a fundamental insight, and one overlooked by virtually every electricity deregulatory process.

In a regulated world with government-sanctioned monopolies, the government creates vast bureaucracies to review costs and ensure regulated utilities have sufficient revenue to finance their operations, but don't abuse their monopoly position to earn unfair profits. In a competitive market, this need for oversight goes away, as long as no single firm can dominate the market.

When all companies are equal, each must strive to produce more value per dollar of cost than the others do, or risk losing market share. The quest for profits at the expense of one's competitor ultimately drives prices down, and customers win. But Adam Smith's invisible hand is shackled when one firm can control the market and use this control to gain monopoly rents at the expense of competitors and customers.

By contrast, in a regulated market the regulator focuses on cost-recovery and protecting the utility monopoly. Kahn is the rare regulator who understood this transition from both perspectives. Virtually none of the restructured states have effected this transition in regulatory oversight. No regulated utilities now find themselves subject to antitrust enforcement, and no commissions have volunteered to cede their oversight of consumer protection to antitrust authorities. Neither regulated

A Model for Reform

The experience of the past 15 years has shown even modest market liberalization reduced real electricity prices. However, the recent increase in inflation-adjusted rates suggests U.S. policymakers probably have accomplished all they can from those first, tentative deregulatory steps. This argues strongly for much bolder deregulatory moves to allow competition at the point of electricity consumption.

The United States has massive opportunities for further deployment of local generation that is vastly cheaper and more fuel efficient than the central grid. The EPA has identified 65 GW of potential power generation[1] capacity from presently wasted energy—all of which could generate power with zero marginal fuel cost or emissions. The DOE has identified another 135 GW of combined heat and power[2] potential that would require additional fuel consumption, but still would be at least twice as efficient as the central grid. In total, these two opportunities alone could reduce carbon emissions associated with power generation by over 40 percent and reduce electricity prices.

With this potential in mind, here is a simple path toward true—and fair—market liberalization:

1. First do no harm. Do not roll back current deregulation, but recognize its limitations.

2. Overhaul existing ISO market-pricing models to allow bilateral contracts between generators and consumers. Some customers need base-load power, some need peak power, and many need both. Customers should be able to procure these separately from specific generators rather than simply paying a blended wholesale price set by ISO markets.

3. Deregulate local power markets. Electricity always flows to the nearest user, but current retail markets set prices for exported power (under PURPA) upstream of the transmission and distribution system, effectively presuming the grid is free. In other words, the utility charges ratepayers the full cost of transmission and distribution, even if the PURPA-generation source is next door. No economically rational reason justifies a utility company charging consumers 10 cents for a kilowatt-hour of electricity and paying only 3 cents for the same kilowatt-hour sold back to it. Instead, regulators should set price signals that will incentivize full participation with the following changes:

a. Remove the prohibition on private wires. A local generator should be able to sell excess power to neighboring consumers without having to go through a single company's distribution network. The current failure in all 50 states to allow electricity distribution by unregulated businesses props up monopoly rents at regulated utilities and prevents the deployment of more efficient generation.

b. Set prices for all discrete elements of the utility grid, and structure markets for those elements such that smaller users are not economically precluded from participation. ISO-New England has been a leader in this regard in its forward capacity market, which gives electric consumers a financial incentive to reduce their load based on the direct value realized by not delivering more expensive upstream peak power. Many other ancillary services—from power factor correction to voltage stabilization—can be provided by local generation, but those generators will not be built if they are paid nothing for these services.

c. Remove all size and technology caps on net metering. A kilowatt-hour from a small generator provides no more value than one from a large generator, yet net-metering rules today all limit participation to the smallest sources.

4. Remove the profit incentive, billing, and metering functions from the regulated (wires) utility. Distribution utilities have done an exceptional job building, maintaining, and operating the electric grid. They have done a horrific job at incentivizing economically responsible dispatch, especially of generation beyond their control. As long as regulated utilities own meters and billing functions, they will have a financial interest to block the deployment of load-sited generation. Many have tried to blunt this incentive through demand-side management programs or decoupling, but all these approaches leave intact the innate conflict between shareholders and customers of any for-profit monopoly. If distribution utilities are natural monopolies, then logical consistency requires they be regulated as toll-collectors rather than for-profit companies. They certainly need sufficient revenue to cover their costs, but a profit motive serves no more public good for a wires monopoly than it would for a local police department.

