**Testimony of Robert McCullough**

**Before the Subcommittee on Energy and Air Quality**

**Wednesday, February 13, 2002**[1]

Thank you for your invitation to testify.

Six words characterize the California market since April Fool's Day, 1998 – "bad design, bad incentives, bad results". The market was overly complex, checks and balances were absent, information (except to suppliers) was virtually non-existent, and market concentration was very high. This is an expert's list of the factors that lead to market failure.

Enron had a strong role in this market. Enron also had a central role in designing this market. Since Enron's accounting practices have failed any sensible business ethics test, the question we will have to wrestle with in days to come is whether the ethical problems we have seen at LJM and Whitewing will surface in its commercial transactions as well.

It seems very likely that Enron had the ability to affect prices in California. This is not an indictment of free enterprise. Market power is a continuing problem in competitive markets. In California we do not have ready access to market information as we do in other markets. What little we know makes a careful review of Enron's role very necessary.

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[1]Special thanks to Ann Stewart assistant director of the Harvard Electricity Policy Group and James Harding of Seattle City Light, City of Seattle for detailed comments and input.

**A Brief Overview**

Market based pricing for short term markets started in 1980 on the West Coast. This was the first time we had seen an open, competitive market in the electric industry. We weren't entirely pleased. The Bonneville Power Administration averages a "non-firm" surplus of nearly 3,000 average megawatts on a yearly basis.[2] Traditionally BPA had allocated this surplus among its customers.

After the passage of the Pacific Northwest Electric Power Planning and Conservation Power Act of 1980, with its complex rate provisions, BPA decided to market this power on a monthly basis. A number of BPA customers actually litigated against this decision, but the Ninth Circuit found in favor of BPA's discretion.

After the first two years of this arrangement, other Pacific Northwest utilities began to appreciate the benefits of an open market. For example, we introduced the first commodity/electric derivative in 1982 and 1983, in part because access to the new market gave us new choices. Known in the markets as "variable rates" this is now the standard approach across the world for energy-intensive industrial customers

California utilities hated the idea since prices tended towards the running cost of the highest cost unit

[2]Non-firm and secondary are terms of art in the Pacific Northwest that mean firm power that may not be available during the following year if a drought occurs. Electric utilities are not allowed to use "non-firm" power in their planning to meet system peaks.

along I-5 as opposed to the extremely low embedded cost of the Columbia River dams.[3] After a number of cases before FERC, the WSPP (Western Systems Power Pool) experiment was put in place in 1987. This allowed members of the WSPP to buy and sell short term energy without FERC cost based regulation. In 1991, market based pricing for short term sales became permanent.

By this time we had established a competitive market in energy across the WSCC. The market was open – any buyer and any seller could enter and exit the market at will. California's barriers to market entry – rules and regulations that made participation difficult – were years in the future.

Data from this period is not hard to find, but since there was no centralized reporting, it tends to be taken from the books of the individual utilities rather than a central source. Commodity/electric derivatives and spot pricing contracts were common and this provides much of the data on the monthly spot markets. Because of the vast ability of the Columbia River to factor off-peak energy, the real time markets were not (and still aren't) terribly important.[4]

Almost all transactions in the market were monthly. This is still the case today. Short term transactions tended to reflect special operating issues – plant outages and load spikes. Longer term transactions were common, but these tend to reflect alternatives to resource purchases. Due to a peculiarity in BPA's enabling legislation, five years was a logical time horizon for forward

