





Future Imperfect: 2001 To 2005

Robert McCullough
Managing Partner
McCullough Research



The Hindenburg Metaphor

- On May 6, 1937 the pride of Nazi technology crashed and burned at Lakehurst, New Jersey
- The tragedy was an example of a bad theory meeting unforgiving reality
- No large scale use of hydrogen has been tried since then



Future Imperfect

- News from the front
- Pricing in distorted power markets
- Market Expectations
- Meeting Reality



News From The Front

January 18th Stage 3 Emergency

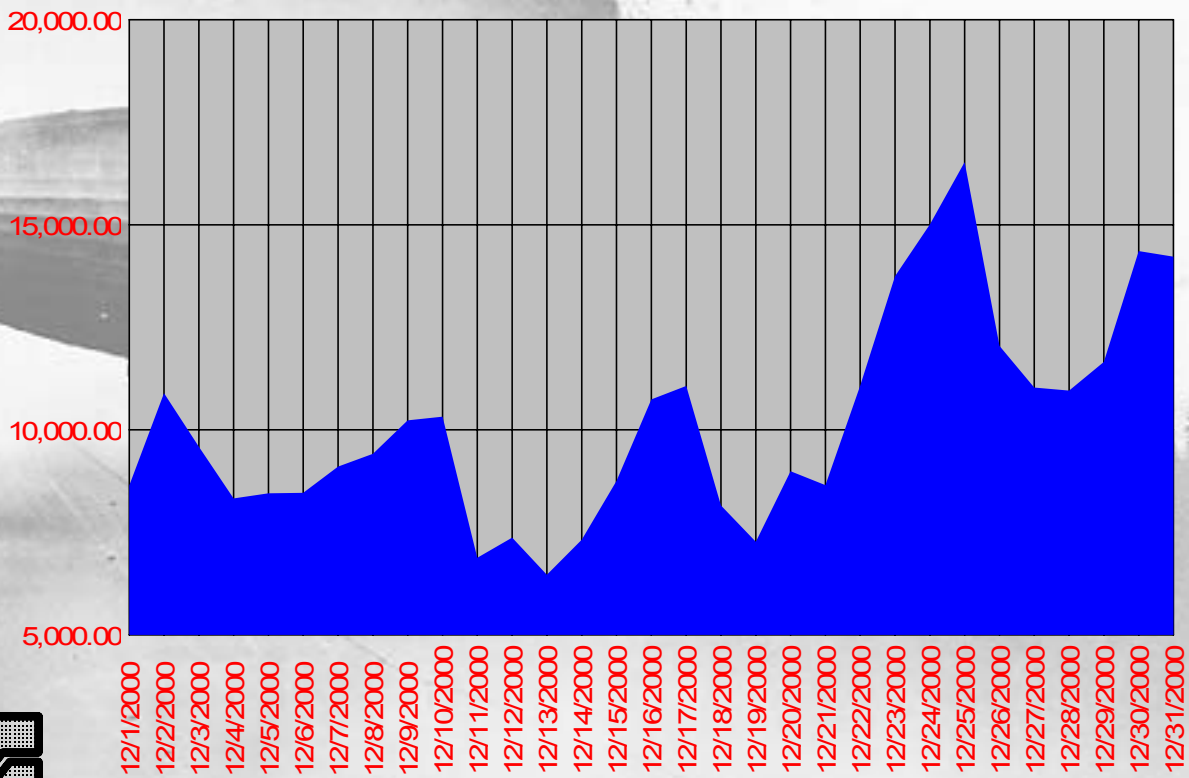
- Total resources: 47,532
- Outages: 12,574
- Loads: 29,503
- Actual Reserves: 5,455

