





**Future Imperfect:
Demystifying The First Twelve
Months of the California
Emergency**

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Future Imperfect

- Alberta, Texas, and "Everywhere Else"
- Last Month's "Emergencies"
- Villian and Victim
- The Role of Secrecy
- AB-1890
- Twenty Years of Efficient Markets
 - One Year of Inefficient Markets
- May 22, 2000
- Market Power
- Inefficient Administered Markets
- Solutions?



Alberta, Texas, and "Everywhere Else"

- The Problem In A Nutshell
- Changing Markets
- Established Special Interests
- Legislative Spaghetti
- Will Texas Be Different?



The Problem In A Nutshell

- At the turn of the century Sam Insull invented trusts, utilities, stock manipulation, pyramiding of control, and the Securities and Exchange Commission
- He wrote the laws, established the Commissions, and founded the utilities
- Ultimately, he implemented a ninety year cost plus structure that left North America with the best (and most costly) electric infrastructure in the world



Our Founder - Sam Insull



Changing Markets

- Jimmy Carter's 1979 law, the Public Utilities Regulatory Practices Act, allowed free entry into bulk power generation
- Competition quickly reduced the costs of generation by a factor of three
- The resulting measuring stick effect made traditional regulation look very expensive



Established Special Interests

- Insull's regulatory scheme created a series of special interests
- None of these would exist in a normal market
- California is an extreme
 - Hispanic Energy League
 - Lesbian Wind Association
- Unfortunately, even more staid states have spawned numerous special interest groups from the Gray Panthers to Green Peace



Legislative Spaghetti

- Each state has attempted to placate a variety of different groups
- Environmentalists have received largely symbolic funding for a variety of ultimately worthless pursuits
- Business has gotten some access
- Homeowners have gotten rate guarantees
- Utilities get market pricing guarantees
- The result in every state has been to bring far, far too many cooks into the kitchen



Will Texas Be Different?

- Yes and No
- Texas is not requiring a centrally administered market
- Texas is over engineered, however, and actual operations will probably reflect the 10% complexity surcharge we have seen in California
- Rates are fixed in Texas

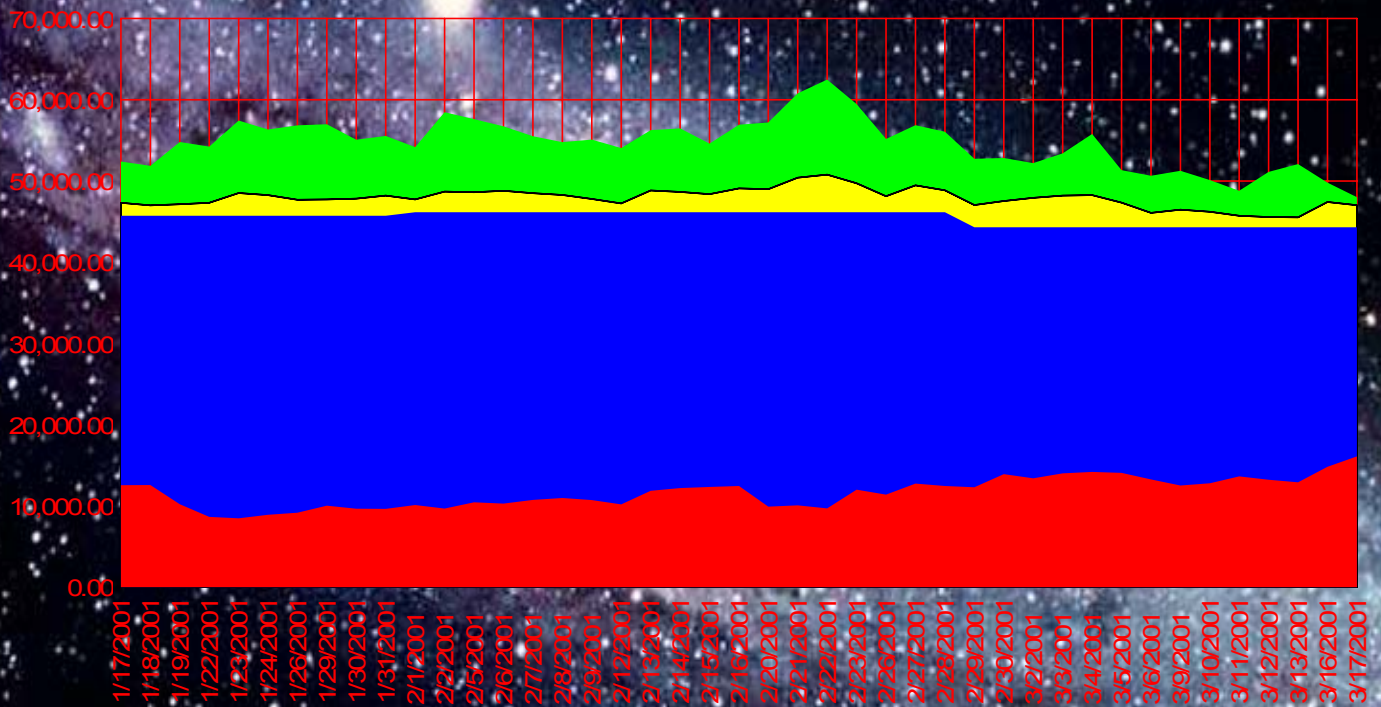


Last Month's "Emergencies"

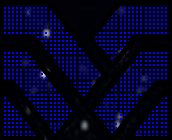
- March is a period of low loads in both electric resistance heating and cooling areas
- The California ISO announced blackouts two days this week
- The problem was not loads (as they announced) but outages



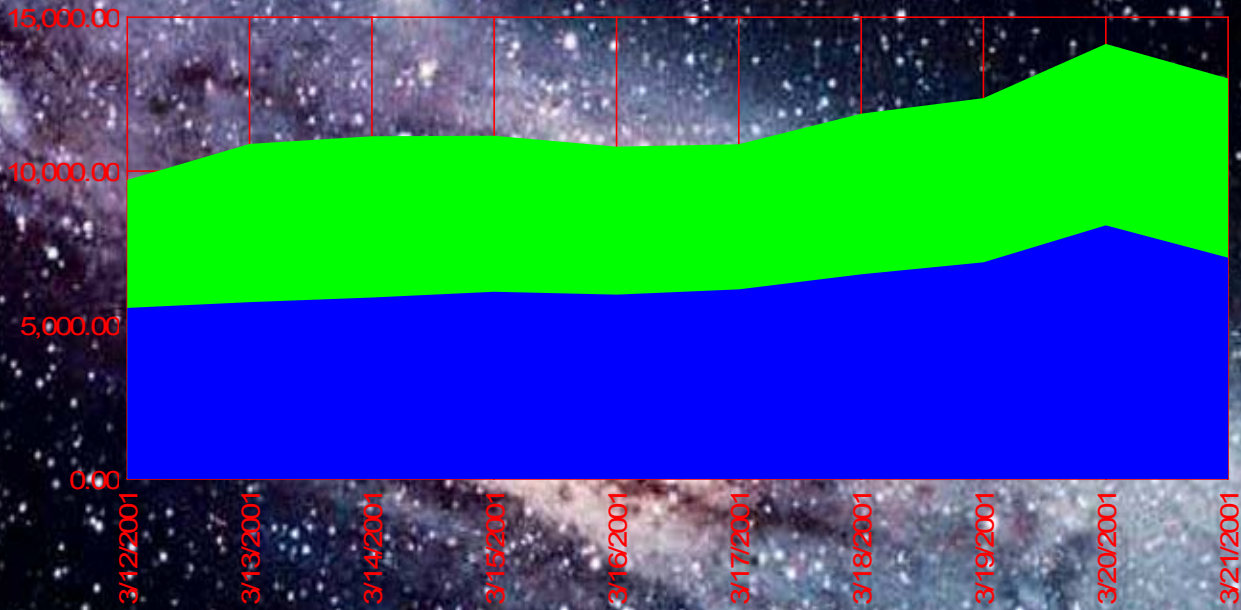
Loads and Resources



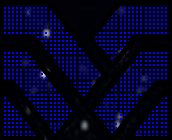
■ Outages ■ Net Resource ■ Net Import ■ Surplus



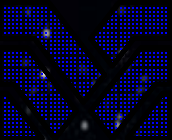
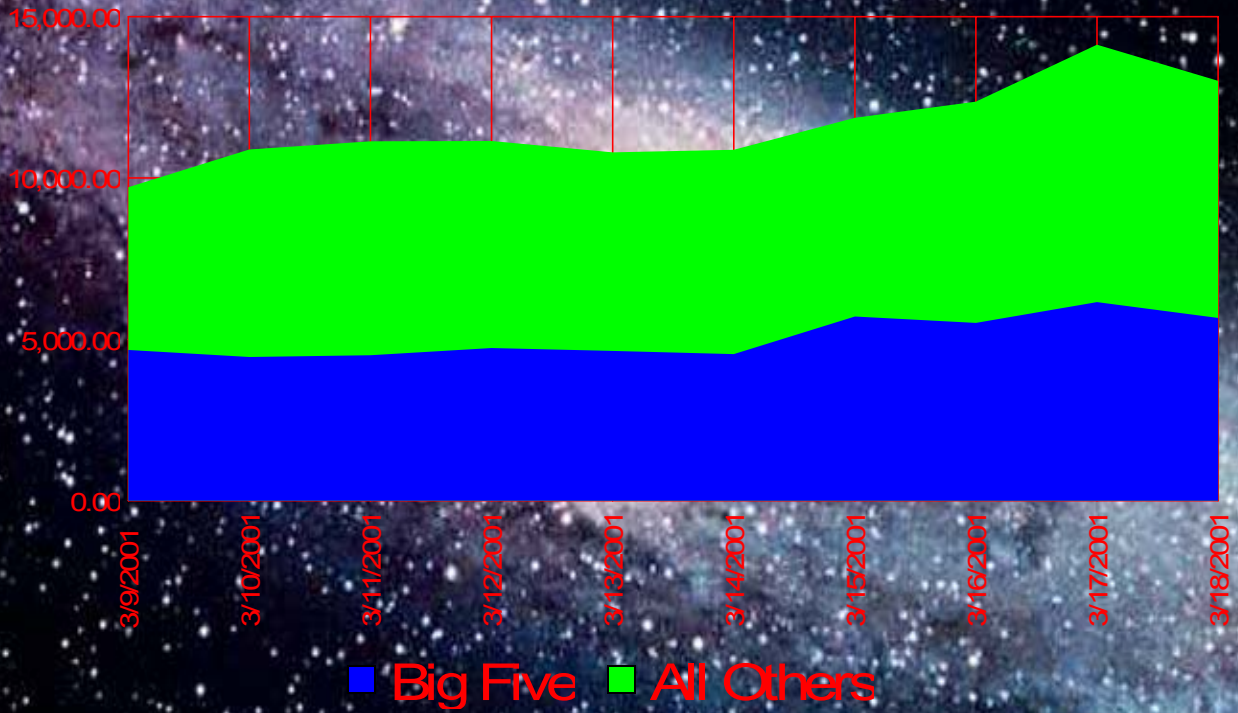
Outage Types



