The California Energy Crisis and its Aftermath: A Regulator’s Perspective

Aaron J. Johnson
Regulatory Analyst
Division of Strategic Planning

Opinions expressed herein are those of the presenter and are not official CPUC positions
California Public Utilities Commission

Presentation Overview

- Background on CPUC
- Background on California energy system
- AB 1890 and the plan to deregulate
- The California energy crisis of 2000-01
- California’s actions during the crisis
- California’s actions since the crisis
- What remains to be done
CPUC Background

- Constitutional agency
- Formed in 1911 in response to railroad abuses
- Physically separated from state capital to create independence
- Quasi-legislative, quasi-judicial organization
- Regulates private utilities in electricity, gas, telecommunications, water, transportation, rail safety, and hot air balloons
- Clearinghouse for customer utility complaints
CPUC’s Role in Energy Issues

• Set rates & requirements
• Enforce compliance (including levy fines)
• Safety standards
• Distribute public goods funds
• Site transmission lines, include environmental review
• Most important: CPUC can tell the utilities what it wants them to do and controls the purse strings for those actions
The CPUC regulates about **$48 billion** in economic activity, roughly four percent of California’s gross state product of $1.2 trillion, the 6th largest economy in the world.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Economic Value (2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>$17.1 billion</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$7.6 billion</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>$19.3 billion</td>
</tr>
<tr>
<td>Rail</td>
<td>$2 billion</td>
</tr>
<tr>
<td>Passenger Carriers</td>
<td>$.77 billion</td>
</tr>
<tr>
<td>Household Goods Carriers</td>
<td>$.36 billion</td>
</tr>
<tr>
<td>Vessel Operators</td>
<td>$.04 billion</td>
</tr>
<tr>
<td>Water</td>
<td>$.86 billion</td>
</tr>
<tr>
<td><strong>Grand Total:</strong></td>
<td><strong>$48 billion</strong></td>
</tr>
</tbody>
</table>
California Public Utilities Commission

CPUC Organization

President and Four Commissioners

Office of Ratepayer Advocates (123)

Executive (50)

Industry Divisions

Energy (86)

Administrative Law Judges (69)

Telecommunications (72)

Consumer Protection & Safety (161)

Water (36)

Strategic Planning (6)

Consumer Services & Information (69)

Legal (81.5)

Information & Management Services (97)

850.5 Positions
California Public Utilities Commission

CPUC PROGRAM SUPPORT EXPENDITURES BY FUNDING SOURCE
2004 - 05 FISCAL YEAR
$101,148,000

- Vessels, Pipelines $240,000
- Transportation Rate Fund (household goods carriers) $1,306,000
- State Highway Account, State Transportation Fund (railhighway crossing safety) $2,395,000
- Public Transportation Account, State Transportation Fund (Rail Safety, AMTRAK Safety) $2,300,000
- Railroad Corporation Safety $3,473,000
- Passenger Vehicle Operators $3,982,000
- Reimbursements (CEQA, WMDV/BE, Merger, Reasonableness Reviews, Reporting Services) $12,706,000
- Federal Trust Fund (gas safety) $933,000
- Electric Corporations $23,210,000
- Water Corporations $10,880,000
- Telecommunications Corporations $20,448,000
- Gas Corporations $12,753,000

- PUC UTILITIES REIMBURSEMENT ACCOUNT
- REGULATION OF UTILITIES
- PUC TRANSPORTATION REIMBURSEMENT ACCOUNT
- REGULATION OF TRANSPORTATION
California Public Utilities Commission

Other California Energy Agencies

- CA Energy Commission (CEC)
  - Includes research, forecasting, generation siting, program administration
- CA Independent System Operator (CAISO)
  - Transmission grid operation and wholesale market administration
- Electricity Oversight Board (EOB)
  - Monitoring and authority over CAISO
- CA Power Authority (CPA)
  - Issue bonds to build generation (currently unfunded)
- Municipal Electric Utilities & Irrigation Districts
- Federal Energy Regulatory Commission (FERC)
  - Interstate commerce: wholesale power contracts & high voltage transmission costs
Energy Used In California During 2003 - By Source