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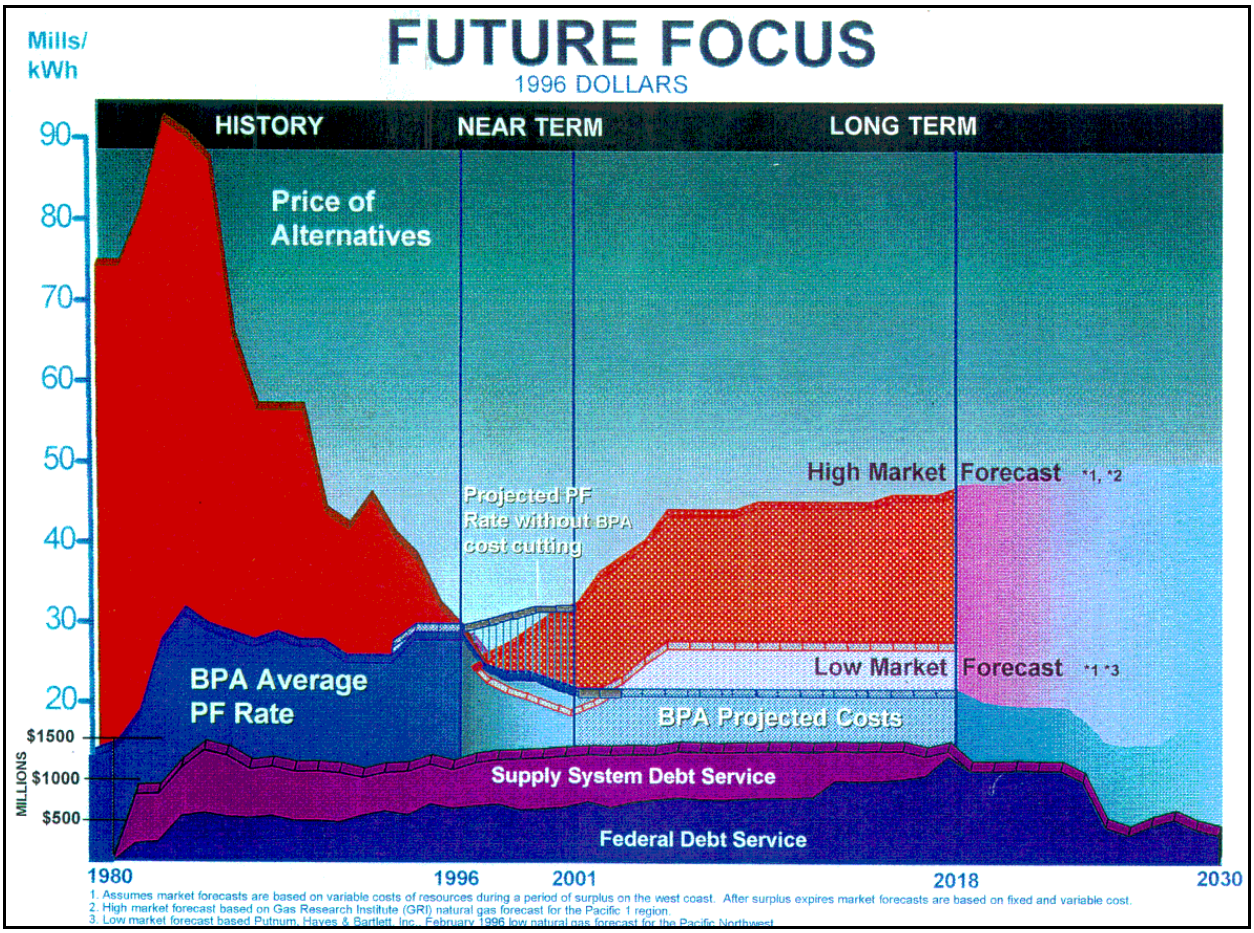
[3]The geography of the West Coast is divided into the "west side" – the major cities from Vancouver, British Columbia to San Diego – and the "east side" – the utilities nestled into the Rockies. For transmission reasons, the I-5 corridor is the most integrated. The reliability of the western half of North America is in the hands of the Western Systems Coordinating Council (WSCC). Market participants often use WSCC as a shorthand way of describing the market from Edmonton to Tijuana.

[4]One of the ironies of the failed California centralized market experiment is that it concentrated on a part of the market that might never have gained prominence without California's disastrous prohibitions on forward markets.

transactions.[5] We have little organized data on long term costs. Bonneville's often issued "future focus" diagram gives a sense of the overall firm costs since 1980.




From 1980 through 1996, long term prices fell from $75 per megawatt-hour to $18. In the late 1990s, BPA frequently expressed its concern that market competition might expose it to bankruptcy. By comparison, a five year transaction today will cost a wholesale customer $28 per megawatt-hour.

[5]BPA must include a "pullback" condition in its long term contracts for sales outside the Pacific Northwest. While there are exceptions to this rule, it tended to make the five year duration a logical choice in the market.

One year ago, the same transaction would have cost a customer $80 to $100 per megawatt-hour.[6]

The wholesale market was surprisingly stable before May 2000. In spite of three major droughts, fossil fuel price spikes, and true resource shortages in the early 1980s, prices reflected the operating cost of the least efficient unit currently operating. In the past twenty two years, this rule was only violated from May 2000 to June 2001.

West Coast markets reached their greatest level of competition in 1996 and 1997. At that time there were more than twenty active competitors. Today, by comparison, there are usually very few players in the long term market. In the absence of PG&E and SCE, California is only represented by Sempra. Enron was present until its bankruptcy and Morgan Stanley, Calpine, El Paso, and Aquila continue to be active. Many Pacific Northwest utilities have dropped out of the market. Idaho Power and Powerex are still active, but Powerex is very cautious and requires board approval to make deals. On the Canadian side of the market, Edmonton and TransAlta have largely dropped out as well.

Long term transactions have tended to be complex in an effort to capture transmission and operating advantages. The PX/ISO structure discourages that level of optimization. More importantly, the winter of 2000-2001 led to the ISO breaking most of the interregional agreements on "operational emergency" grounds. Overall, the choices available to ultimate consumers like utilities and industries have diminished markedly.