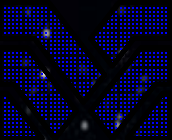
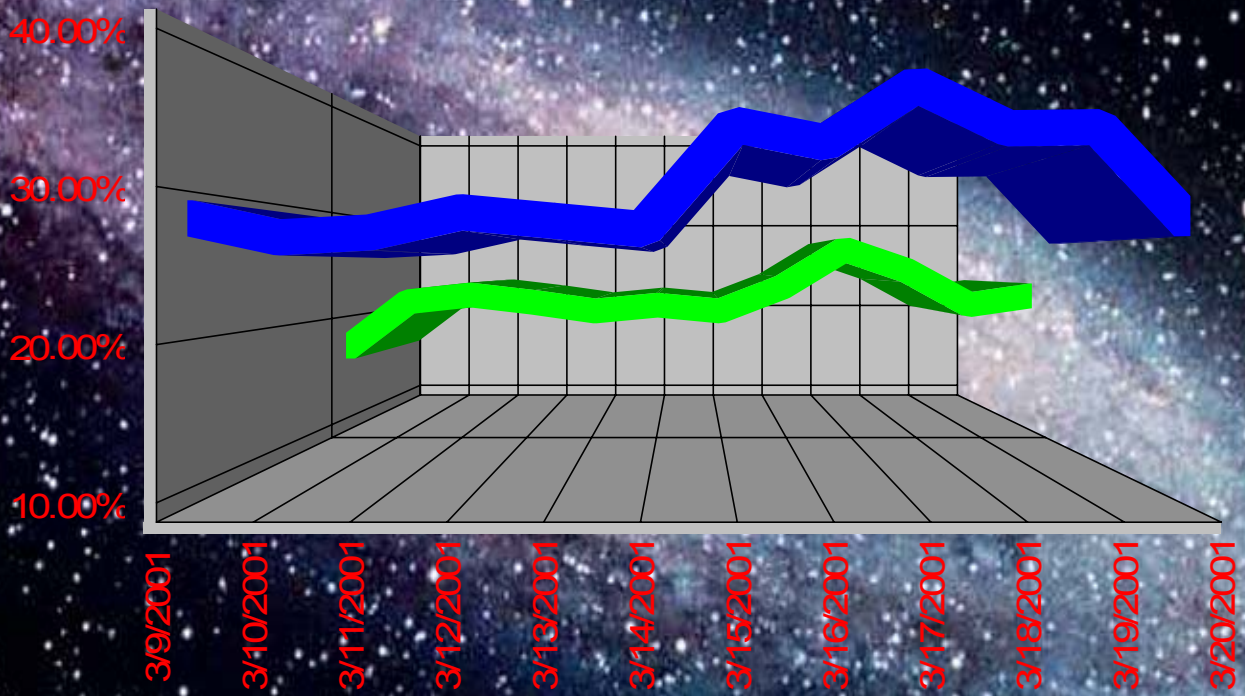
■ Total - Forced ■ Total - Planned



Outage Owners



Relative Outages



■ Big Five ■ All Others

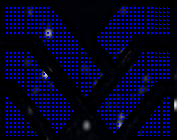
Villian and Victim



Professor Hogan:
Lucius N. Littauer
Professor of Public
Policy and
Administration at the
John F. Kennedy School
of Government, Harvard
University



Professor Fessler:
Eminentus Professor of
Law
University of California
at Davis School of Law



Villians and Victims

- Professor Hogan believes (to this day) that markets must be guided and managed by government
- Professor Fessler believes (he has been understandably silent since may 22nd) that prices cannot be measured accurately without Professor Hogan's mechanisms
- Their unfortunate common understanding of the world set California down the path to administered markets, mandated secrecy, inefficiency, and ultimately blackouts



The Role of Secrecy

- Secrecy was a central tenet of the California experiment
- The logic was that cost recovery required "transparent" pricing (Dan Fessler), "transparent" pricing required administered markets (Bill Hogan), the absence of competitors required secrecy of bids and outcomes
- The result was that market manipulation and management failure became obscured by the mantle of competition embracing secrecy
- Simply stated, secrecy in areas of central public policy importance is neither required nor desirable
- Increased secrecy will bring additional government controls in order to avoid widespread blackouts



AB-1890

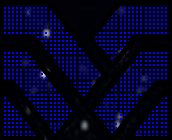
- **AB-1890 was neither engineered nor inspired -- it was a disaster designed by a committee**
- **The primary plan was the creation of two new state agencies -- the ISO and the PX -- to administer California markets**
- **Customer choice was an early and inadvertent casualty -- eliminated by the formulas designed to recover stranded costs**



California's System



Prices

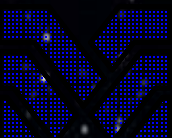
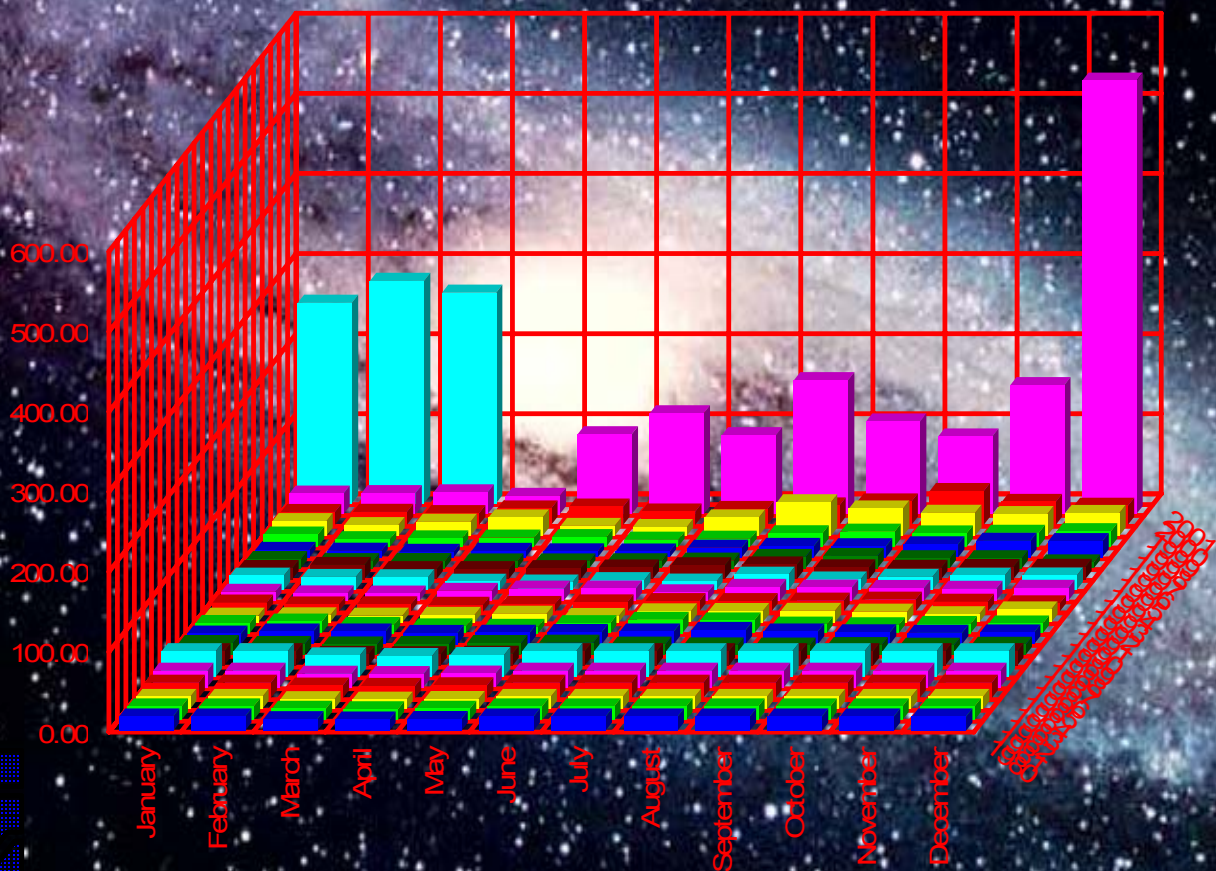


Twenty Years of Efficient Markets

- Since 1980 the West Coast has enjoyed an active wholesale market
- FERC ratified the market in 1987
- California's deregulatory scheme was a step backwards from competition