AC Intertie

- Lightly loaded
- No path 15 problems



ISO Control Area Surplus In December



Pricing In Distorted Power Markets

- Prices Since May 22nd
- Market Power
- Governmental Intervention

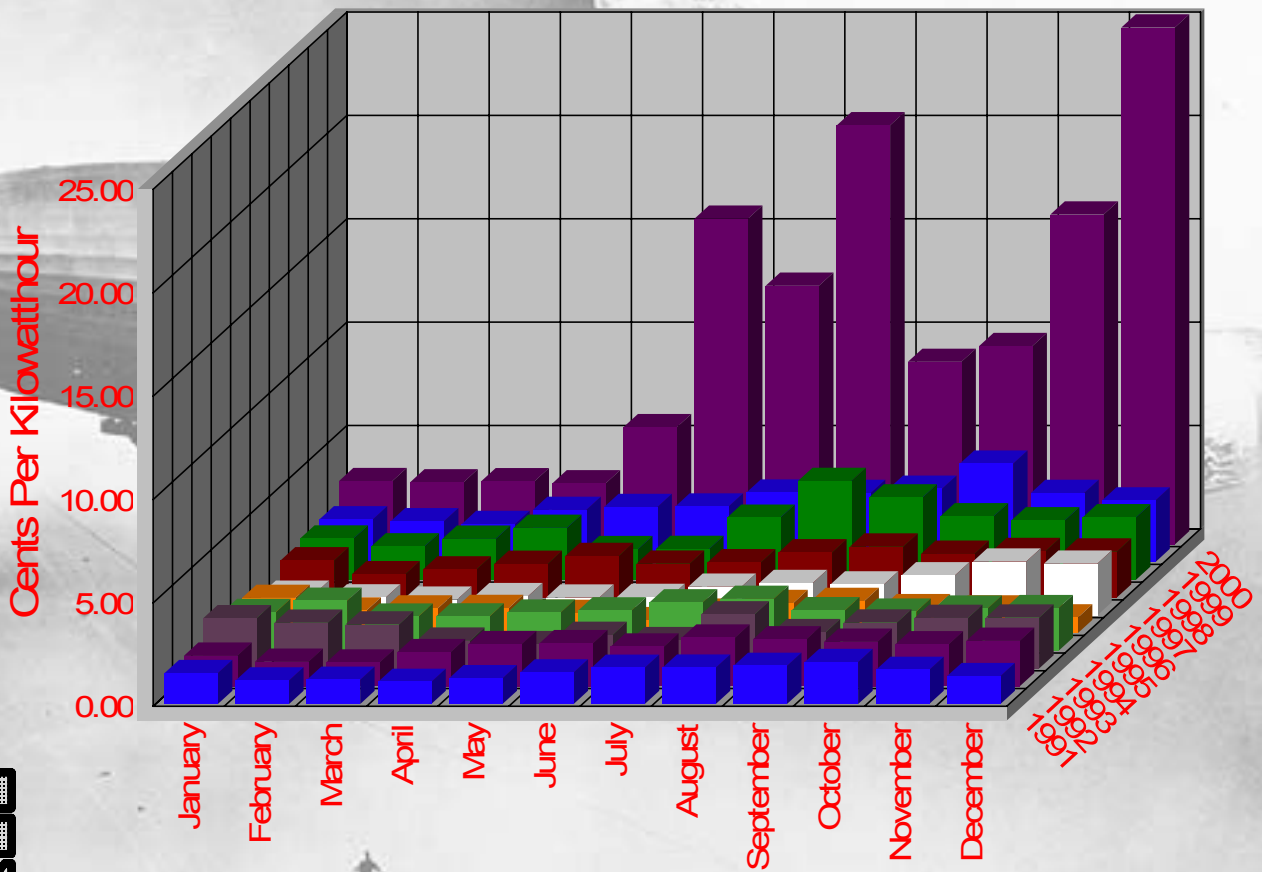


Prices Since May 22nd

- In spite of 2000 being a dull year with lower peak loads in most regions and average water, wholesale prices reached the highest level in history
- While some of the problem was caused by governmental intervention in California -- particularly ISO market interventions, a major explanation is the market power exercised by a small number of California players
- After November 15th, high prices reflected the longest and largest set of plant outages in U.S. history



Twenty Years



Market Power

- A careful review of plant operation show a dramatic departure from traditional economic dispatch
- In 2000, dispatch rates of major California plants approximated 50% in spite of some of the highest energy prices in history
- Dispatch of plants in the SCAQMD was approximately the same as that outside SCAQMD