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[6]Newcomers to these markets often confuse current events – weather and streamflows – with long term prices. Since weather, streamflows, and plant outages are unknown and unknowable for future years, prices reflect fundamental conditions of supply and demand as opposed to current events.

**California's Market Experiment – "Bad Design"**

Prices increased almost immediately after the California experiment started. One reason was the elimination of the buying power of Pacific Gas and Electric. Prior to that time, PG&E's enormous buying power allowed it to dictate prices to the market for much of the year. Since it was a net buyer, it negotiated ferociously to keep wholesale prices as low as possible.

Another reason was the enormous complexity of the California market. Enron was a major participant in the process that created two state agencies – the Independent System Operator and the Power Exchange – to run the market. While Enron's involvement in the CPUC process and the negotiations leading to the passage of AB-1890 was significant, it was just one of many groups that maneuvered for advantage in this byzantine process.[7]

While this observation is unpopular with the proponents of "market design", the sheer complexity of the California market (and equally complex institutions elsewhere) discouraged suppliers from entering. As late as a year ago, a confidential ISO report (posted on its web site) noted that even PG&E was unable to understand ISO operations. Many utilities and marketers elsewhere in the WSCC were in the same boat. Participation in the ISO requires a detailed knowledge of hundreds of thousands of pages of rules, regulations, protocols, studies, directives, investigations, and committee reports. Literally, thousands of individuals either work at the ISO or are committed to its "stakeholder processes" on a daily basis. Even large utilities have found the resource

[7]Enron's central role in the CPUC hearings, passage of AB-1890, and the prolonged implementation process has been carefully detailed by Eric Woychik in "Enron -- "Leader of the Pac" in California", February 6, 2002.

commitment to enter this market daunting.[8]

On April 1,1998, the new California market was launched. One unforeseen side effect of the rules was the complete irrelevance of the retail side – the original goal of the entire process. Enron, although initially aggressive in the retail market, dropped out after just a few months. This decision proved clairvoyant since the difference between market prices and retail price was one of the most catastrophic features of the California crisis for entities trying to serve retail load.

May 22, 2000 was the beginning of the California crisis. Everyone has heard the slogan that "California hadn't built a plant in ten years while rapid load growth had taken place." Enron's representatives have repeated this refrain throughout the entire debate concerning the California crisis. This slogan was audacious in its mendacity.

In reality, the industry was in better load/resource condition in the summer of 2000 than it had been in some time. Peak loads were lower and total resources were higher than in previous years. The following chart shows actual reserve margins in the WSCC from 1992 to the present.[9]

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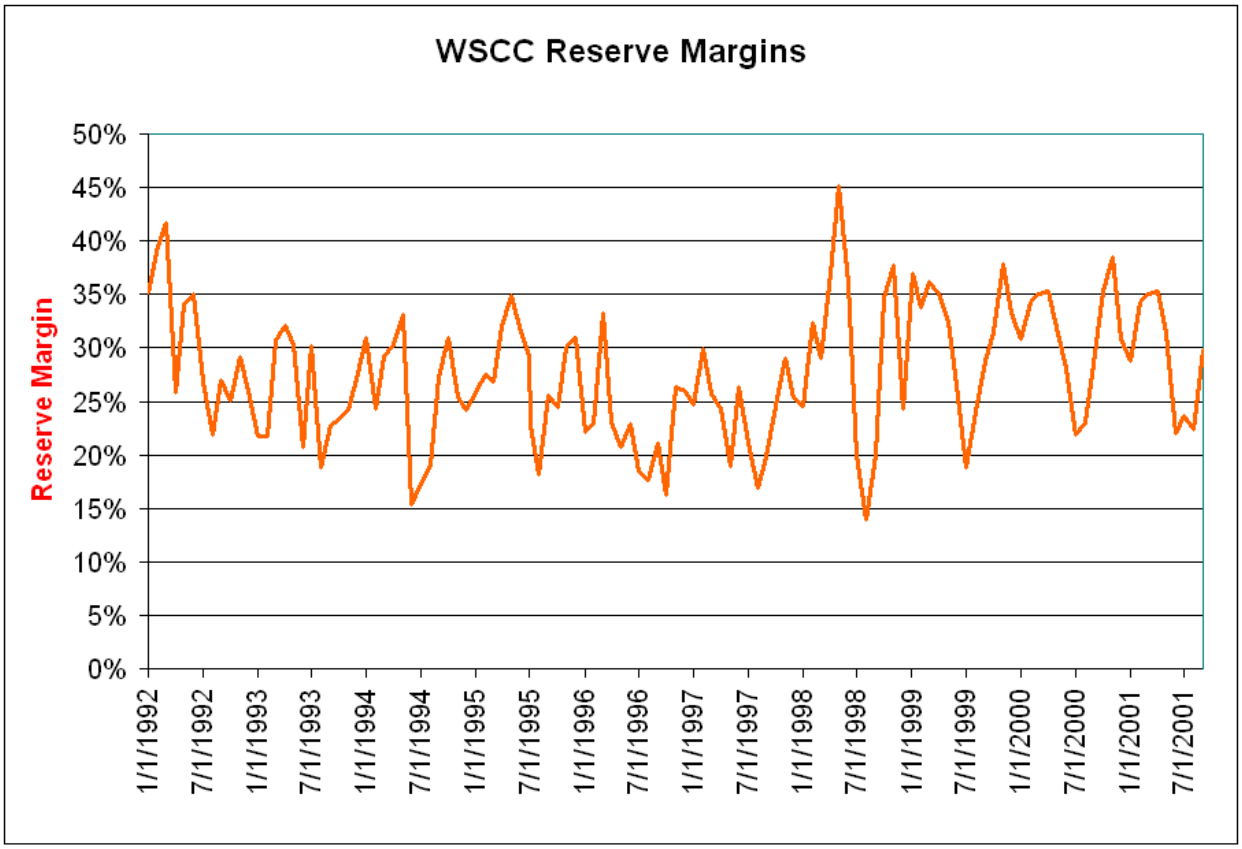
[8]Paula Green, power manager of Seattle City Light, has estimated that contract administration costs in California were as high as 10% of the total energy cost.