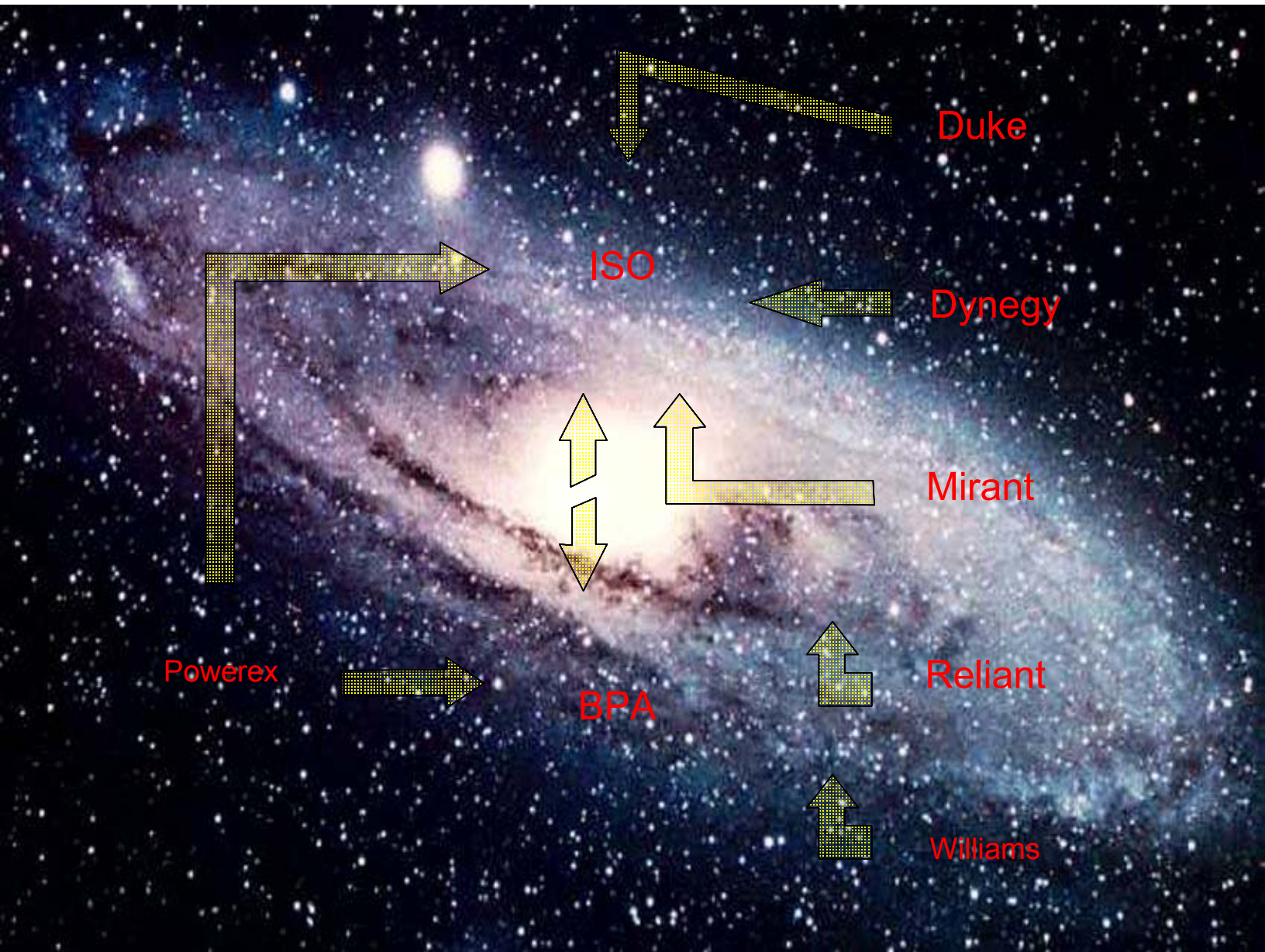
Twenty Years At Mid-Columbia



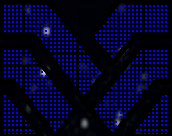
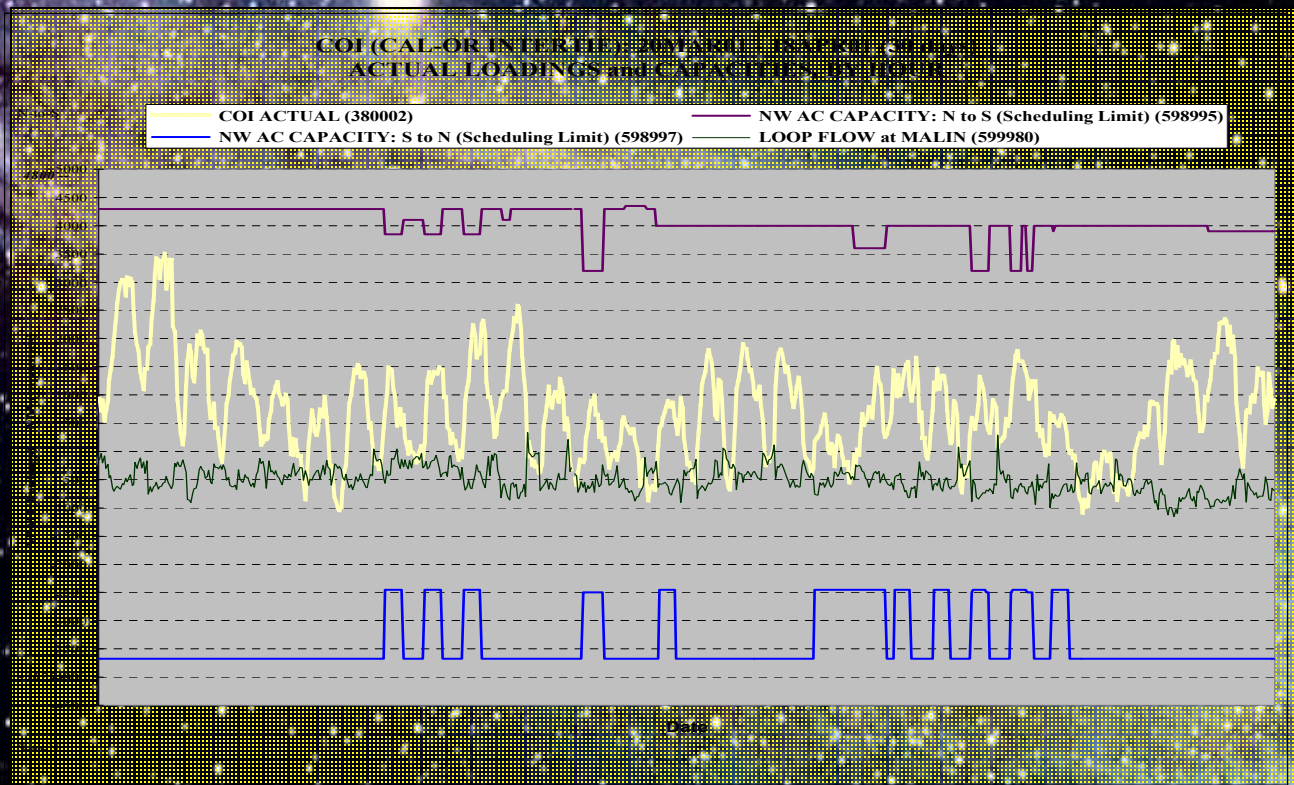
One Year of Inefficient Markets

- Since May the ISO has taken direct control of markets every few days
- Since November, the ISO has taken direct control almost every day
- The primary "market" if this term can be used is the bilateral daily negotiation between Williams, Dynegy, Reliant, Duke, and Southern
- The regional market has suffered from the massive level of governmental intervention





Intertie Loading

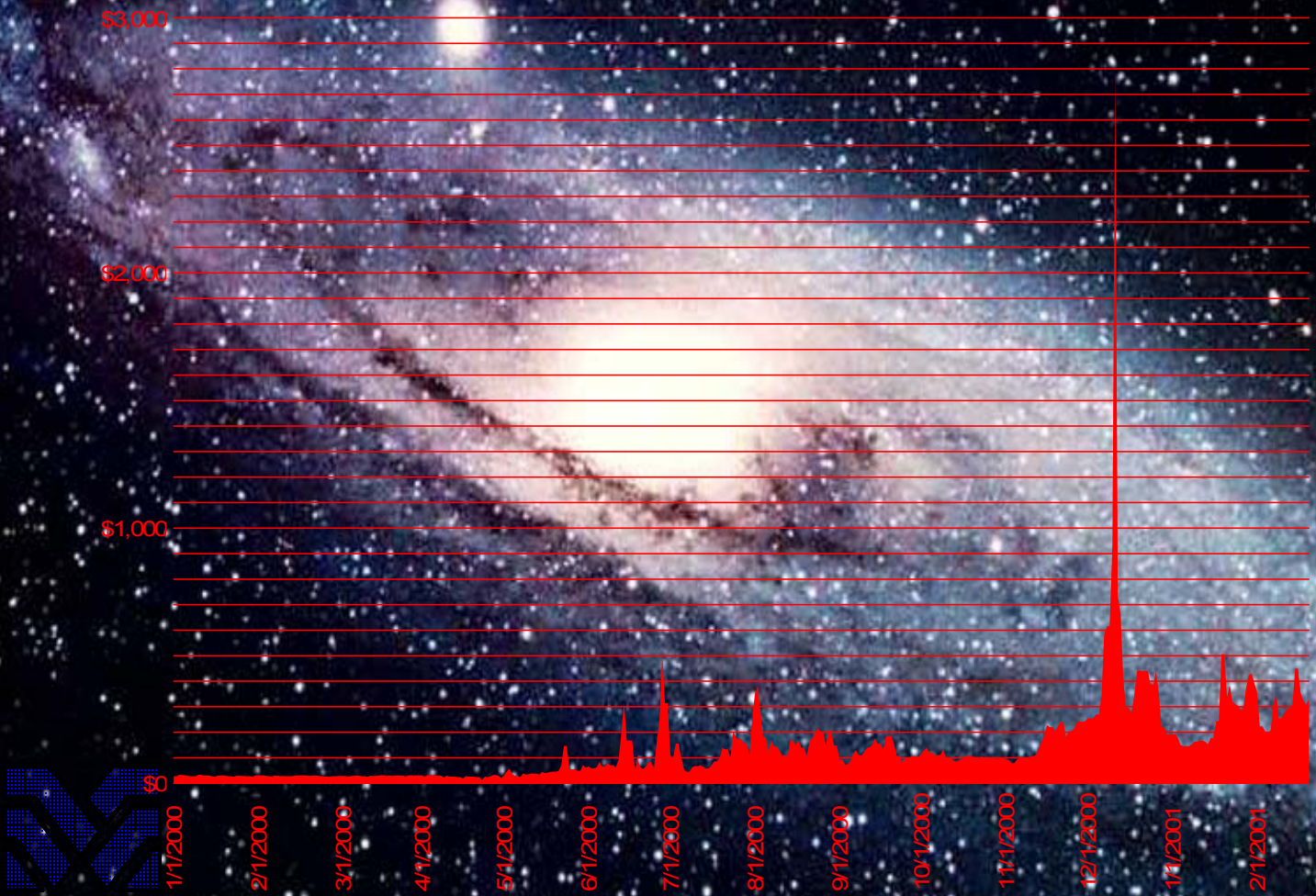


May 22, 2000

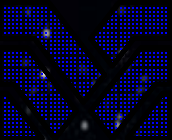
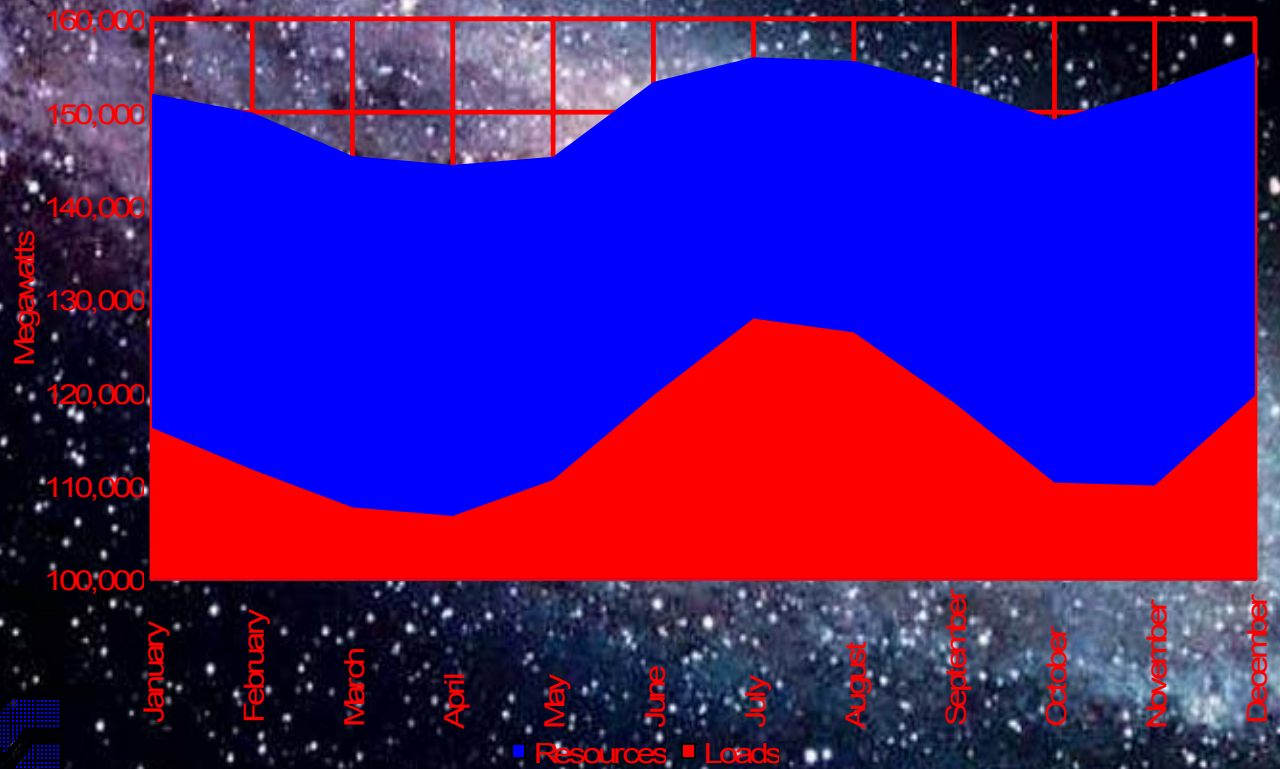
- Pricing changed on May 22nd
- There are almost no explanations for the shift