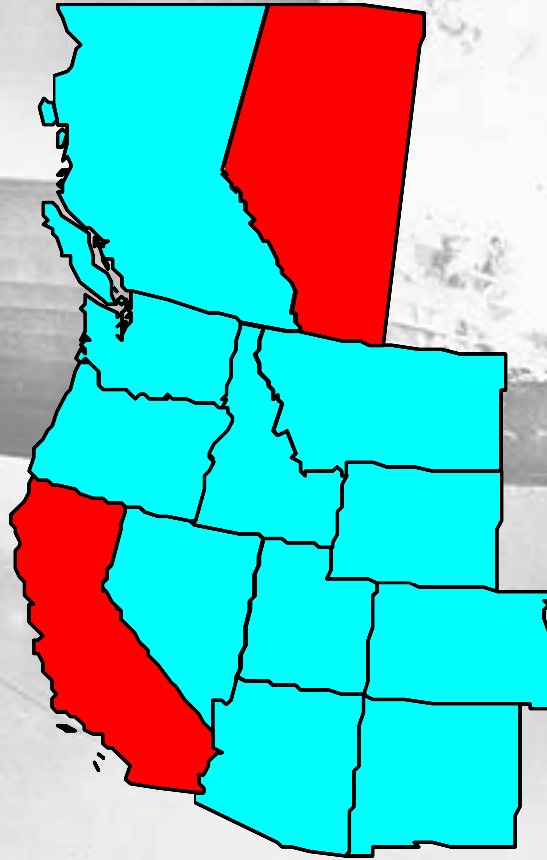


Governmental Intervention

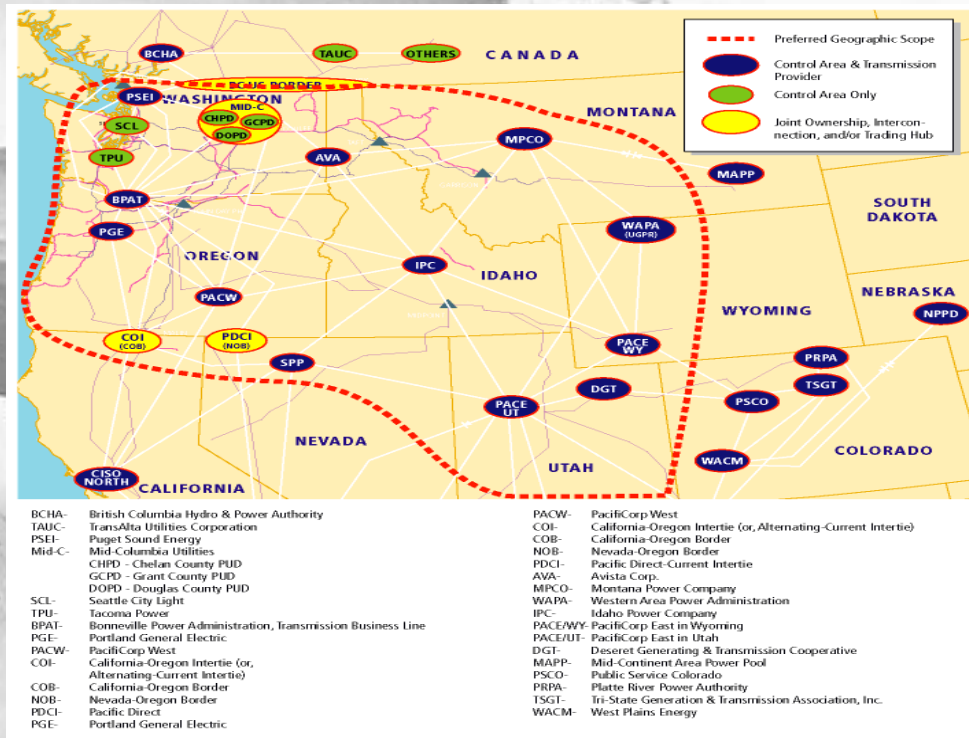
- The history since 1998 is that governmental control of bulk power markets has proved very expensive
- Alberta's experiment has been as bad in its way as California's
- Proposed RTO solutions for the Pacific Northwest may well extend these deadweight costs throughout the region