[9]WSCC Coordinated Plan Summaries from 1993 through 2000. Monthly data for 2001 are a forecast from the 2000 Coordinated Plan since this data has not yet been released by the WSCC.




The reserve margin is the ratio between electric resources and peak loads. Like the ratio between snacks and hungry teenagers, the reserve margin is better when it is high. Industry practice is to keep the reserve margin above 15%. As the chart shows, reserve margins in the WSCC reached as low as 15% in 1994 and actually crossed this line in 1998. Columbia River runoffs were 20% lower in 1994 than they were in 2000.

The source of this data is the Western Systems Coordinating Council yearly reports summarizing the past year and the upcoming decade. The WSCC provides these reports because it is responsible for preparing the authoritative load resource balance for the western half of the continent – Canada, U.S., and Mexico – in order to ensure electric reliability. They have been preparing these studies for

the past 35 years.

The chart illustrates a simple truth. The WSCC's load resource balance was better (more snacks than teenagers) in 2000 than it had been since 1993. A large part of this was the low peak loads that occurred in California that year. Peak California loads in the ISO's control area in 2000 were the lowest since 1997.[10]

When faced with this data, proponents of the resource shortage theory usually fall back on two secondary explanations. First, the crisis in California was caused by the drought in the Pacific Northwest, and second, that environmental authorities forbade plant operations. While there is a little more truth to these arguments than the resource shortage argument, they turn out to be very, very weak. While the Pacific Northwest did have roughly normal water in 2000, the severe drought actually occurred in 2001. The worst of the drought occurred <u>after</u> price controls had gone into effect and prices – both short and long term – had fallen to historical competitive levels.[11] The environmental argument blames low plant operations on local environmental rules. In fact, the environmental authorities granted exceptions, changed market rules, and accelerated permits. The comments of two of the most important districts, L.A. and San Diego's, on February 6, 2001 used

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[10]Historical Coincident Peak Demand and Operating Reserve, California Energy Commission, December 7, 2000, page 1:

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|---|---|
| 1997 | 44,059 |
| 1998 | 44,406 |
| 1999 | 45,884 |
| 2000 | 43,784 |

[11]Hydroelectric generation in the 3rd quarter of 2001 was only 74% of hydroelectric generation the year before. In spite of the low hydro in the summer of 2001, prices returned to normal.

very blunt language to describe the value of the generators' claims.[12]

**Market Failure – "Bad Incentives"**

A simpler explanation lies ready to hand. Starting in 2000, the WSCC had established a database showing the hourly plant operations of many of the plants on the West Coast. The California ISO provided plant data to the WSCC which, in turn, provided it to any interested WSCC member. While secrecy of operating data is a cornerstone of the California market design, the practice of secrecy at the ISO was unusual. The ISO provided this secret data in contravention of its FERC filed tariff throughout the summer and fall of 2000.[13] Any market participant equipped with this data would be able to easily adjust their operations to accentuate the California ISO's problems during an hour when demand was high. Curiously, Portland General Electric, Enron's subsidiary, did not contribute data to the database. Enron had access to the data of others, but did not welcome access to its own plant operations.

The California ISO has provided numerous charts that show that as its system approached peak, supplies offered to the California PX would begin to drop off. The resulting deficit would become an operating problem at the ISO. Once emergency conditions were declared, prices would skyrocket and supplies would reappear.

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[12]February 6, 2001 letters by Barry Wallerstein (SCAQMD) and Richard Smith (San Diego APCD). Mr. Wallerstein's letter includes the phrase "[t]hese statements by AES are completely false and call into question AES' motivation in this matter."