5. Restructure utility regulatory agencies to shift their focus from consumer protection to antitrust enforcement. This refocusing is critical to ensure no existing or emerging company is able to dominate the electricity market at the expense of the public interest.—***SC***

Endnotes

1. Bailey, Owen and Worrell, Enrst, *Clean Energy Technologies: A Preliminary Inventory of the Potential for Electricity Generation*, Lawrence Berkeley National Laboratory, April 2005. Note: This report identifies 96 GW of total potential, but some of this total includes fueled cogeneration applications.
2. Hedman, Bruce, *Combined Heat & Power and Heat Recovery as Energy Efficiency Options,* Briefing to Senate Renewable Energy Caucus, Sept. 10, 2007; Energy and Environmental Analysis/USCHPA, Washington D.C.

entities nor regulators have any economic or political incentive to make this transition—and California illustrates the result.

On the one hand, companies such as Enron manipulated the market, using their market clout to withhold electricity and drive up the price. An antitrust enforcer should have—per Kahn—been on the watch for precisely such behavior, and yet such a regulatory body did not exist. When Enron later claimed it hadn't really broken any laws, it was not entirely

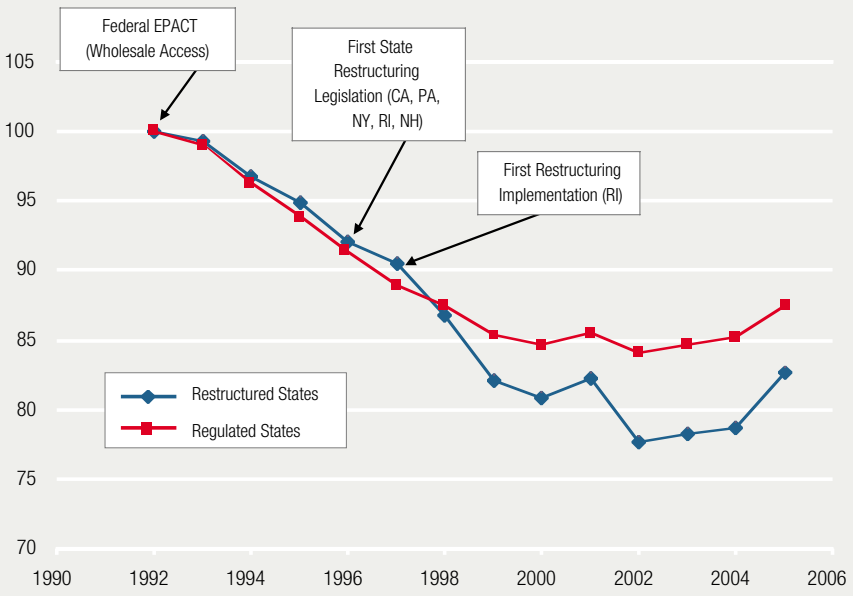
wrong. Its behaviors may have been unethical, but some degree of culpability must lie at the doorstep of regulators who failed to establish the necessary antitrust oversight.

However, the other side of this flawed deregulation—overemphasis on consumer protection—is less visible, and perhaps more damaging. A pair of well-known industry bankruptcies illustrates this.

When (unregulated) Calpine filed for bankruptcy, the company was weighed down by $17 billion in debt. Popular media touted the resulting loss in shareholder value as an example of why deregulation failed. Conversely, when (regulated) PG&E declared bankruptcy, its costs (now approaching $16 billion) were borne by California's ratepayers in the name of the public interest—and the popular media cited the need for a public bailout as an example of why deregulation didn't work.

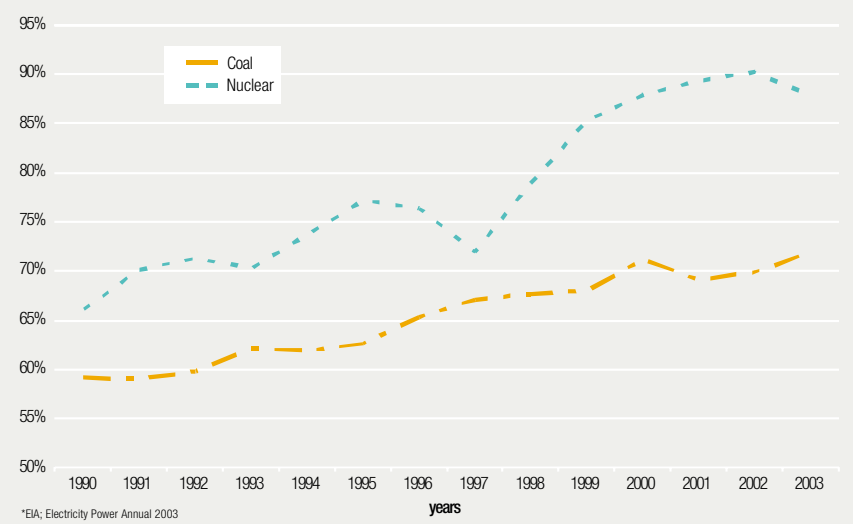
Clearly, both assertions cannot be correct. A hallmark of a functioning market is not only the ability to succeed, but also the transfer of the risk of failure to shareholders. In the case of Calpine, this exposure was clear—but in the case of PG&E, regulators imposed that risk on the public rather than jeopardize the utility's shareholders. California's experience might be extreme, but it isn't unique. All restructured states have limited the scope of deregulation and largely left their weakened utility commissions responsible for market oversight, in spite of their reduced span of control. Both serve to confuse the distinction between antitrust enforcement and consumer protection, and therefore limit the ability of markets to reduce consumer prices.