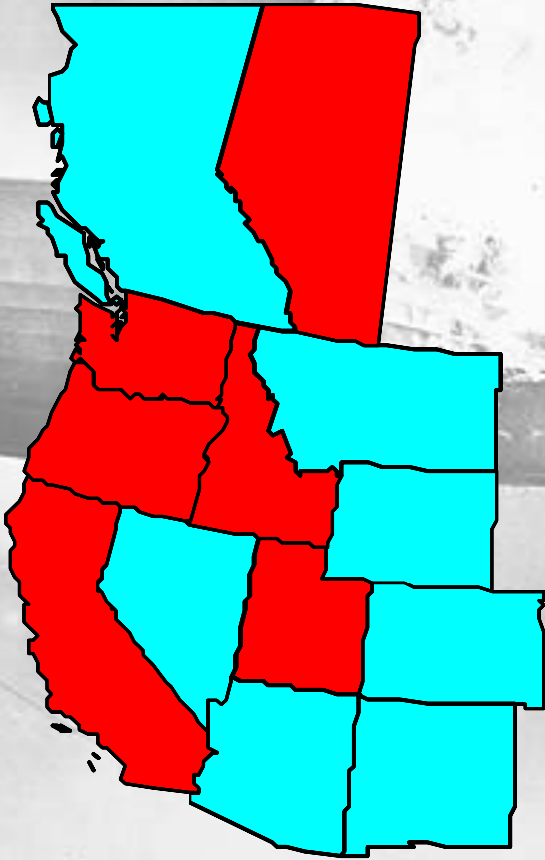
Current Intervention



Northwest RTO



Proposed Intervention

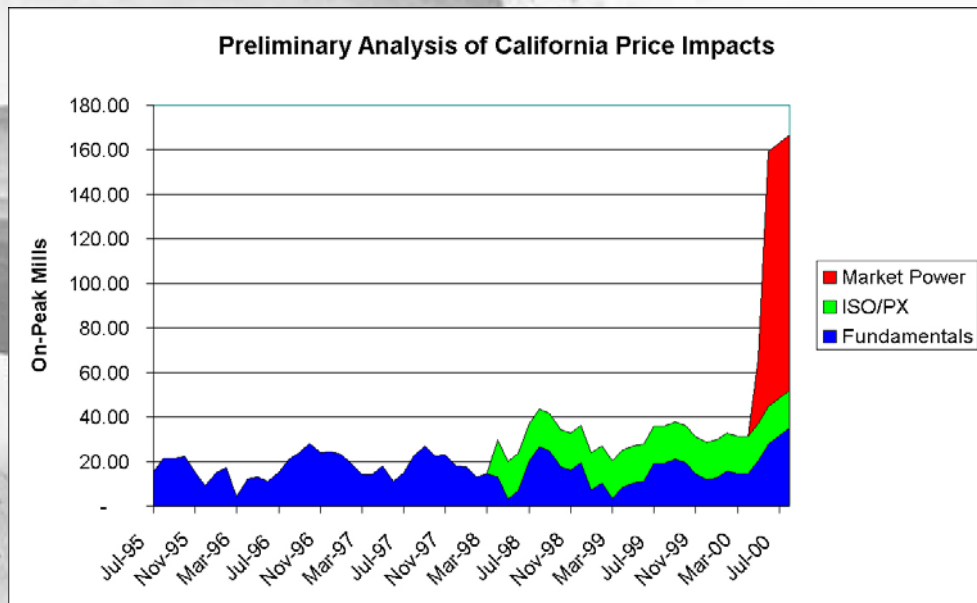


Naive Social Engineering

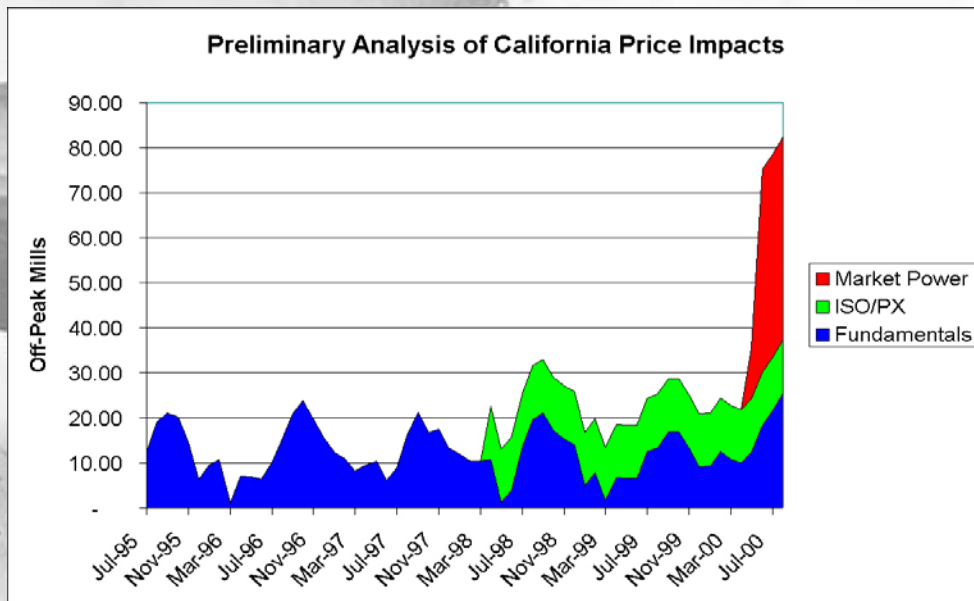
- John Chandley simply wants a more complex mechanism
- Stephen Angles compares the RTO to an air traffic controller
- Bottom line is that these are enormously costly solutions to minor problems