[13]California ISO Information Availability Policy, originally dated October 22, 1998, modified November 1, 2001.

Documenting this was not easy. During the first part of the crisis, the generators' representative was the Chairman of the ISO board. ISO market surveillance was rudimentary and timid. Generators' lobbying at the WSCC made access of the operating data to non-market participants slow and controversial.

Ironically, the hourly data is public outside of California – even today – as part of the EPA's emissions database. Unfortunately for the ratepayers in California, access to this data is usually delayed from three to five months.[14]

The following chart shows the monthly operations of the units owned by Duke, Dynegy, Southern, Reliant, and AES over this period. While plant operations in the rest of WSCC reached 100%, plant operations for the groups who have primarily profited from the crisis averaged 50.3% from May 2000-June 2001. Interestingly, plant operations were actually slightly higher for the three months that followed price controls, even though market prices were significantly lower.[15]

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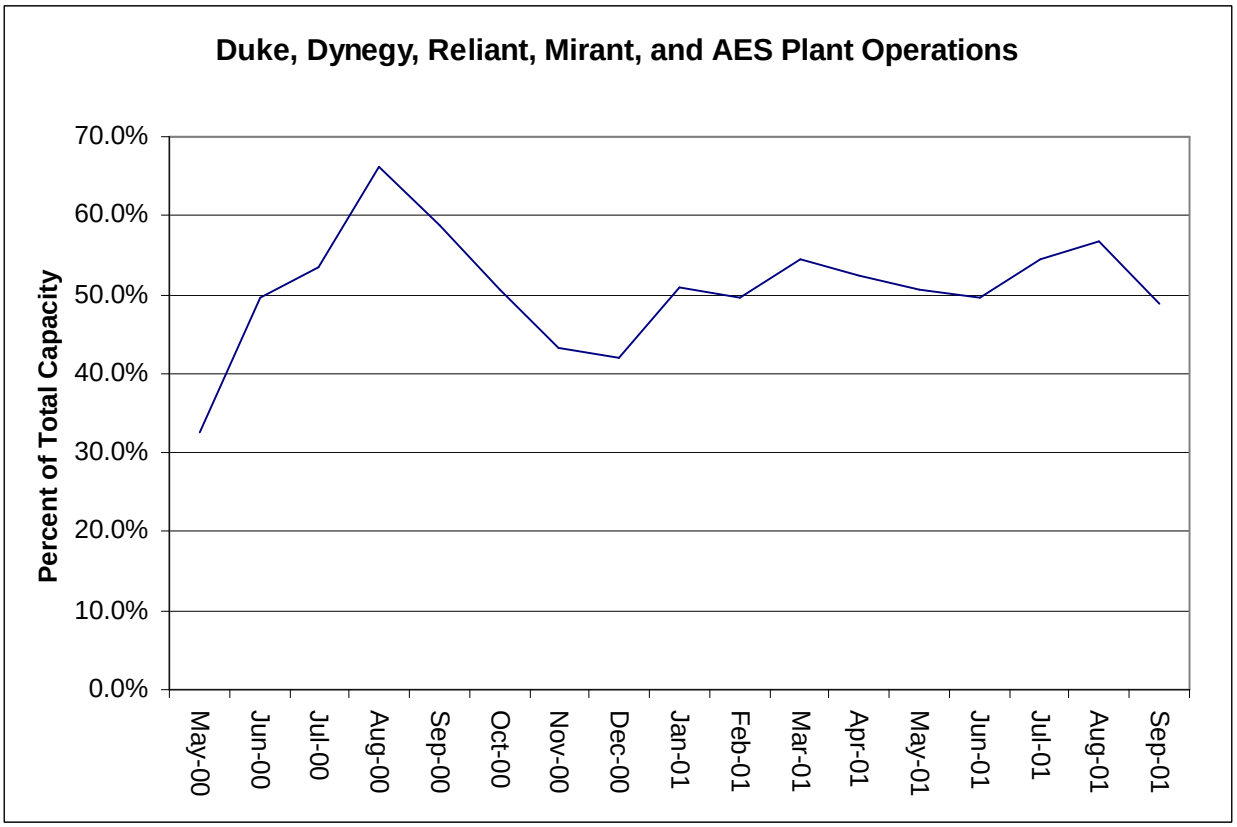
[14]One of our first roles in the summer of 2000 included providing this "secret" information back to policy and regulatory agencies in California after it had been supplied to the Oregon Public Utilities Commission.

[15]This chart was based on data provided by the EIA. The EIA has faced substantial pressure to reduce the amount of such data available to public, as has FERC, the WSCC, and the North American Electric Reliability Council.