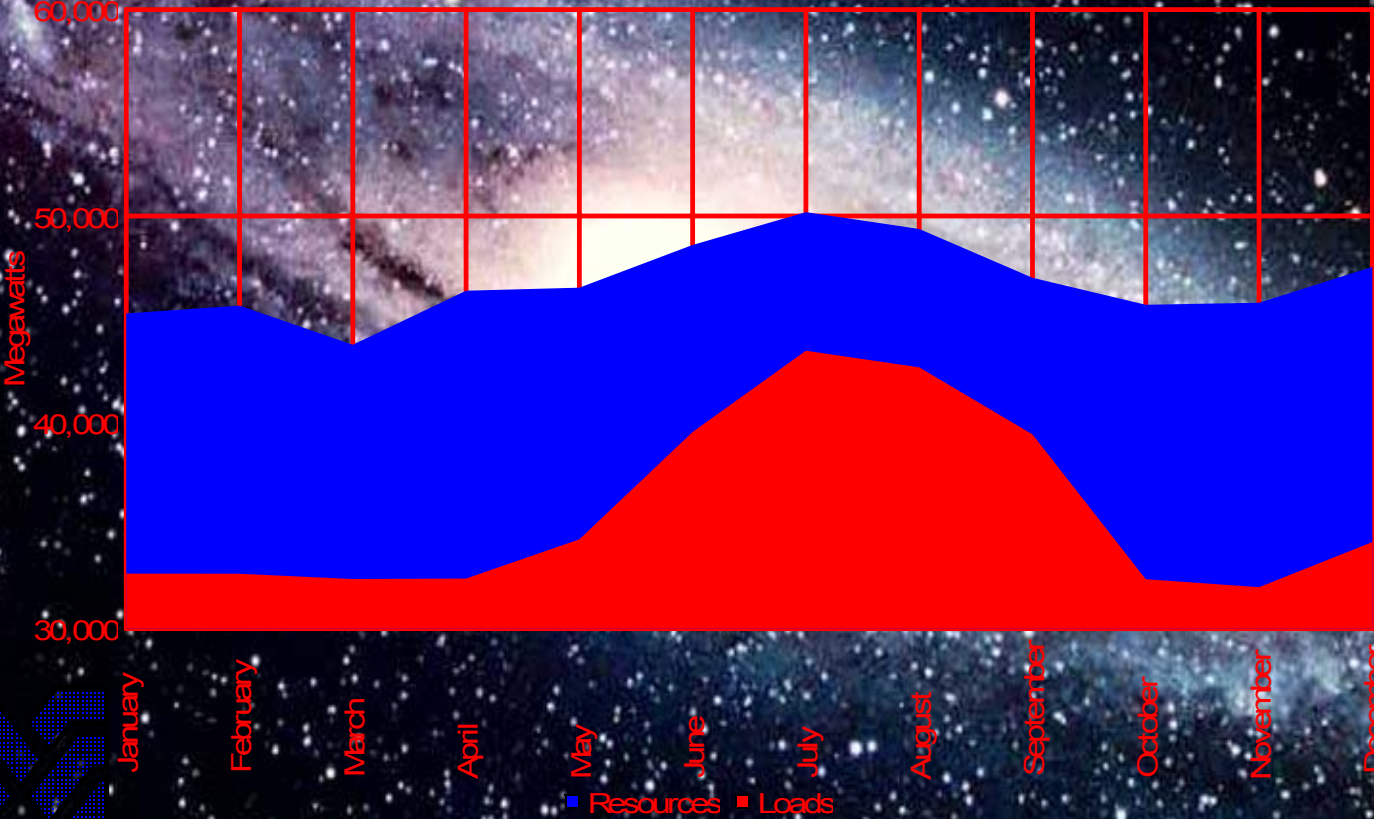
Current Prices



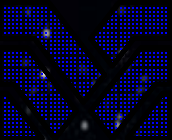
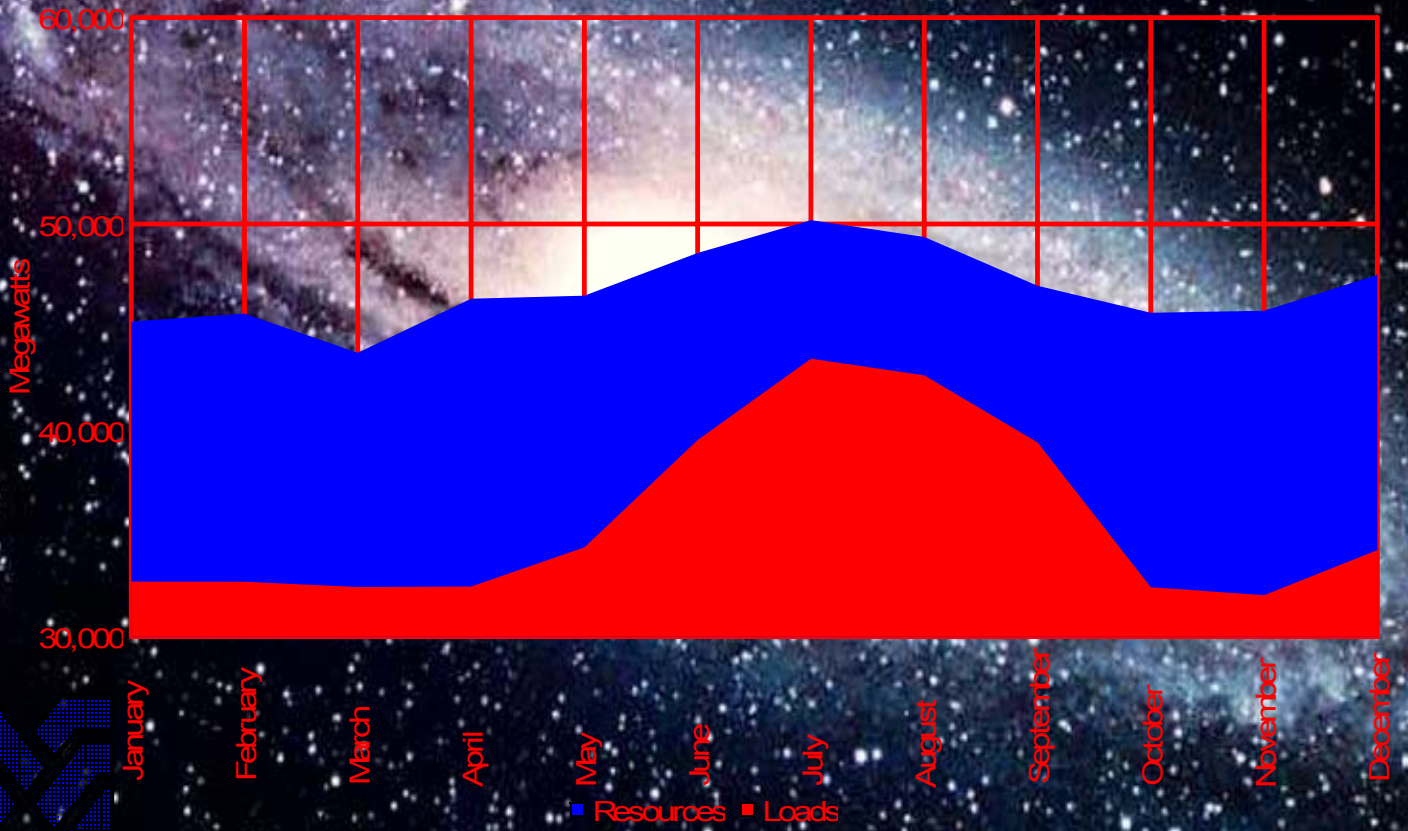
WSCC Capacity Balance



California Capacity Balance

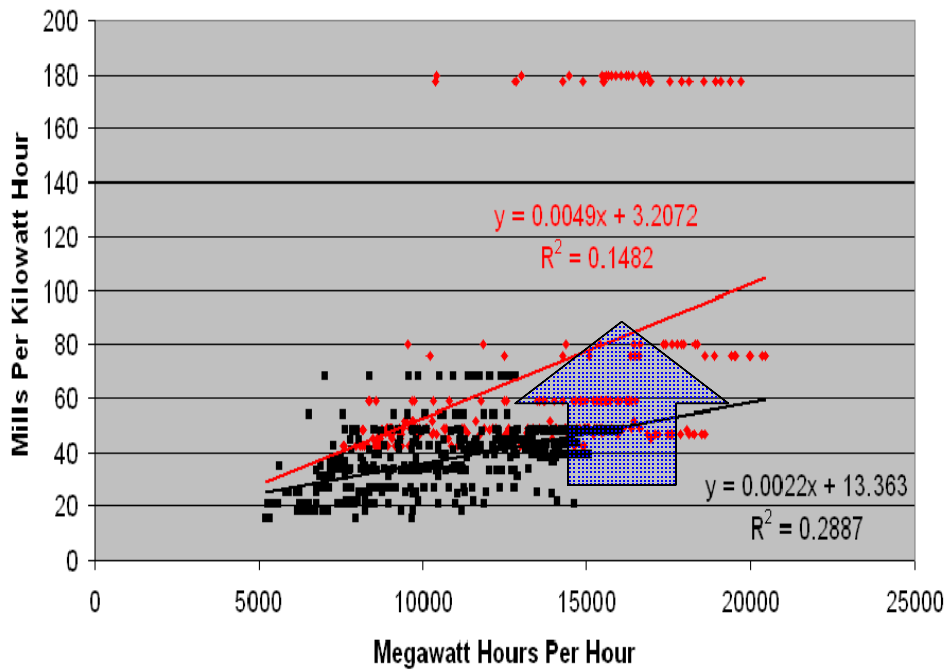


ISO Capacity Balance

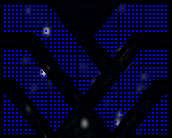


May Shift

COB Prices Versus Cumulative ISO Generation
(From EHV Data Supplied By The California ISO) For May 2000



◆ COB May 22-31 ■ COB May 1-21 — Supply Curve (May 1-21) — Supply Curve (May 22-31)