- Natural Gas: 36.9%
- Nuclear: 15.2%
- Large Hydro: 17.7%
- Coal: 21.3%
- Biomass: 2.0%
- Geothermal: 5.0%
- Small Hydro: 1.9%
- Solar: 0.3%
- Wind: 1.3%

Renewable Share: 10.4%
California Public Utilities Commission

Total Electricity Use per Capita 1960-2000

Source: CEC
California Public Utilities Commission

California Electricity Rates Compared to Other States (cents/kwh)

Note: The 2001 Adjusted CA Rate is 13.68 cents/kwh

7 Highest States

- HI 16.83
- ME 14.69
- RI 13.64
- NH 11.80
- CT 10.35
- VT 10.57
- CA 9.68

California Moving Up

CA 1999
CA 2001

18 November 2004
California Public Utilities Commission

California Electricity Rates 1970 - 2003


Residential
Small Business
Large Business
California Moves to Deregulate

- Driven by large industrial customers in search of lower electricity rates
- White paper process at CPUC in 1993-94 commences the process
- Legislature intervenes, cuts a deal with everyone, passes AB 1890 unanimously in 1996
- Market to commence in 1998
AB 1890 Restructures the CA Market

- Promises 20% rate reduction (likely anyway)
- 10% rate reduction now paid by bonds (net 3% reduction)
- Utilities encouraged/forced to sell generation
- Caps rates for four years or until utilities pay off stranded costs (no set dollar value) – benefit to utilities not customers
- CAISO to operate grid and administer real time market
- CA Power Exchange (CAPX) to serve as power pool clearinghouse, where regulated utilities must buy and sell all power; no long-term contracting authority
- Retail competition begins immediately for large and small customers alike
Early on, CA Deregulation Looks Good

- Market starts only 3 months late, 31 March 1998
- Utilities sell off entire fleet of aging thermal generation, fetching 2-3X book value
- Utilities keep nukes and hydro initially
- Wholesale prices low for first two years, driven by cheap natural gas in US markets
- Utilities recovering their stranded costs quickly, expect to end rate freezes early and for rates to fall
- No new generation being built in California in 1990s due to existing glut and economic downturn in early 1990s and then “regulatory uncertainty” around deregulation
- Direct access thrives with large users (15% of load migrates) but fails with residential customers (2% of load migrates)
California Public Utilities Commission

Trouble Comes…

• Enron pulls out of residential direct access market
• In spring 2000, San Diego pays off its stranded costs, ends rate freeze, and has retail prices tied to markets
• Hot day in late May 2000 – prices rose and they never came down
• Utilities begin losing money under scheme to cap retail rates for stranded cost recovery
• Summer problems morph into emergency situation during low demand winter period
• Direct access customers return to the utilities
  – 15% of load pre-crisis vs. 2% post-crisis
• Clinton FERC vs. Bush FERC: no difference as federal government fails to address problem
California Public Utilities Commission

Average Monthly Energy Prices Skyrocket Until FERC Acts

(excludes Ancillary Services Costs and Out of Market Costs)


FERC June 19th Order Setting Price Caps & "Must Offer" Requirement.

DWR signs Long-Term Contracts for $45 Billion

Source: Chart prepared by CPUC Energy Division. Data from CAISO [http://www.caiso.com/docs/2001/03/22/2001032214552322811.pdf] and DWR Revenue Requirement Filings

18 November 2004
“Perfect Storm” film analogy
  - No new generation built in the state, driven by strict environmental standards for siting & emissions
  - Existing fleet of thermal plants was old, breaking down
  - High demand fueled by hot summer and hot dot-com economy
  - Low hydro conditions in the Pacific Northwest
  - Natural gas prices spiked
  - Price caps prevent people from seeing costs and responding to the crisis
  - Poorly designed wholesale market does not allow utilities to sign long-term contracts
What Went Wrong?: The Reality