On-Peak Price Impacts



Off-Peak Price Impacts

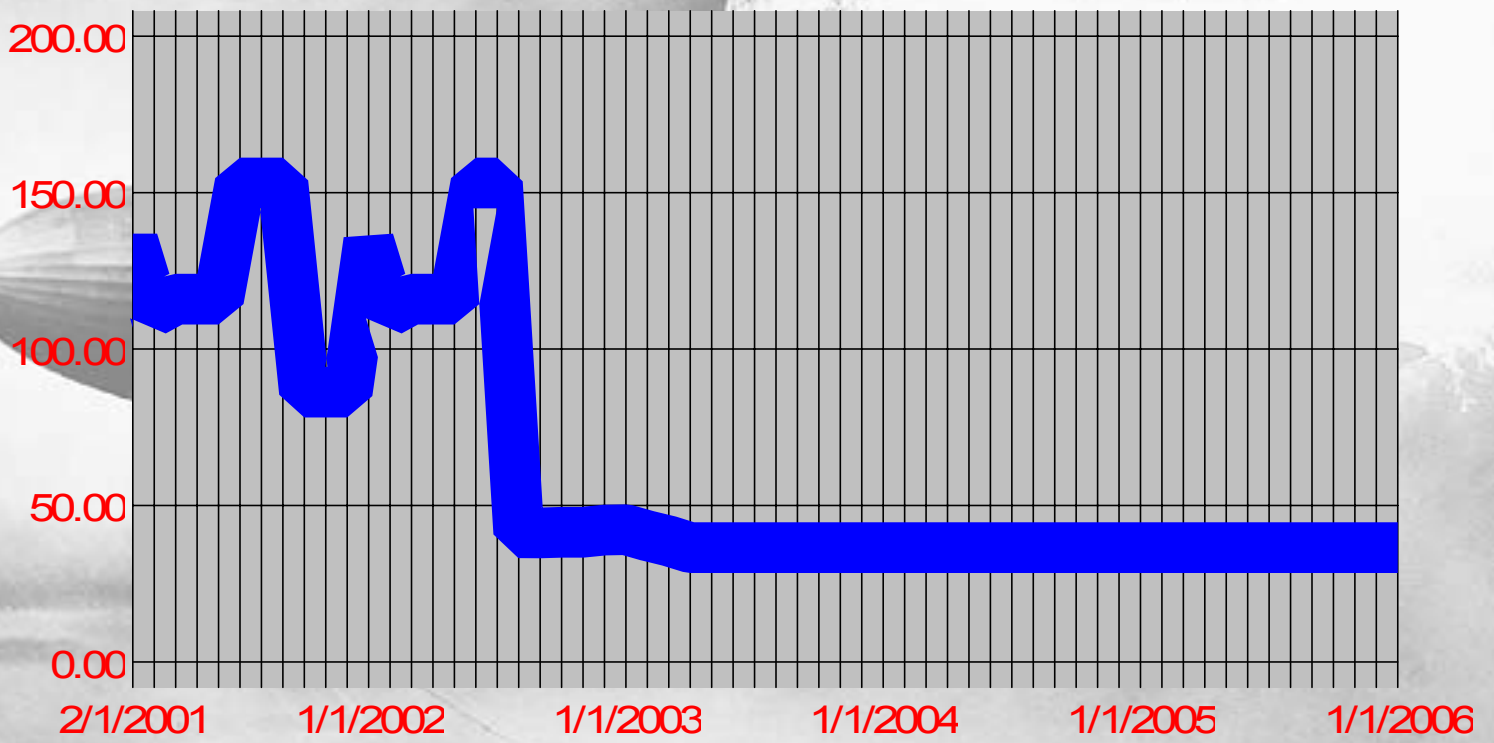


Market Expectations

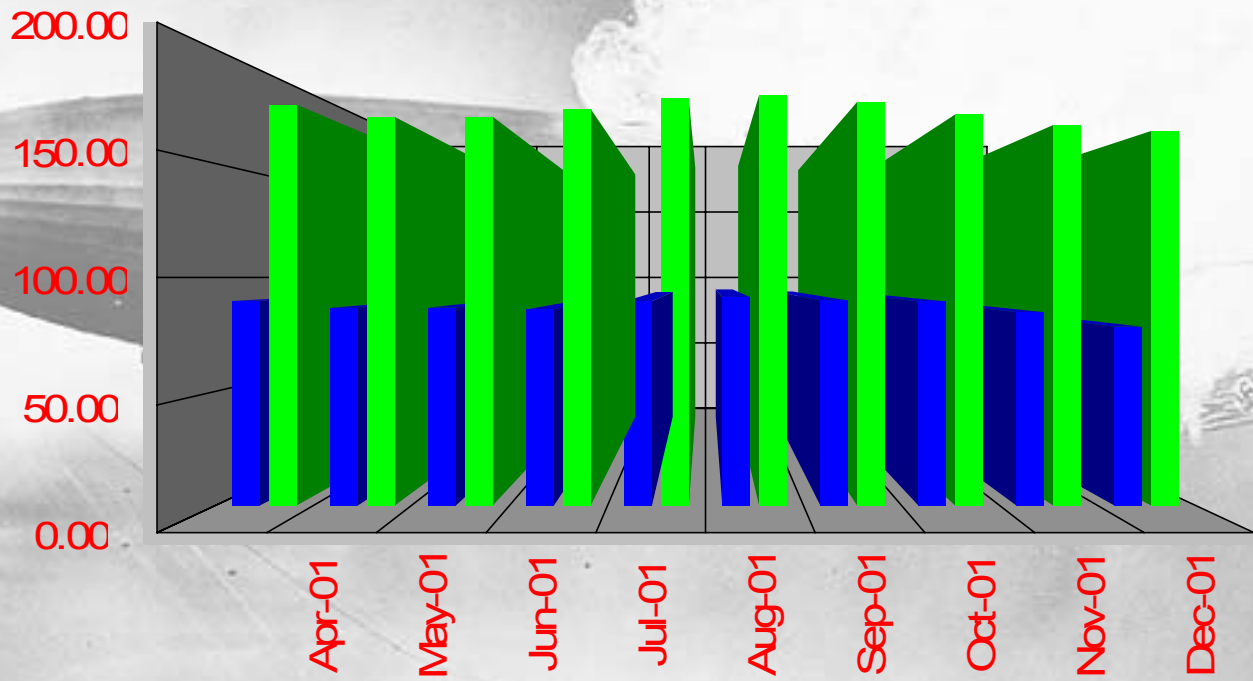
- "Future curves" are confused at best
- Most market participants predict prices reflecting short term distortions and long term natural gas prices
- While simple, these forecasts are hardly reassuring or very authoritative