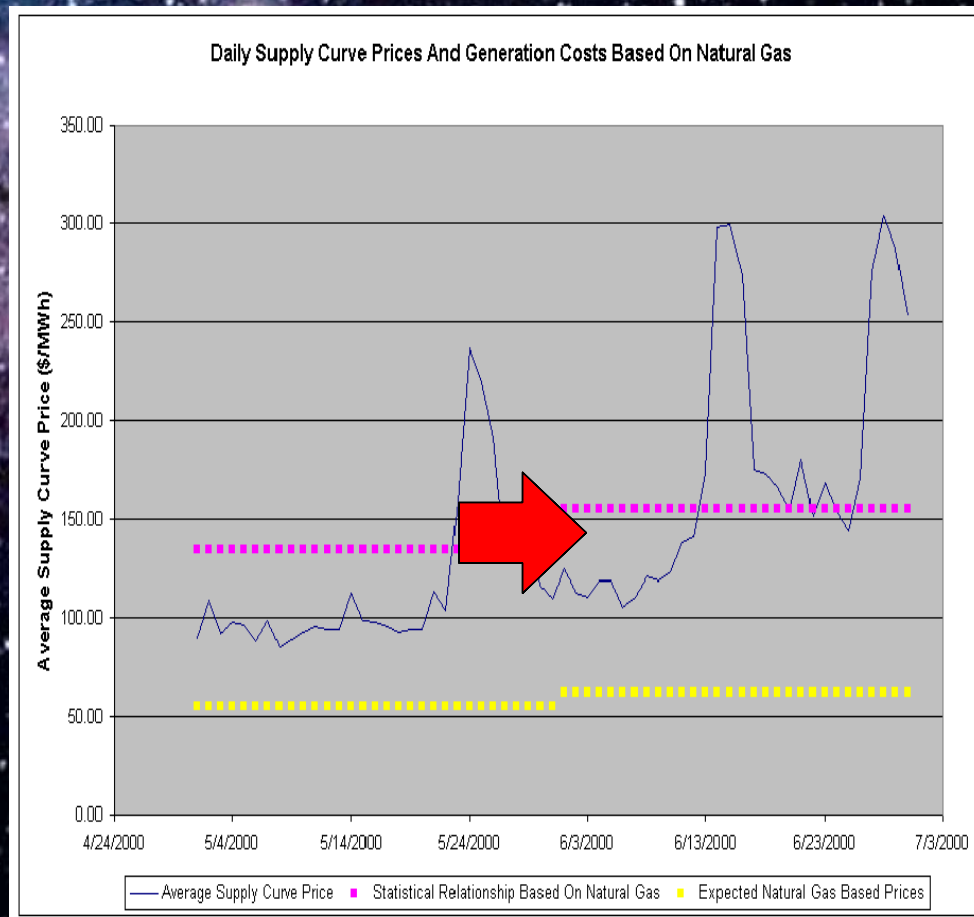


Market Power

- California's forced divestiture brought five outside owners into the center of their administered market
- These owners have very different incentives than vertically integrated utilities or qualifying facilities



PX Supply Curves



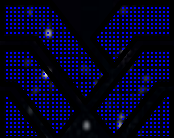
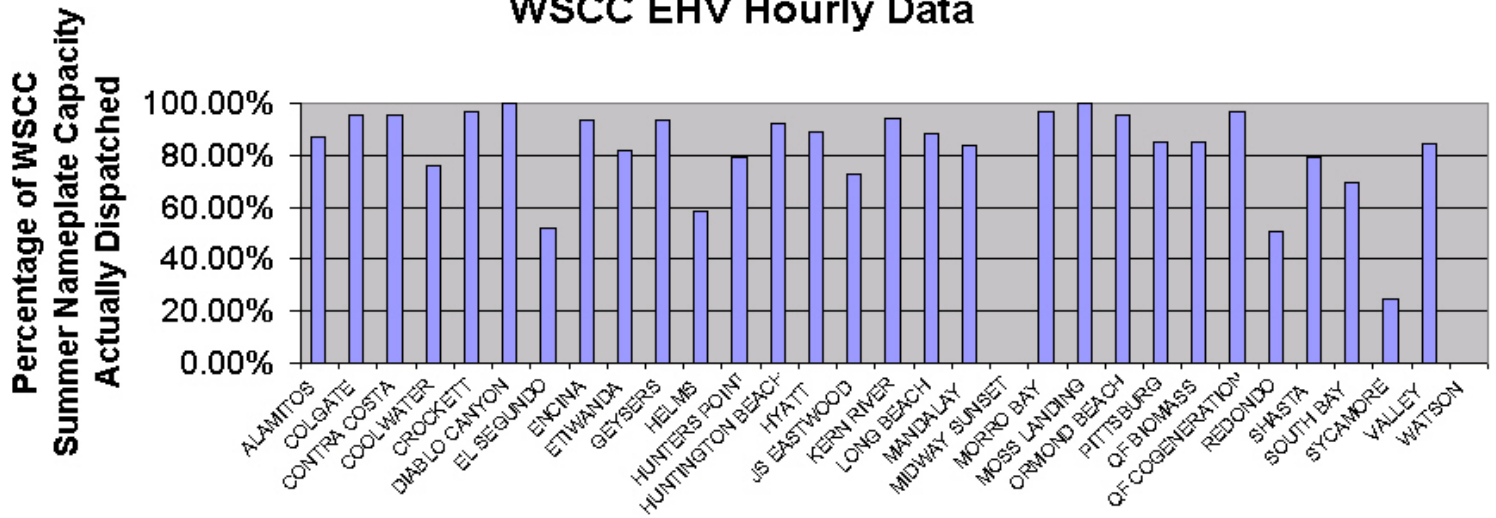
California On-Peak

- ISO perceptions of shortage are proving very subjective
- Inadequate ISO methods are securing scarcity in the midst of abundance
- Overall, in the contest between the ISO and the WSCC, the ISO is failing to prove their case



An ISO Emergency

July 24, 2000 ISO Emergency
WSCC EHV Hourly Data

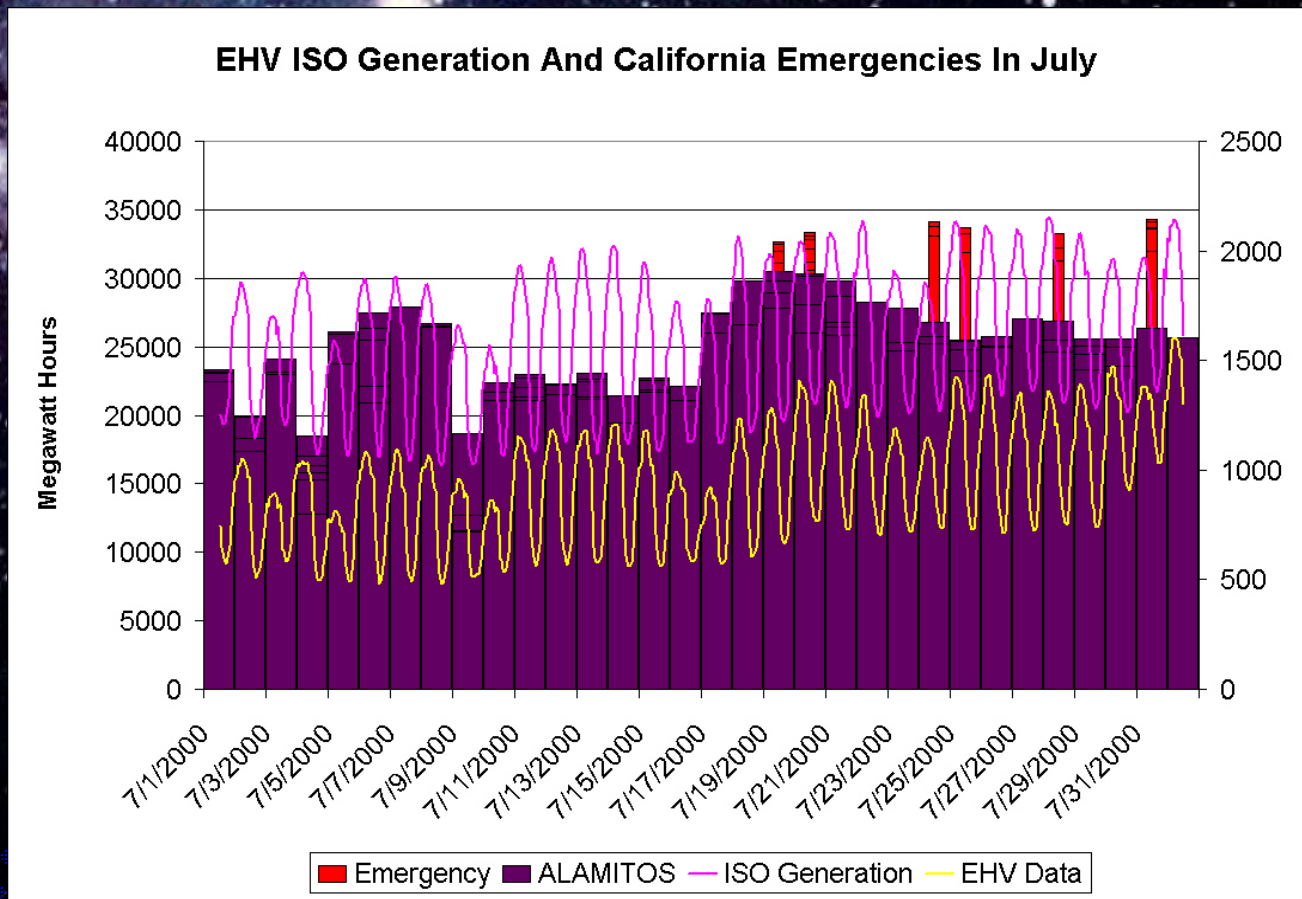


The Missing Peak

- Alamos dispatch isn't close to maximum during system emergencies
- Overall, system dispatch matches emergencies poorly -- raising questions of how seriously the emergencies are taken by generators