We have been unable to explain the hourly operations of these five generators even after enormous effort. Frequently, plants went undispatched during system peaks and even during ISO declared emergencies. Whistleblowers from the plant operations staff have indicated that their directions from management were inexplicable. Operations at plants outside of California have shown none of these problems. In fact, outside of the plants in the chart above, operations have been as close to 100% of capacity as the owners could reach.

From November until the onset of price controls, the five generators reported massive plant outages. The ISO did not reliably solicit or record plant outage data until 2001, so it is difficult to compare the outages in November 2000-May 2001 with previous years for the same plants. Detailed

historical data on the performance of similar plants – by age, size, technology, and fuel – are accumulated by the North American Electric Reliability Council. Its data shows vastly lower outage rates on similar equipment.[16]

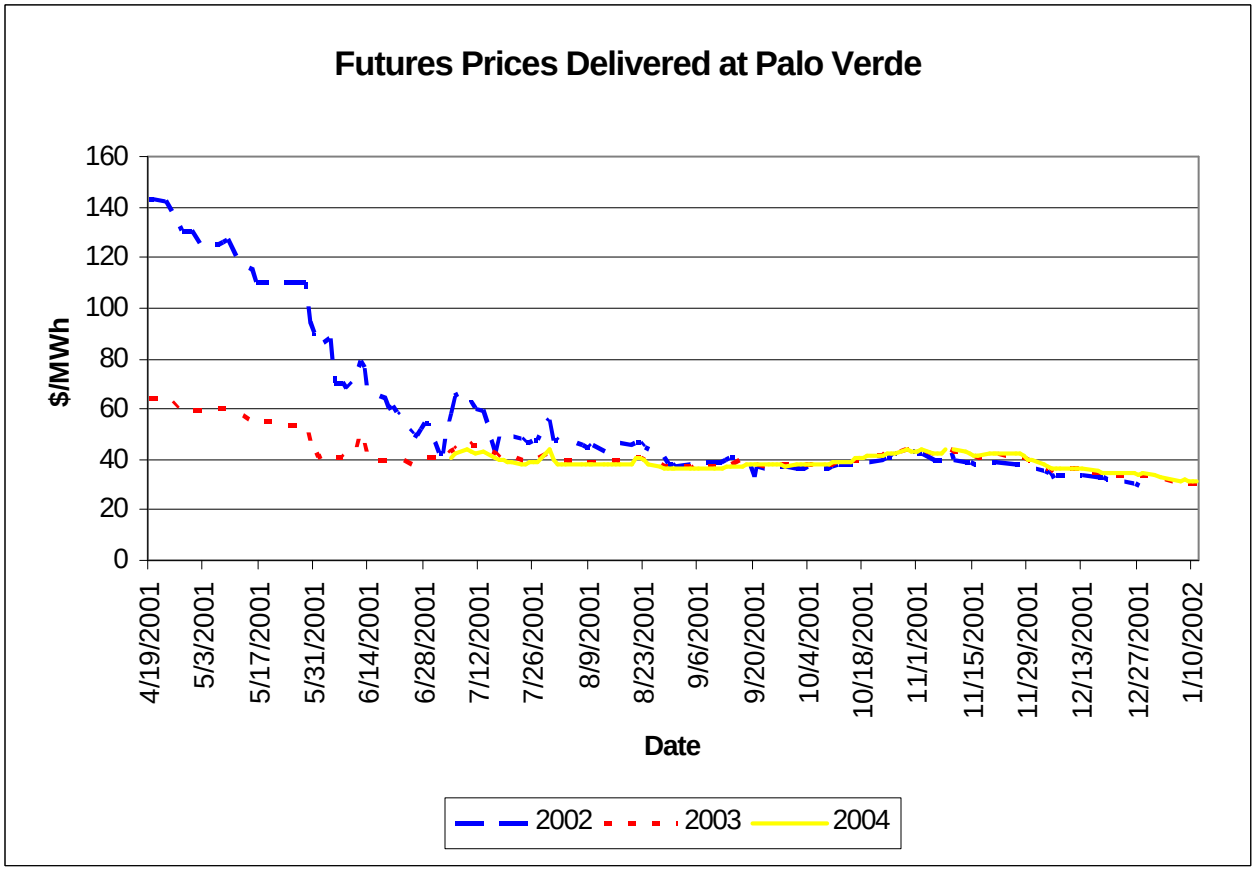
**Implementation of Price Caps – Correcting "Bad Results"**

While predictions of widespread blackouts were common through the spring of 2001, FERC's decision to implement a WSCC wide price cap appears to have had a significant impact on plant outages, short term prices, and long term prices in the late spring. As always, shifts in long term prices are the most interesting, since they are not affected by weather or other operating problems.

The onset of price caps in June led to the larger of the West Coast's two long term price reductions in 2001.

[16]NERC's Generation Availability Data System (GADS) can be used to review the history for any type of plant. It is available on NERC's web site.