FIG. 3 INFLATION-ADJUSTED RETAIL ELECTRIC PRICES IN REGULATED AND RESTRUCTURED STATES



Source: EIA and author

FIG. 4 U.S. FLEET CAPACITY FACTOR, BY FUEL TYPE



Source: U.S. DOE/EIA data on fleet nameplate capacity and annual MWh generation by fuel type.

Restructuring Misdirected

The final consideration is most important, both to recognize the limits of past deregulatory processes and the biggest opportunities for further liberalization. The approach taken by those states that did restructure excluded the largest opportunities to reduce the cost of electricity. To understand why, consider the following.

- **Thermodynamic Fact 1:** In any fueled power plant, the majority of the fuel is converted into heat (rather than electricity).
- **Economic Fact 1:** Transmitting electricity costs less than transmitting heat.
- **Economic Fact 2:** Notwithstanding Economic Fact 1, the single biggest capital cost of the electric system is the grid itself.

Taken together, these facts mean that in all grids, the cheapest generation to build and operate will be that sited at or near the electric load, for rather straightforward reasons. Namely, such local generation can economically recover and sell its inevitable waste heat, thereby achieving two to three times the efficiency

of central power. Second, according to FERC data, the average transmission and distribution network costs $1,300/kW of peak capacity, plus additional factors for line losses (7 to 10 percent) and reserve-margin requirements, driving costs to nearly $1,700/kW.

Local generation not only avoids the need for much of this upstream infrastructure, but also makes the existing infrastructure more efficient by reducing line losses and adding more nodes, reducing reserve-margin requirements.

Even more dramatically, these load-sited investments tend to be smaller, and the overwhelming majority of them historically have been made by unregulated entities.[2] Thus, ratepayers don't bear the risks of their failure.

Nevertheless, these opportunities for cheaper electricity are not allowed to capture most of the benefits they create.

Siting generation at the load creates numerous benefits in deferred upstream investment, greater grid reliability and local economic growth—in addition to the environmental benefits associated with greater energy efficiency. With the exception of avoided retail-power purchases, the majority of these benefits cannot be realized directly by on-site energy projects due to the lack of market mechanisms available to unregulated generators. Moreover, such projects often are blocked or made needlessly expensive by obsolete regulations and other barriers to economic efficiency. Examples include discriminatory interconnection standards, standby rates, and the inability to gain market access at a fair price.

To obtain deeper savings beyond those earned to date, society must deregulate the downstream elements of the grid that have the most potential to lower the total cost of electricity.

Indeed, beyond the savings associated with fuel-switching and dispatch order, very little of remaining potential savings from deregulation can be achieved if limited to upstream,