The Missing Peak

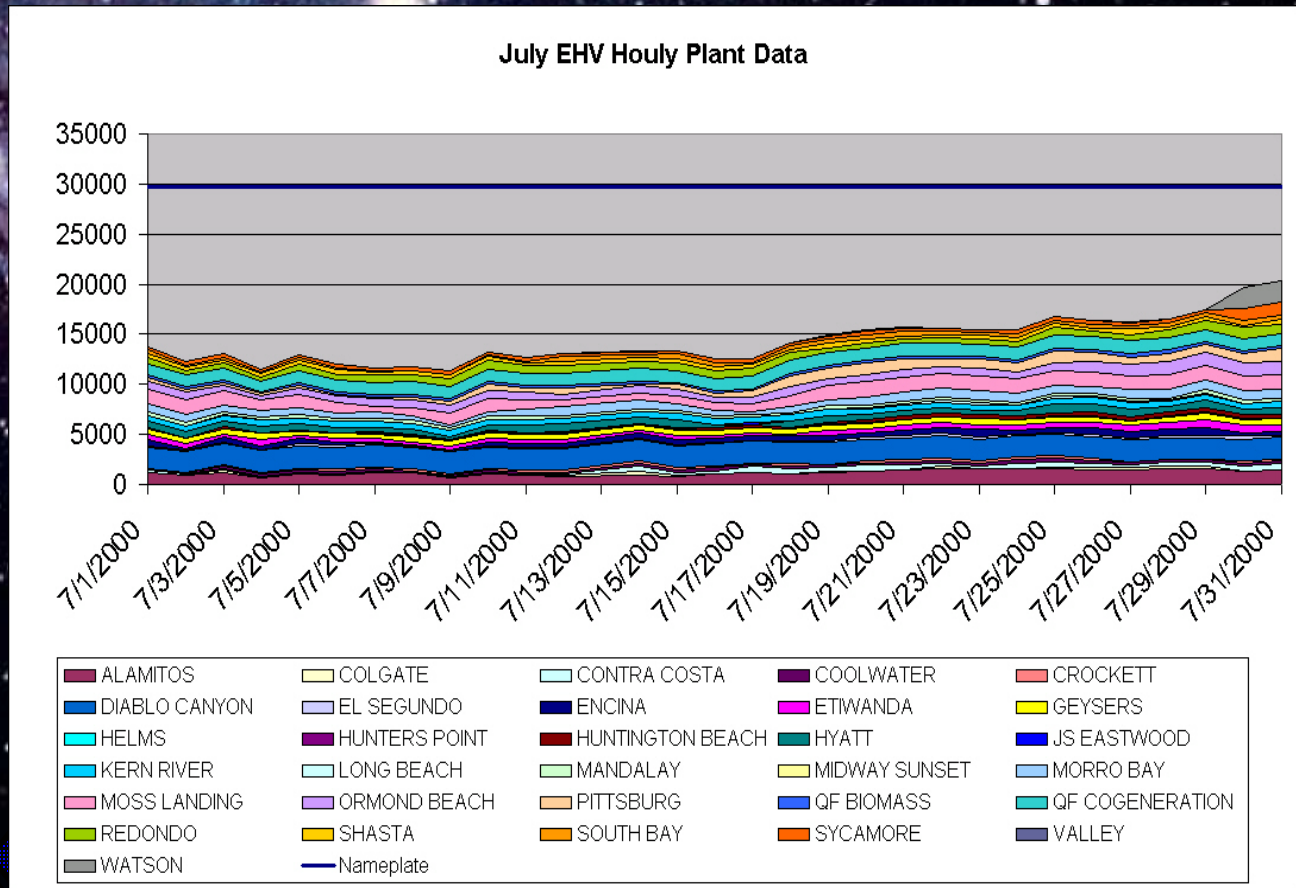


Inefficient Peak Dispatch

- ISO plants dispatch erratically
- Although total capacity equals nameplate, actual dispatch averages only 50% of nameplate
- ISO dispatch doesn't even approach nameplate during system peaks



Inefficient Dispatch

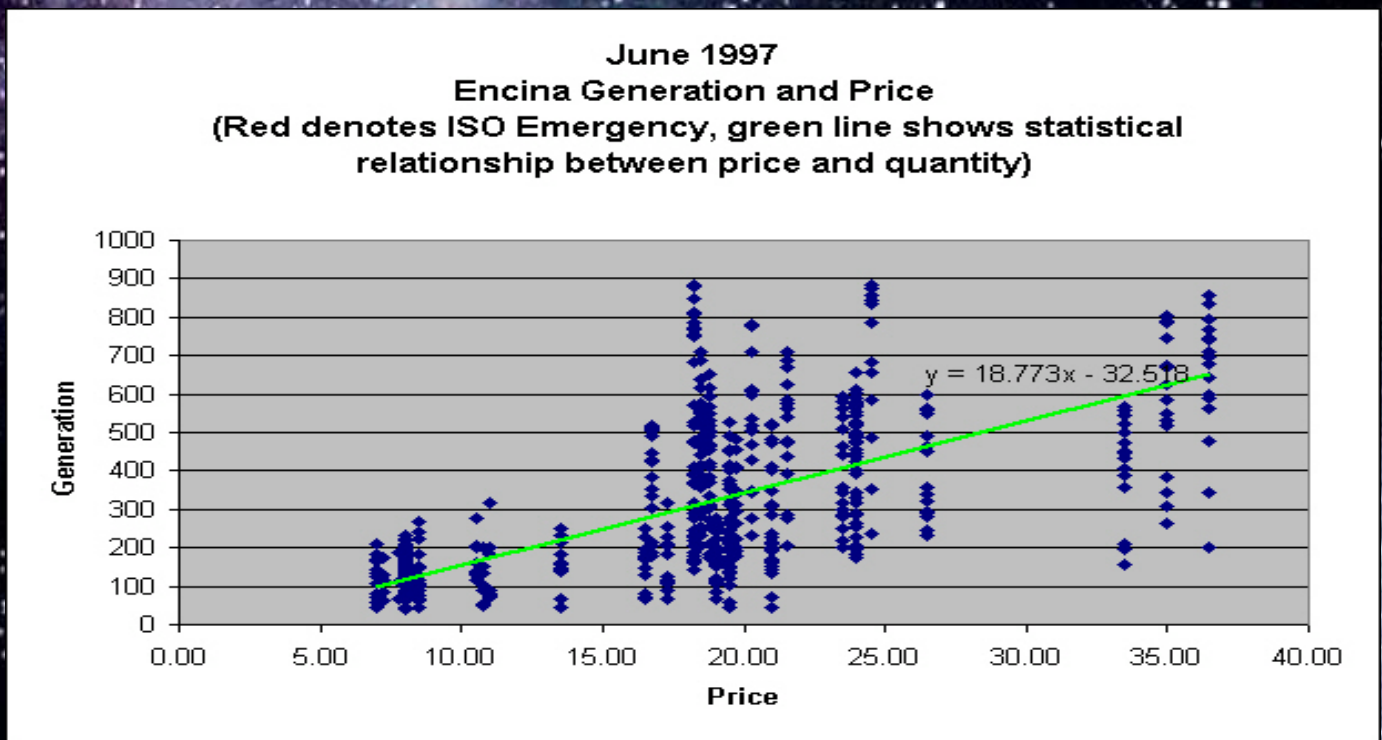


California Off-Peak

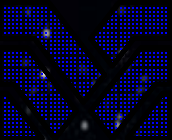
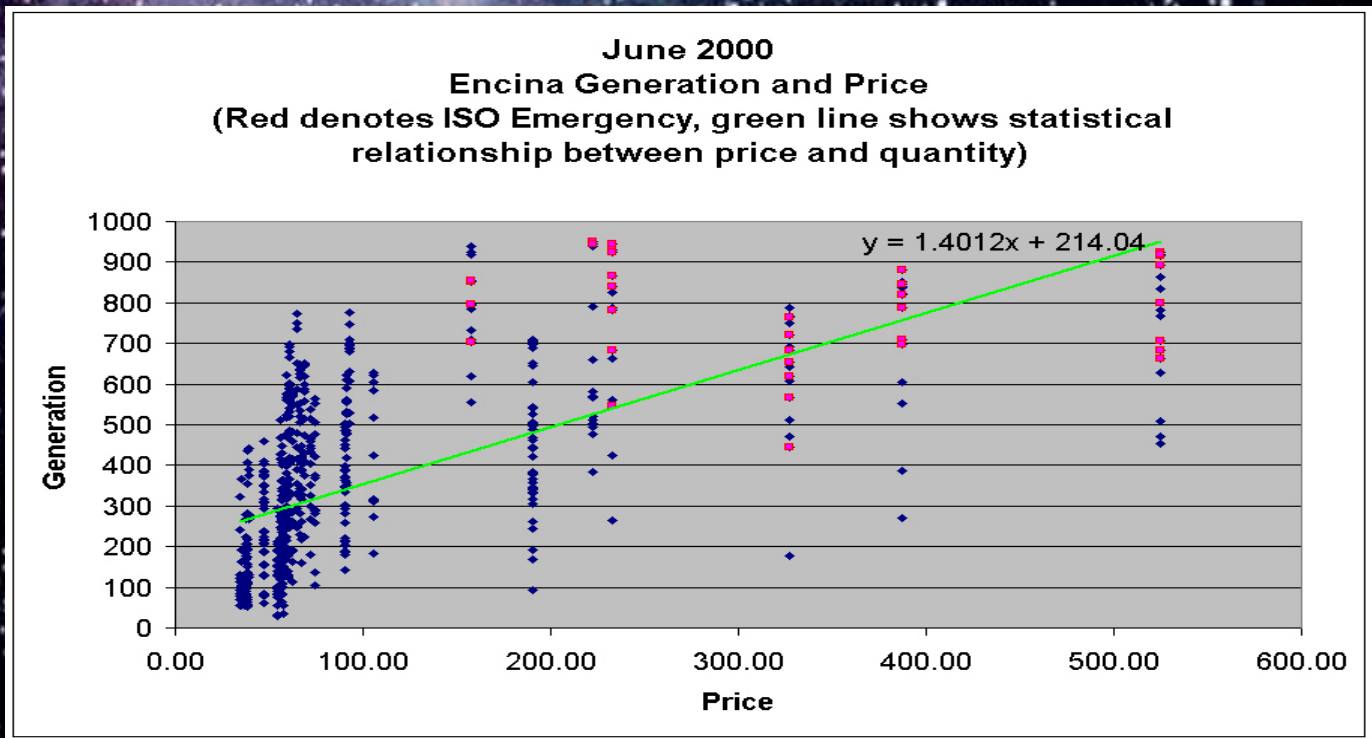
- Hourly investigation of economic dispatch at California "marginal" plants indicate large changes in behavior -- both on-peak and off-peak
- Price responsiveness of dispatch has seemingly diminished dramatically



June 1997: Encina Generation and Price



June 2000: Encina Generation and Price



Off-Peak Conclusions

- It now costs the market 13 times as much to raise generation levels as it did in 1997
- Substantial evidence exists for signaling -- change production levels to check the responses of other generators
- Replacing the internet with major generating units as "tom-toms"



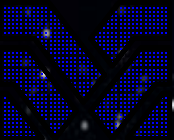
Regional Off-Peak

- Northern off-peak generation appears far more logical
- Marginal generating units in Oregon, and Washington do reflect traditional marginal dispatch rules
- Moving California plants to Oregon would increase generation from 30% to 50%



Optimal Dispatch: June 2000

- Encina 180%
- South Bay 164%
- Hermiston 100%
- Gadsby 120%
- Naughton 101%



Phase 2

- Since November 15th, California generators have changed their behavior from a form of price based market manipulation to physical manipulation
- Plant outages are "secret" but some plants have publicly admitted a three month planned outage cycle



Current EMR Outages

Western Generating Unit Outages

Current	Begins	Ends	Reason
CAISO units/<250/3671 total planned/unplanned*	NA	NA	
Colstrip #2/330/coal	10-Feb-01	?	unplanned*
Contra Costa #6/339/gas	05-Dec-00	?	maintenance
El Segundo #3/342/gas	29-Jan-01	?	maintenance
Escalante/235/coal	11-Feb-01	13-Feb-01	tube leak*
Etiwanda #4/333/gas	28-Jan-01	?	maintenance
Haynes #4/222/gas	05-Nov-00	Feb-01	maintenance
Haynes #5/341/gas	05-Nov-00	Feb-01	maintenance
Haynes #6/341/gas	05-Nov-00	16-Feb-01	maintenance
Hunter #1/440/coal	25-Nov-00	01-Apr-01	maintenance
Moss Landing #6/739/gas	01-Oct-00	?	maintenance
Navajo #1/750/coal	20-Jan-01	18-Feb-01	maintenance
Pittsburg #1-3/489/gas	10-Nov-00	?	maintenance
Redondo Beach #8/495/gas	11-Feb-01	?	unplanned*
San Juan #2/350/coal	10-Feb-01	14-Feb-01	tube leak*
San Onofre #3/1080/nuclear	02-Jan-01	20-Feb-01	unplanned