The success of the price caps can be seen immediately. The presence of a counterweight to California's fragile power markets almost immediately returned long term prices to the levels we have seen for the past twenty years. As FERC's recent report notes " the average price (both simple




and weighted) at which the Western utilities sold power in the daily spot market was significantly below the price cap of $92/MWh."[17] This is quite an understatement – by the end of June, prices had fallen to $43/MWh at Palo Verde.

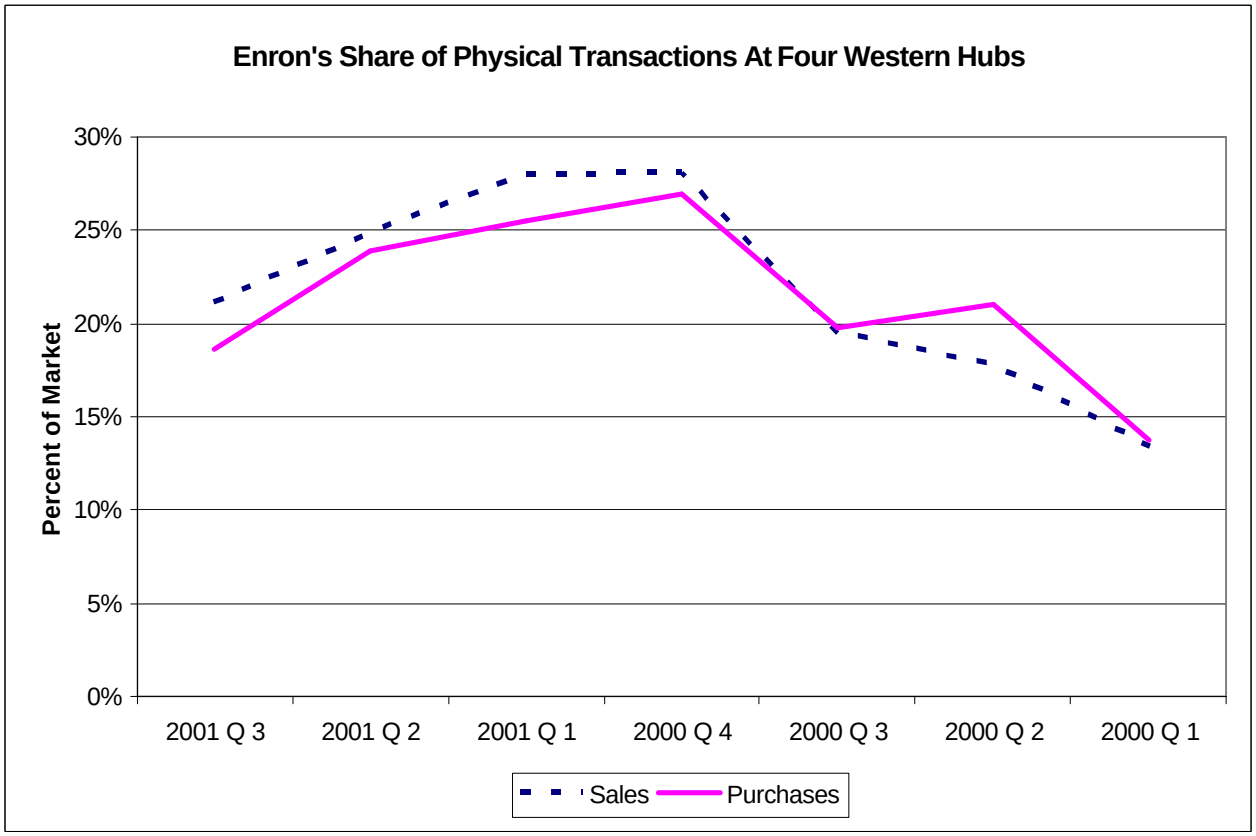
[17]The Economic Impacts on Western Utilities and Ratepayers of Price Caps on Spot Market Sales, January 31, 2002, page 4.

While price caps are unlikely to work in a competitive market, the California market was hardly competitive. The incentives under AB-1890 rewarded shortages. Once the ISO entered an emergency, it offered prices five to thirty times higher than normal levels for emergency supplies. Once FERC eliminated the ISO's ability to pay such distorted prices, generators in California were rewarded by producing more rather than less electricity. All of the data indicates that once the incentives were repaired, plant operations improved and prices fell.

**Enron's Role in the Market**

Clearly, enormous concentration in California markets was required for this to take place. FERC does not accumulate the data necessary to show the degree of concentration on a systematic basis. FERC does require energy marketers to file quarterly reports. Enforcement of this provision is weak. Some marketers fail to file their reports. Others file their reports in illegible or illogical formats. Still others, like Enron, do not specify any detail on the hubs where they bought and sold electricity.

The following chart shows Enron's share of the major California hubs over time. The data used to generate this chart was taken from sales and purchases of major Enron trading partners who do show where Enron's transactions take place.




