

Deregulation, scarcity, and the aftermath: California's Energy Crisis

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A lot to cover...

- PURPA, which paved the way for restructuring, or deregulation, of the CA electricity industry.
- The actual restructuring: AB 1890, its predecessors, and the aftermath.
- Not enough capacity?
- Market power
- Lessons learned

Some Definitions

- IOU: Investor Owned Utility
- IPP: Independent Power Provider
- PUHCA: Public Utility Holding Company Act - 1935
- PURPA: Public Utility Regulatory Policy Act - 1978
- PX: Power Exchange
 - California's market for short term wholesale electricity transactions, set up by AB 1890.
- ISO: Independent System Operator
 - A private non-profit responsible for the reliability of the electricity system. Has operational control over the California grid.

PURPA, Section 210 - 1978

- Landmark energy legislation that introduced free market principles to the electricity industry for the first time.
- Utilities had to buy electricity from “qualifying facilities” at an “avoided cost.”
- Qualifying facilities are renewable and cogeneration plants. They were enabled to sell their electricity to utilities and set up long term contracts to do so.



CA and PURPA

- California took PURPA and ran; the 1980's saw a huge influx of qualifying facilities. Remember that utilities were required to buy this energy. A good idea, even in practice, but this led to problems after the restructuring of the industry.



The Energy Policy Act of 1992

- Exempted IPP's (outside those protected under PURPA, such as QF's) from the provisions of PUHCA, allowing utilities to buy these facilities.
- EWG's could sell power even if they heavily depended on debt - regulated companies are prohibited from doing such.
- EWG's could also operate regardless of their energy efficiency, while QF's had to abide.
- The transmission arena was huge to CA's situation:
 - Allowed the sale of wholesale electricity from distant producers.
- Set the stage for CA deregulation, allowed for more competition.

AB 1890

- Enacted in August 1996
- Got rid of long term wholesale contracts by setting up short term sales through PX
 - Electricity sold one day and one hour ahead
- This new structure was put into place with all good intentions: CA Assembly wanted to promote perfect competition to the fullest extent (therefore letting the market work and driving prices down).

Leading to Market Power

- CA restructuring mandated that utilities sell their fossil-fuel generating plants to out of state interests, allowing Enron and other giants to gain a huge market share in the state.
- Since electricity was now a short term market, utilities had to buy electricity on the short term market (one day in advance), and if they ran into a gap between supply and demand, they had to buy power as little as an hour ahead.
- This lead to a massive withholding of electricity; power plants being shut down to drive prices way up.