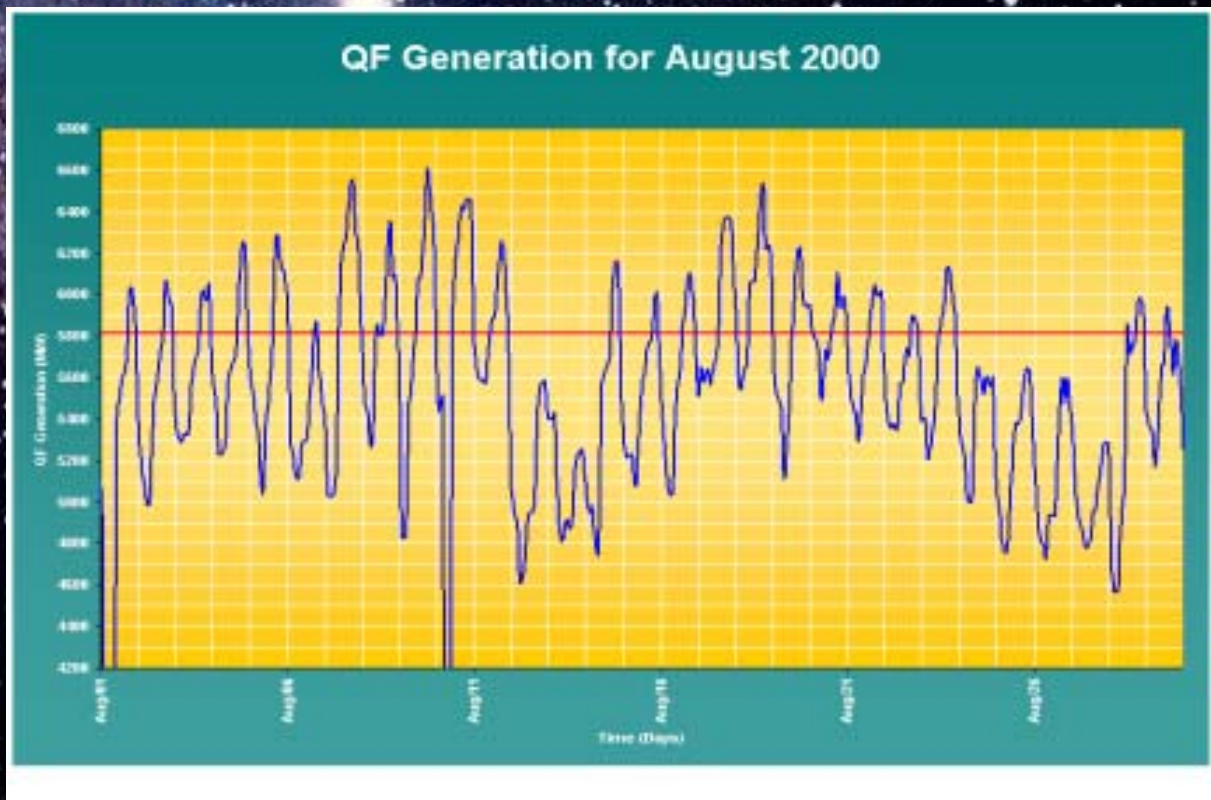


Inefficient Administered Markets

- The ISO is undertrained, undermanned, and inexperienced in its current role
- ISO dispatchers neither understand hydro (25% of the state's resources) nor have direct control over dispatch
- The ISO has no control over QF dispatch

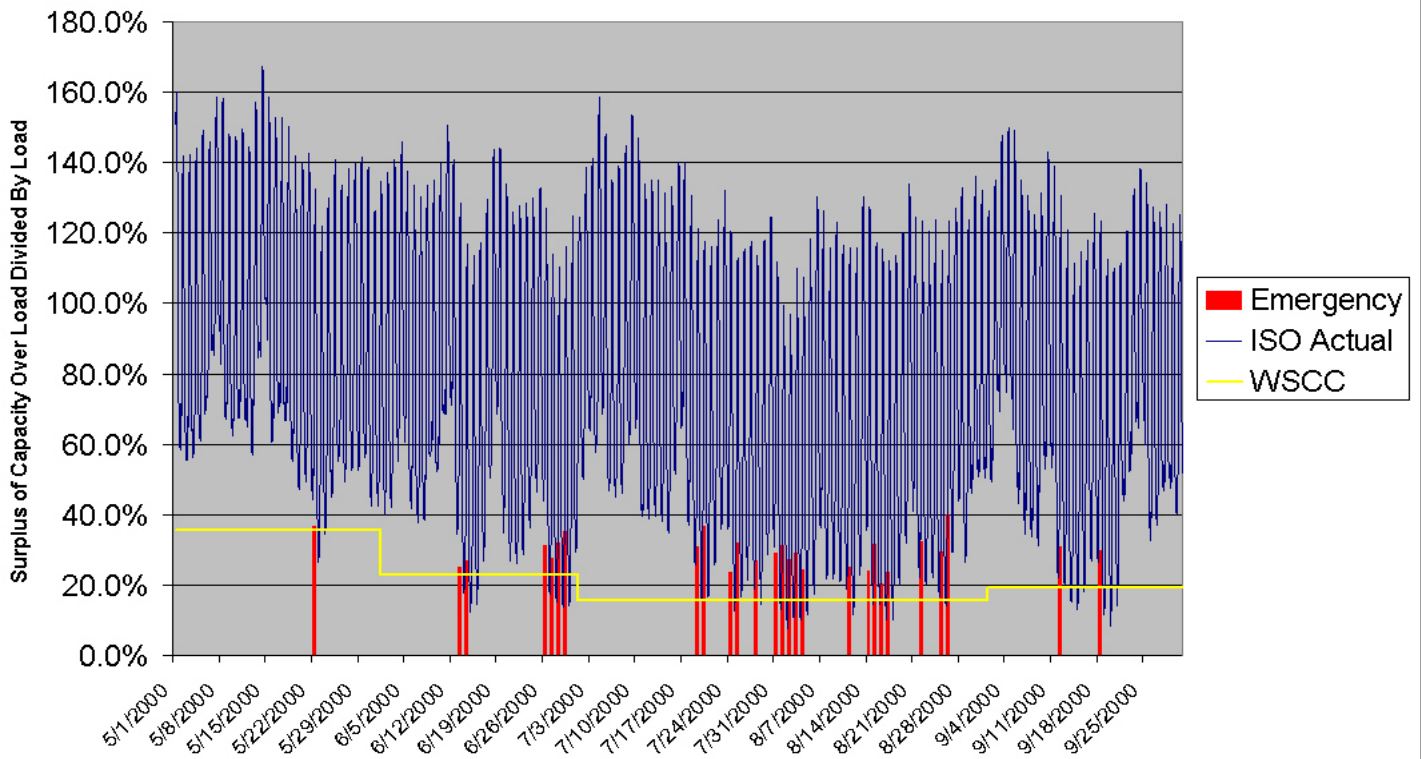


Missing QF Generation



Actual ISO Capacity Margins

Actual ISO Capacity Reserve Margins Compared To WSCC Summer Adequacy Report Forecasts



Solutions?

- Refunds
 - The ISO DMA has recently asked for \$5.5 billion
- Elimination of the daily capacity auction
- Direct dispatch of hydro and QFs
- Short term price caps
- Open information

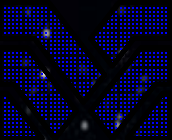
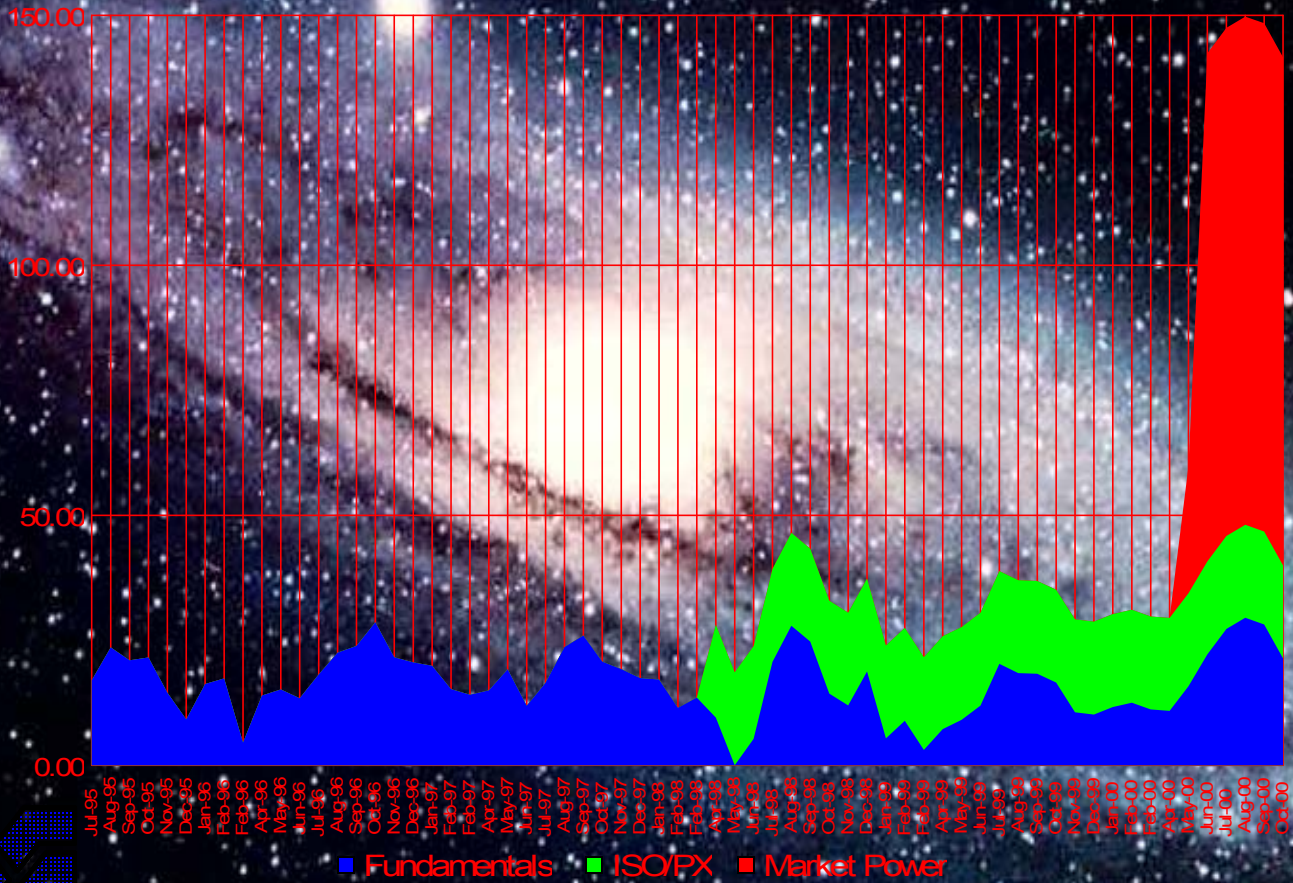