Future Curves



Forecast For 2001



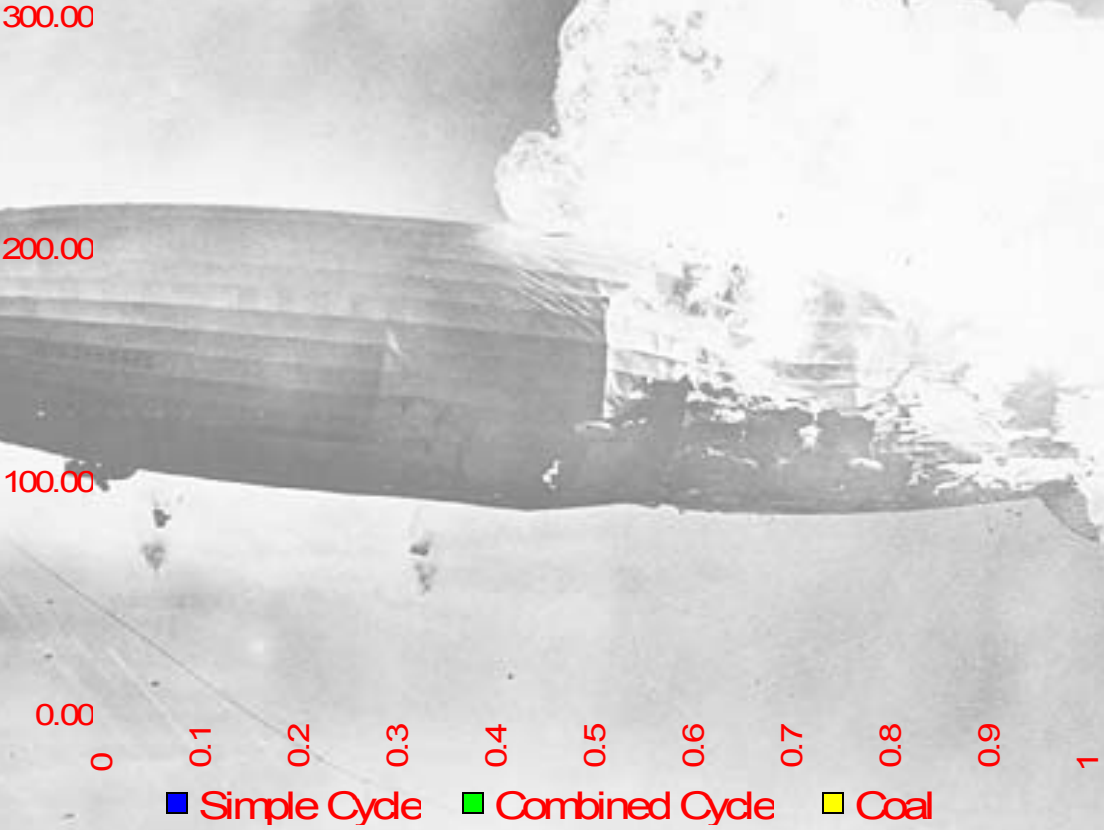
■ Off-Peak ■ On-Peak

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



Meeting Reality

- Social Engineering
- Market Power
- Fossil Fuel Prices
- Environmental Realities



Social Engineering

- Proposals to solve market problems have tended towards the expansion of governmental intervention and ownership
- Little attention has been given to the role of the failures of the California ISO in the crisis
- We may well expand this failed concept before eliminating it



Market Power

- The current round of plant construction in California does little to diversify ownership in a deeply concentrated market
- California has managed to find a short during a period with a 40% reserve margin
- To reach even this level of margin will require 12,000 new megawatts of generation in California



Fossil Fuel Prices

- The only fuel being considered in the current round of power plants is natural gas
- Natural gas supply and demand balance is likely to get far worse over the next two years rather than better
- December's run up in Sumas prices reflected a real shortage -- not a California theoretical exercise



Environmental Realities

- The I5 corridor -- from San Diego to Vancouver -- is dominated by environmental concerns
- Heavy handed political exploitation of the California crisis is more than likely to create overreaction towards the environment



Bottom Line

- There is little evidence that much has been learned from the disaster since May 22, 2000
- A number of players, like FERC, are still placidly proceeding down the same path
- Political solutions are seldom natural winners in economic arenas