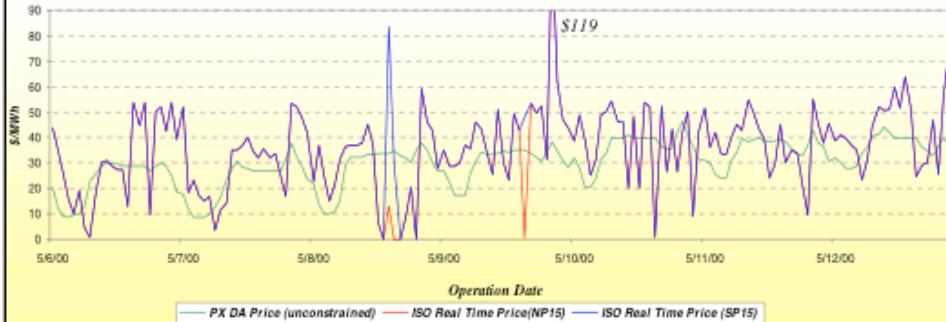


CALIFORNIA ISO

Weekly Market Watch

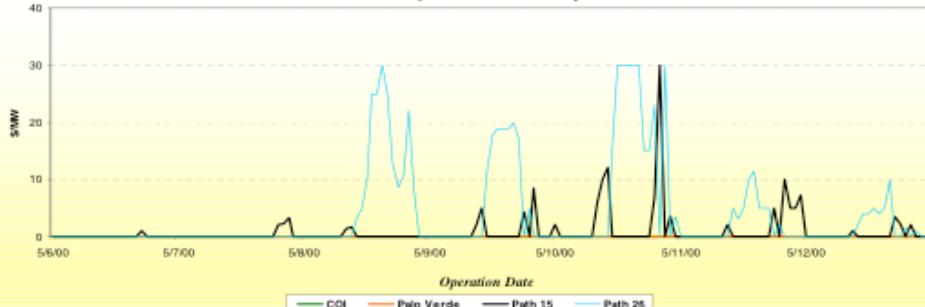
Week ending Friday, May 12, 2000

PX Day Ahead vs ISO Hourly Ex-Post Imbalance Energy Prices



Price volatility fell significantly in the ISO real time energy market while peak and off-peak prices were mixed in both the real time and PX day ahead energy markets. The real time energy market was split zonally for three hours during the week. A real time price of \$118.63/MWh occurred at HE 21 on May 9. During this hour, the ISO utilized less lower-priced supplemental energy dispatched over the inter-ties and relied more on relatively higher-priced, in-state generation. The day ahead unconstrained PX energy price for peak period hours ranged from \$13.01/MWh to \$46.72/MWh with an average of \$33.98/MWh, a decrease of \$5.09/MWh from the previous week. Peak period prices for the ISO real time market ranged from \$0/MWh to \$118.63/MWh with an average of \$36.28/MWh, a decrease of \$6.63/MWh from the previous week. Off-peak prices for the PX averaged \$22.56/MWh, an increase of \$3.25/MWh, while off-peak ISO real time prices averaged \$34.26/MWh, an increase of \$14.74/MWh from the previous week. Peak loads for the week were 31,013 MW, down 6% from the previous week, while total energy was 4,273 GWh.

Selected Day Ahead Branch Group Prices



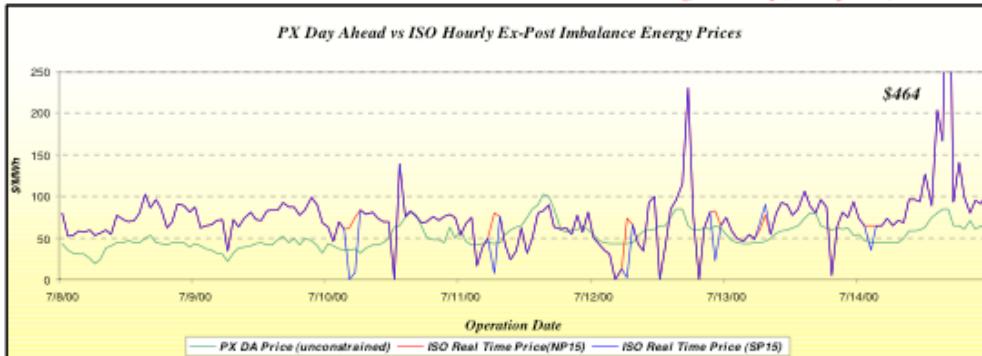
Congestion rates for Path 15 and Path 26 for the week were 8% and 29%, respectively, with average congestion prices of \$2.74/MW and \$13.28/MW, respectively. There was no congestion on either COI or Palo Verde during the week. All congestion on Path 15 and Path 26 was in the N-S direction. Day ahead congestion also occurred on NOB (2%) and Mead (4%). Day ahead congestion was due primarily to transmission demand exceeding available capacity though Path 26 was de-rated somewhat for a portion of the week due to equipment outages. Hour ahead congestion occurred on NOB (11%), Mead (1%), Path 15 (5%), and Path 26 (26%). All hour ahead congestion was in the import direction with the exception of Path 26 and Path 15, where all congestion was in the N-S direction. Average hour ahead congestion prices for these branches were \$.01/MW, \$.05/MW, \$15.31/MW, and \$15.93/MW, respectively.



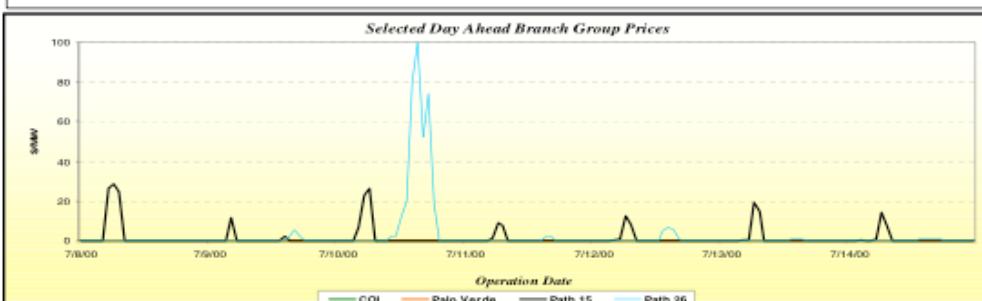
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Weekly Market Watch