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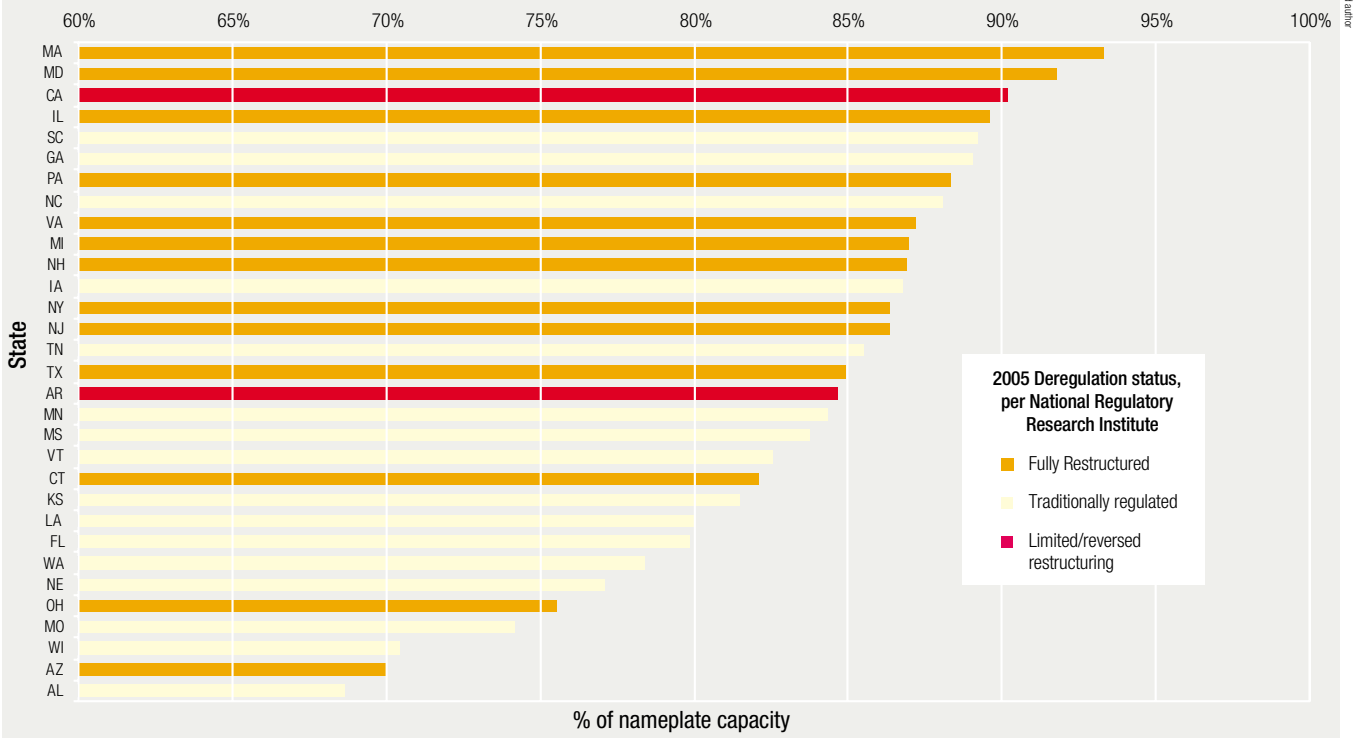
Fig. 5 **Nuclear Load Factor by State (2005)**



Source: EIA and author

wholesale markets. And we have very nearly exhausted the potential of those two strategies, as Fig. 4 illustrates.

Arguably "retail competition" exists, but the term is a canard, since this competition simply allows different players to buy upstream electricity and sell it to retail customers. No jurisdictions have provided grid access or fair pricing to generation sited at the load, and retail competition therefore simply is a way to give wholesale actors access to retail customers. The fundamental limitation of this approach is that it fails to contemplate a grid architecture that is different from the (too expensive, too inefficient) central paradigm.

Society now faces massive electric rate increases as new transmission and generation investments are added to utilities' rate base. Additionally, the U.S. grid has tapped out its ability to increase the uptime for coal and nuclear plants. As a result, most growth in future electricity consumption will be served by new, expensive coal or nuclear generation—or else increased operation of the existing expensive gas fleet.

Concurrent with the increase in coal and nuclear load factors has been a corresponding reduction in the load factor of the gas fleet, from 20 percent to 30 percent to less than 15 percent. Thus, while most added power capacity has been gas-fired, much of the new generation on a gigawatt-hour basis has been from coal and nuclear plants. Gas-fired plants could be run much harder—and new ones could be built—but only at the expense of much higher electric rates given their higher fuel costs.

Meanwhile, the urgent need to reduce carbon emissions seems certain to place a huge added cost on all centrally generated power, due to its inherently limited energy efficiency. This is not the time to blame deregulation, especially when it has been so successful at blunting the failure of the regulated states to keep their power costs down since 1996. Instead, the time has come to stop looking for scapegoats, and to start applying the proven power of competitive markets to ensure future reductions in electricity costs.

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Endnotes

1. Kahn, Alfred E., *Lessons from Deregulation: Telecommunications and Airlines After the Crunch*, AEI-Brookings Joint Center for Regulatory Studies, Washington D.C., 2004.
2. As of 2004, the U.S. Combined Heat and Power Association had identified 80,905 MW of combined heat and power plants in the United States, spread across 2,845 local installations. Of this total, just 2,200 MW (75 installations) were owned by regulated utilities.