Calculated Refunds

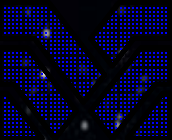
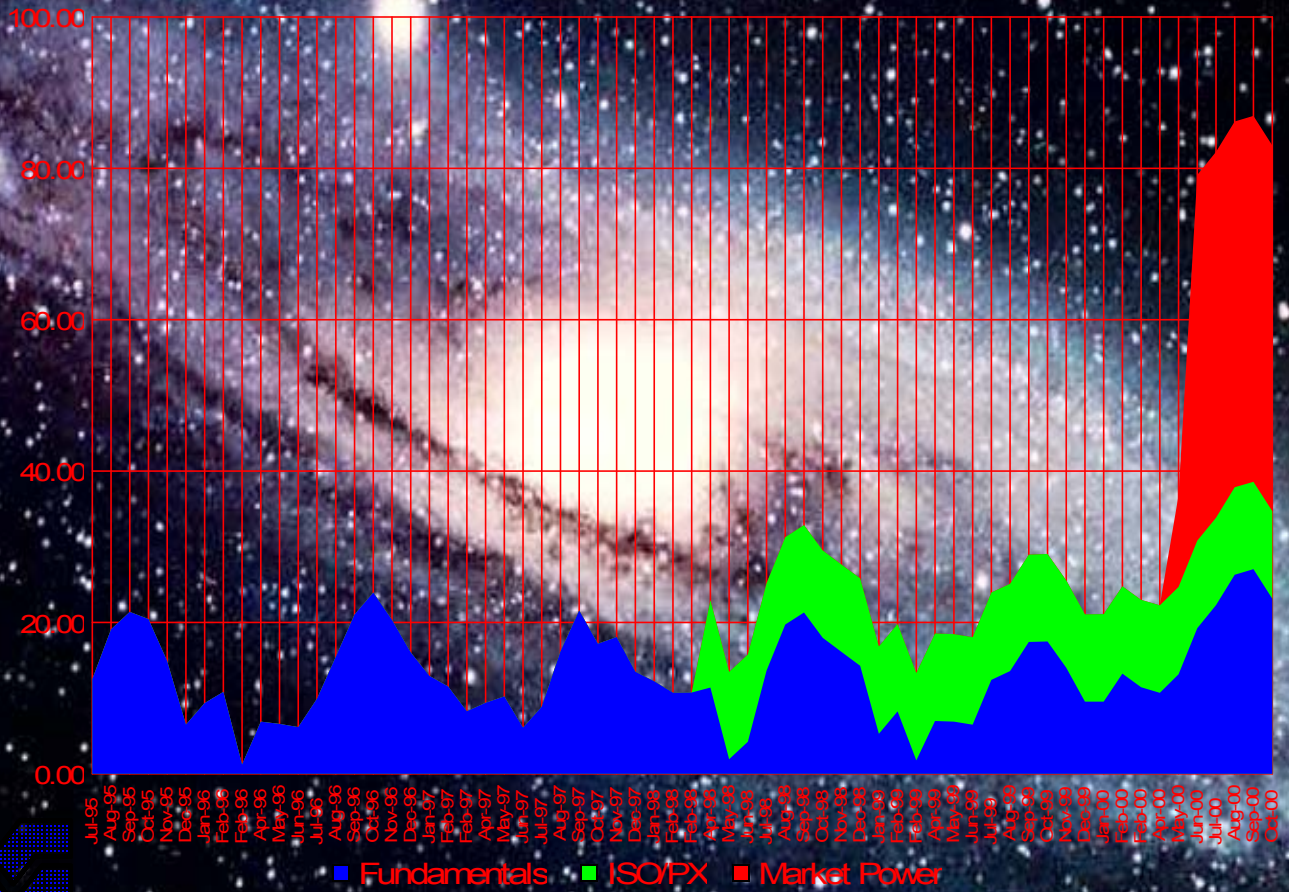
- On-Peak: 101.6 mills +/- 23.2 Mills
- Off-Peak: 48.4 mills +/- 11.6 Mills
- Refunds appropriate from May 22nd through October 31st
- Additional data will continue to refine estimates on a month by month basis



On-Peak Price Impacts



Off-Peak Price Impacts

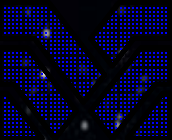


Resource Choices

- When you have a hammer, all problems look like nails
- At natural gas prices in the \$2.00/mmbtu range natural gas dominated regional resource choice
- At natural gas prices above \$3.00, modern coal units are considerably less expensive



Resource Screening Curve

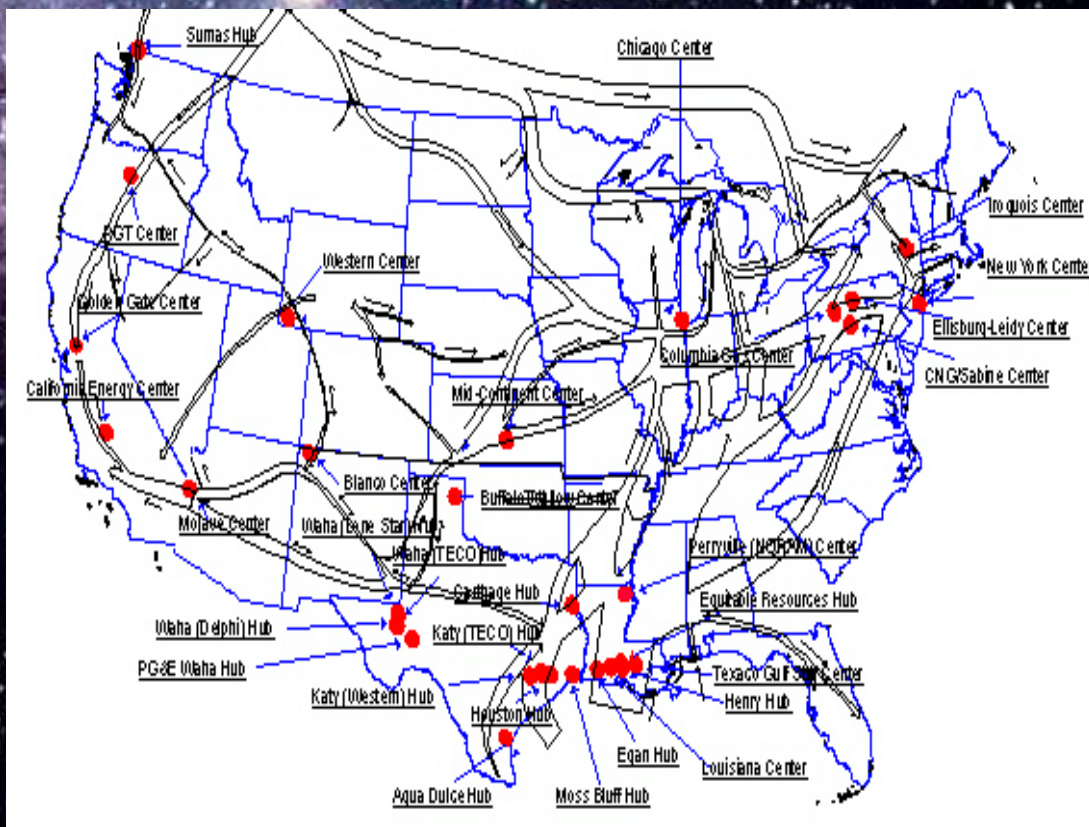


Coal Technologies

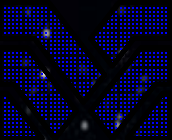
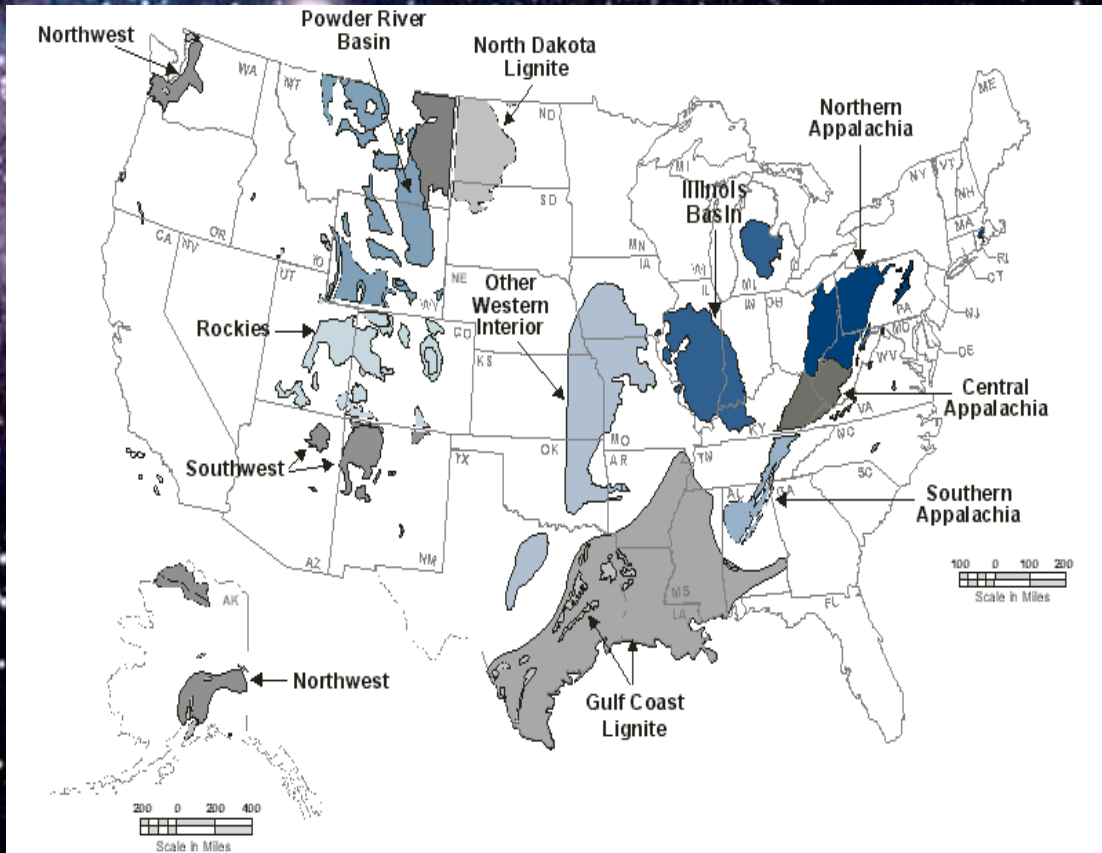
	Pulverized Coal Steam-Electric	Atmospheric Fluid- Bed Steam-electric Power Plant	Coal Gasifier Combined-cycle Power Plant	Pressurized Fluid- Bed Combined-cycle Power Plant
Configuration	1x300	1x200, circulating bed	1x540, Destec process	1x340, bubbling bed, supercritical
Status	Mature commercial	Mature commercial	Early commercial	Demonstration
Typical Application	Bulk power supply	Bulk power supply	Bulk power supply	Bulk power supply
Unit Capacity (MW)	300	200	540	340
Availability (%)	85%	90%	86%	81%
Heat Rate (Btu/kWh)	10,070	10,290	8,490	8,510
Overnight Cost (\$/kW)	\$1,650	\$1,930	\$1,480	\$1,340
Fixed Operating Cost (\$/kW/yr)	\$48	\$39	\$15	\$39
Variable Operating Cost (mills/kWh) ³	1.1	1.3	5.4	1.0
Development & Construction Lead Time (Months)	48/36	48/36	36/38	36/36
Cash Flow (%/yr)	1/1/1/2/25/45/25	1/1/1/2/25/44/25	1/1/2/25/45/25	1/1/2/25/45/25
Service Life (Years)	40	40	30	30
Comparative Levelized Energy Cost (cents/kWh) ⁴	4.4	4.7	3.9	3.5



Natural Gas Geography



Coal Geography





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