Week ending Friday, July 14, 2000



Continued moderate load conditions led to mixed prices in both the PX and ISO real time energy markets. There were a total of nine hours during the week when the real time market was split zonally due to real time congestion on Path 15/Path 26. The real time market experienced a \$464/MWh price at HE 17 on July 14 when the ISO required about 1,400 MW of incremental generation to balance the market. This price occurred during the peak load hour of the week which had relatively limited incremental energy bids as evidenced by five out of six ten-minute price segments reaching the \$500/MWh price cap. The \$231/MWh real time price on July 12 at HE 18 was also related to relatively limited incremental generation bids during the evening peak period, despite the relatively lower load level of 34,891 MW. Peak period prices for the PX energy market ranged from \$19.50/MWh to \$102.29/MWh with an average of \$56.52/MWh, a decrease of \$4.10/MWh from the previous week. Peak period prices (NP15) for the ISO real time market ranged from \$0/MWh to \$464.32/MWh with an average of \$80.98/MWh, an increase of \$31.60/MWh from the previous week. Off-peak prices for the PX averaged \$44.97/MWh, an increase of \$4.62/MWh, while off-peak ISO real time prices (NP15) averaged \$62.65/MWh, an increase of \$10.75/MWh from the previous week. Peak loads increased by 10% to 37,942 MW compared to last week's level of 34,598 MW. Total energy for the week was 4,822 GWh, an increase of 6% compared to last week's total of 4,543 GWh.



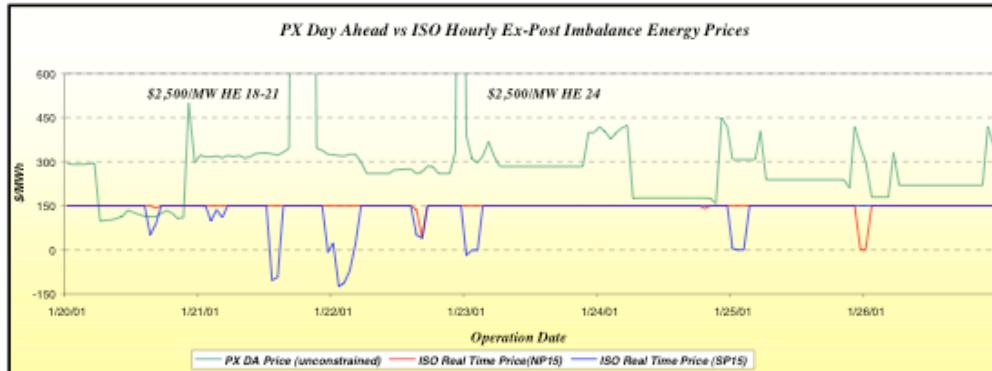
Congestion rates for Path 15 and Path 26 for the week were 14% and 15%, respectively, with average congestion prices of \$13.69/MW and \$15.48/MW, respectively. There was no congestion for the week on either COI or Palo Verde. All congestion on Path 26 was in the N-S direction while congestion on Path 15 was in the S-N direction except for one hour. The only other branch groups that experienced day ahead congestion were NOB (3%) and Cascade (1%). Congestion on NOB was in the import direction while Cascade experienced only export congestion. Hour ahead congestion occurred on COI (1%), Mead (1%), NOB (13%), Path 15 (11%), Sylmar (5%), Summit (1%), and Path 26 (8%). Average hour ahead congestion prices for these branches were \$57.90/MW, \$.75/MW, \$38.08/MW, \$11.06/MW, \$47.25/MW, \$13.13/MW, and \$34.08/MW, respectively. All hour ahead congestion was primarily in the import direction (S-N for Path 15) with the exception of N-S congestion on Path 26 and export congestion on the Summit branch group.



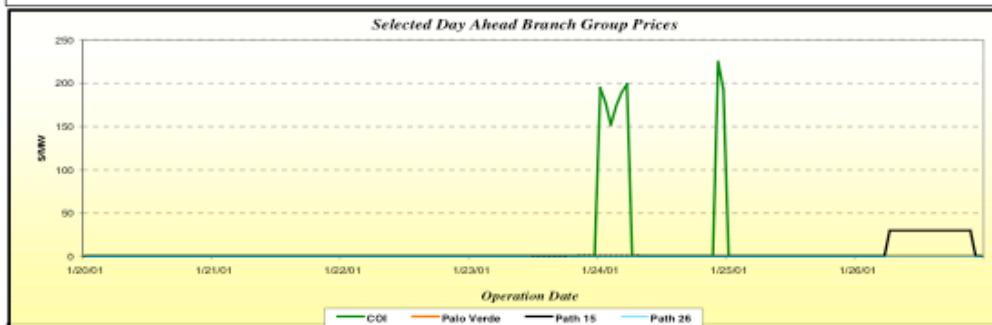
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Weekly Market Watch