This chart matches our detailed research on Enron's trading activities.[18] Enron's market share – for both sales and purchases – increased dramatically in 2000. By the fourth quarter of 2000, the evidence from FERC's quarterly marketing reports indicated that their sales were nearly 30% of the market. As Enron entered 2001, the growth of their wholesale operations appears to have stalled. Overall statistics indicate that Enron's physical sales declined after 4th quarter 2000.

In almost any other commodity market a 30% market share is clearly sufficient to exercise price leadership. Pacific Gas and Electric's share of California wholesale markets before April 1, 1998 was similar and their ability to use their scale to affect prices had long been observed.

[18]Deconstructing Enron's Collapse, January 10, 2002.

Enron's sales directly to the California ISO were not large. Enron's sales at the hubs were vastly greater than their sales to the ISO. This simply reflects the fact the market leader need not show up in every transaction. Price leadership sets the prices for all participants. Each transaction would reflect the price leader's price even though the price leader only had 30% of the market.

Do we know whether Enron exercised its market power in an attempt to increase prices during the market crisis that occurred between May 2000 and June 2001? No.

Publicly available data simply isn't that detailed. And while the California ISO continues to restrict availability of such data through its aggressive use of confidentiality agreements, the public debate will not become much clearer. The irony of the situation is that the ISO, the victim, has restricted market information to the market participants since they must have access to participate in the FERC refund cases and ongoing litigation, but has taken the same data out of the hands of the public, the press, and policy makers.

As it turns out, we are not obligated to prove that hourly prices in California aren't just and reasonable. FERC has already made that finding and has a proceeding underway to determine the refunds necessary to correct the situation.

If arrogance is a clue, Enron's behavior during this period was legendary. During one transaction we were involved in, a junior Enron trader simply hung up on a senior executive of a Fortune 500 company because he would not move fast enough. This is market power with a vengeance.

**Enron's Long Term Price Leadership**

Our research into Enron's financial and accounting arrangements indicates that it was probably more interested in forward markets than spot markets. The pervasive use of mark-to-market revenue and earnings estimates would reward Enron for exercising price leadership in forward markets. As one trader said to the Chicago Tribune, "We would go further out on the futures contracts than anybody else would. ... So you could pretty much make up your own numbers".[19]

The decline in forward markets that took place when Enron declared bankruptcy provides some evidence that they did have price leadership in forward markets. While Enron was not a seller to California in Governor Davis' long term contracts signed in the first quarter of 2001, Enron did have a major share in long term markets. Snohomish PUD, the Bonneville Power Administration, Sierra Pacific, and Palo Alto have all indicated that they had made significant purchases in the forward markets from Enron. Snohomish and Palo Alto have cancelled their purchases, citing credit language in the contracts. Sierra Pacific has asked FERC to review their contracts under its authority to determine just and reasonable prices. Bonneville has not taken any steps so far to revisit these out-of-market contracts.

FERC has indicated that it will review Enron's impacts on the forward markets. Clearly, FERC's role as a regulator should include review long term purchases as well as short term purchases. The question of whether these long term prices were just and reasonable is easily addressed. Long term

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[19] "Huge bets paved way to Enron's downfall", Flynn McRoberts and Melita Marie Garza, Chicago Tribune, 1/31/2002.

prices aren't just and reasonable if they bear no relationship to the cost of constructing new electric generating plants.

Many of the long term contracts signed during the California market failure from May 2000-June 2001 were considerably more expensive than any conceivable new plant. These contracts need a careful review under the just and reasonable standard. To the degree that the pricing of these contracts was based on the short term markets, this determination has already been made in FERC's existing orders.

In sum, Enron was a major player in California markets. If their market share was as high as 30%, their ability to affect prices is not in question. We don't yet know what share of the more robust long term market Enron had. This will only become clear when FERC accumulates data from the region's utilities concerning their long term purchases. At that time, FERC will be able to determine market share and discover just what caused these contracts to depart from the "just and reasonable" standard.

**A Petition For Transparency**

It is worth remembering that concern over market power is not an indictment of free enterprise. The nature of any competitive market is that it can become a victim of market power. The prosecution of Archer-Daniels-Midland in 1996 for anti-trust was not a signal to adopt state regulation of the prices of agricultural products. It simply reflected a continuing need for vigilance. California's contorted market provided bad incentives and created a shortage out of a surplus. The crisis started when a small number of participants had access to operating data that their customers did not. At

the California ISO, these problems still exist.

Perhaps the worst part of the California market is its continuing opacity. Keeping information from consumers can prove an incentive for abuse all in itself. Reserving the same data for market participants is clearly an inversion of effective public policy. Economists call this "transparency." With transparency the standard checks and balances function smoothly. Without it, competitive markets will function in the dark.

Thank you.