- California peak loads were lower in 2000 than in 1999 and 1998
  » Source: California Energy Commission– Electricity Demand “1988-2000 Historical Coincident Peak Demand and Operating Reserves”
- Pacific Northwest hydro was slightly below average in 2000 (92%) and poor in 2001 when prices recovered (74%)
  » Source: National Weather Service, Northwest Power Pool
- West Coast actual reserve margins in 2000 and 2001 were higher than they had been since 1992
  » Source: Western System Coordinating Council, Summary of Estimated Loads and Resources
- Electric prices from June 2000 through July 2001 went up 670%. Natural gas prices in California went up only 210%. National gas prices for utilities went up only 128 %
What Went Wrong?: The Reality (cont’d)

• During the energy crisis, California steam plant generation was only 50%.
  » Source: EPA Clean Air Market Programs Emissions Tracking System: Hourly Emissions Data

• Comparable plant availability nationwide in 1996 through 2001 was 84%.
  » Source: North American Electric Reliability Council (NERC), Generating Availability Report weighted by type and number of plants in California.

(Source: Robert McCoullough website)
California Public Utilities Commission

Age of CA Power Plants owned by Non-Utilities

- 40-49 yrs.: 41%
- 30-39 yrs.: 23%
- 20-29 yrs.: 8%
- 10-19 yrs.: 11%
- <10 yrs.: 3%
- 50+ yrs.: 14%

18 November 2004
California Public Utilities Commission

California Historical Generation Outages 1999-2004

- MWs Off-Line
- 2002 - 2003 - 2004

Graph showing MWs Off-Line from January to December for the years 1999 to 2004.
California Public Utilities Commission

California Generation Exceeds Demand: January 2000 – February 2002

[Graph showing trends in installed power, out-of-service plants, and available power from January 2000 to February 2002]
Total Electricity Use Remains Constant while Costs Rise

Utility Electricity Use and Costs
1999 - 2002

Total Utility Electricity Costs
Utility Load

- $0
- $5
- $10
- $15
- $20
- $25

- 40,000
- 80,000
- 120,000
- 160,000
- 200,000

- 1999
- 2000
- 2001
- 2002
What Happened?

- Gaming
- Market manipulation
- Withholding of generation
- Poorly designed market
- Poor responses by regulators and policy makers, federal and state
California’s Response to the Energy Crisis

- State steps into buy electricity on behalf of the utilities (Department of Water Resources via AB 1X)
- Eventually raises rates 40%
- CAPX goes bankrupt & CAISO changes governing board
- Sell bonds to pay for cost of energy crisis
- DWR signs $42 billion in long-term supply contracts
- Money for conservation (SB 5X), public add campaign
- 20/20 program to encourage conservation
- Froze direct access take-up (AB 1X)
- State streamlines generation siting rules
- Long-term contracting authority & eliminates ex post reasonableness review (AB 57)
Other Actions & Events that Changed the Tide of the Crisis

- Enron memos, Perot software company allegations change public perception of crisis from California incompetence to market manipulation
- El Paso affiliate contract for natural gas ends in May 2001 and natural gas prices drop to historic levels
- New Bush FERC takes action in June 2001
  - Introduce price caps but more importantly must-offer obligation on all generators
- Tech bubble bursts & merchant generator sector tanks during 2001
  - Wall St. loses confidence in US industry sector because of high levels of debt as result of Enron revelations
- New generation starts coming online
What California Accomplished in the Aftermath of the Crisis

• Rescued PG&E from bankruptcy and returned two major investor-owned utilities to creditworthiness status with Wall St. via further headroom schemes for debt recovery
• Removed the State from the electricity buying business and returned utilities to their traditional electricity procurement role
• Commenced integrated resource planning-like process
• Litigated approximately $3 billion in refunds from FERC
• De-coupled electricity sales from utility profits as was in practice prior to deregulation to encourage conservation
• Created generation maintenance standards for merchant generation to ensure plant availability during peak load periods
What California Accomplished in the Aftermath of the Crisis (cont’d)