Week ending Friday, January 26, 2001



The ISO moved to an as-bid pricing scheme on December 8th. Please see the text after the discussion of the Replacement Reserve market for more specific information on real time prices. The following price statistics are for PX and ISO market clearing prices below the soft-cap only. ISO real-time prices were split zonally 14 hours during peak periods and 23 hours during off-peak periods, for a total of 37 hours, or 22% of the week. Peak period prices for the PX energy market ranged from \$99.12/MWh to \$2,499.58/MWh with an average of \$310.28/MWh, a decrease of \$86.36 from the previous week. Peak period prices for the ISO real-time market (NP15) ranged from \$40.71/MWh to \$150.00/MWh with an average of \$148.78/MWh, a decrease of \$1.18 from the previous week. Off-peak prices for the PX averaged \$371.89/MWh, an increase of \$28.89 from last week, while off-peak ISO real-time prices (NP15) averaged \$144.63/MWh, a decrease of \$5.37 from the previous week. Real-time prices for SP15 averaged \$142.29/MWh and \$110.86/MWh, respectively for the peak and off-peak periods. The peak load for the week was 32,695 MW, a decrease of 1.5% from last week's peak of 33,180 MW. Total energy for the week was 4,188 GWh, a decrease of 4.9% from last week's total of 4,406 GWh.



Congestion rates for COI, and Path 15 for the week were 5%, and 10%, respectively with average congestion prices of \$187.93/MW, and \$30.00/MW. No congestion occurred on Palo Verde. Path 26. Other branch groups that experienced day-ahead congestion were Summit (14%), NOB (27%), Sylmar (5%), and Eldorado (1%). All day-ahead congestion was in the import direction (S-N for Path 15 / Path 26), with the exception of export congestion on Summit, NOB, and COI. Hour-ahead congestion occurred on NOB (33%), Sylmar (1%), Path 26 (1%), and Path 15 (29%). Average congestion prices for these branch groups were \$54.59/MW, \$30.00/MW, \$30.00/MW, and \$38.17/MW, respectively. All hour-ahead congestion was in the import direction (S-N for Path 15 / Path 26), except for NOB.

A spiraling effect

- Because of huge prices (in the thousands of dollars per MWh in the worst cases), CA utilities started accumulating massive debt.
- Therefore, they could not pay QF's right away.
- As a result, QF's started shutting down because they could not afford to continue producing. This led to an even greater shortage.
- Rolling blackouts were ordered by ISO for the first time on January 17, 2001.
- On the same day, Governor Gray Davis declared a State of Emergency and ordered the Department of Water Resources to purchase power on behalf of PG&E and SCE.

A nightmare for consumers and utilities alike

- At first, the effects on consumers were mitigated because of a rate freeze: rates were frozen at 10% below their previous level for four years.
- This rate freeze hurt utilities when prices began an unprecedented rise
- SDG&E completed the transition to deregulation first, lifted the rate freeze in July 1999.
- After a wholesale price hike in May 2000, SDG&E consumers saw dramatically high bills in June.
- PG&E and SCE couldn't handle it alone: CAPUC approved an emergency 90-day 1 cent/kWh rate hike
- This hike was made permanent three months later, along with an additional 3 cents/kWh hike.

Did we simply not have enough capacity?

- California's stringent environmental regulations make it difficult and time consuming for new plants to come online.
- Investment in new generating facilities was stifled from 1994-1996 due to large uncertainty concerning deregulation.
- Henceforth, we import nearly 20% of our electricity and relied on those companies that used market power.
- Renewable efforts were discouraged:
 - A plan in 1995 to bring about 1400 MW of renewable and cogeneration capacity was deemed "inappropriate" by FERC in response to complaints from CA utilities.

Lessons to be learned

- When enacting sweeping legislation, no matter how well you think markets work on their own, there is always a risk of market failure.
- Therefore, a strong faith in the market must be coupled with strong precautions to ease us into free market systems if they are to have any chance of succeeding; TRUST NO ONE!