- CEC re-entered the business of bi-annual state energy forecasting
- Built 8,000+ MWs of new gas-fired generation from 2001 through present
- Renewable Portfolio Standard legislation requiring 20% of CA energy to come from renewables by 2017 (current 12-13%)
- Assisted in derailing FERC’s efforts to institute a standard market design (SMD) across the US
- Authorized the building of an upgrade to Path 15, the central transmission line between north and south CA
- Instituted a “cost responsibility surcharge” – an exit fee-like mechanism, to revive direct access
State Agencies’ Energy Action Plan
(adopted March 2002)

1. Start with energy efficiency and demand side reductions; including considering climate change
2. Increase renewable generation more quickly than currently called for by law
3. Ensure reliable, affordable electric generation, including design of fair markets and adequate reserve levels
4. Upgrade and expand transmission and distribution systems
5. Promote clean distributed generation
6. Ensure reliable and affordable natural gas supply
Regime Change: Governor Recalled
California Public Utilities Commission

Governor’s Energy Plan
(as described by key aid in September 2004)

1. Resource Adequacy
   – New Generation
   – Repower/retrofit existing plants
2. Transmission
3. Wholesale market reform/competitive procurement
4. Rate relief
5. Increasing natural gas supplies (LNG)
6. Retail choice (utility service or other options)
7. Renewable energy
8. Energy efficiency
Governor’s Energy Plan in Practice

• Low level of apparent direct involvement or shaping of post-crisis activity by energy agencies
  – Appoints two members to CPUC for January 2004
• Recent editorial stated two goals: rate relief and new power plants
• Tried to pass bill at end of legislative session requiring 50% of new buildings to have solar PV
• Voiced support for RPS but vetoed bill to move implementation date from 2017 to 2010 because it inhibited secondary trading market
• In vetoing AB 2006, major electricity bill of last session, says no new laws needed for now, CPUC just needs to do its job
• Primary energy staffer advocating for short-term capacity markets to let utilities buy now for all customers but to allow possible re-introduction of direct access later
California Public Utilities Commission

What Remains to be Done?

• Procurement, procurement, procurement
  – IOU procurement process is ad hoc IRP
  – Can the CPUC adhere to the loading order contemplated in the all-agency Energy Action Plan?
  – Authorize long-term utility supply plans, which include reaching reserve margins of 15-17% by 2006

• Determine if hybrid system of plant building is here to stay: can IOUs and merchant generators co-exist and compete?
  – SCE builds Moutainview (1050 MW)
  – SDG&E to build Palomar (550 MW), contract for Otay Mesa (570 MW)

• Retail choice: frozen until 2013 when final DWR contracts expire
  – Can it be re-opened without cost shifting between large and small customers?
  – Draws ideological battle lines but who is left to adopt direct access?
  – Community choice aggregation

• Wholesale market redesign
  – MR2000, MD02, MRTU et al – does it matter anymore?
What Remains to be Done? (cont’d)

• Implement RPS
  – Solicitations underway for all three IOUs, approx 600 MW so far
  – Potential problems loom with transmission: Tehachapi

• Energy efficiency
  – Should CA change administration structure?
  – Can EE be integrated into the procurement process? ($280M/year PGC funds + $100-250M in procurement going forward)

• Demand response: can pilot programs be expanded or are interruptible programs enough?

• Distributed generation costs and benefits for the distribution system

• Natural gas: is it time to build LNG in CA?

• Transmission planning and siting
  – Should another agency take over this function?
  – Can the CAISO develop a universal methodology to measure the economic benefits and trade-offs of new transmission lines?
California Public Utilities Commission

Summary of this Regulator’s Observations in the Aftermath

• California consumers care about reliability more than price
• Planning is a good thing
• Downside risk is too great for lofty experiments
  – Change is mostly complete in California at this point though
• Go slow and have a backup plan when undergoing change
• Over-compensating for past mistakes just plants the seeds for the next problem
• Use competitive forces where appropriate but do not rely on price signals or the market to provide a planning function
• California’s electricity industry is in good shape heading into the future