

BLACK AND BLUE: THE CALIFORNIA ELECTRICITY RESTRUCTURING SAGA

**presentation by
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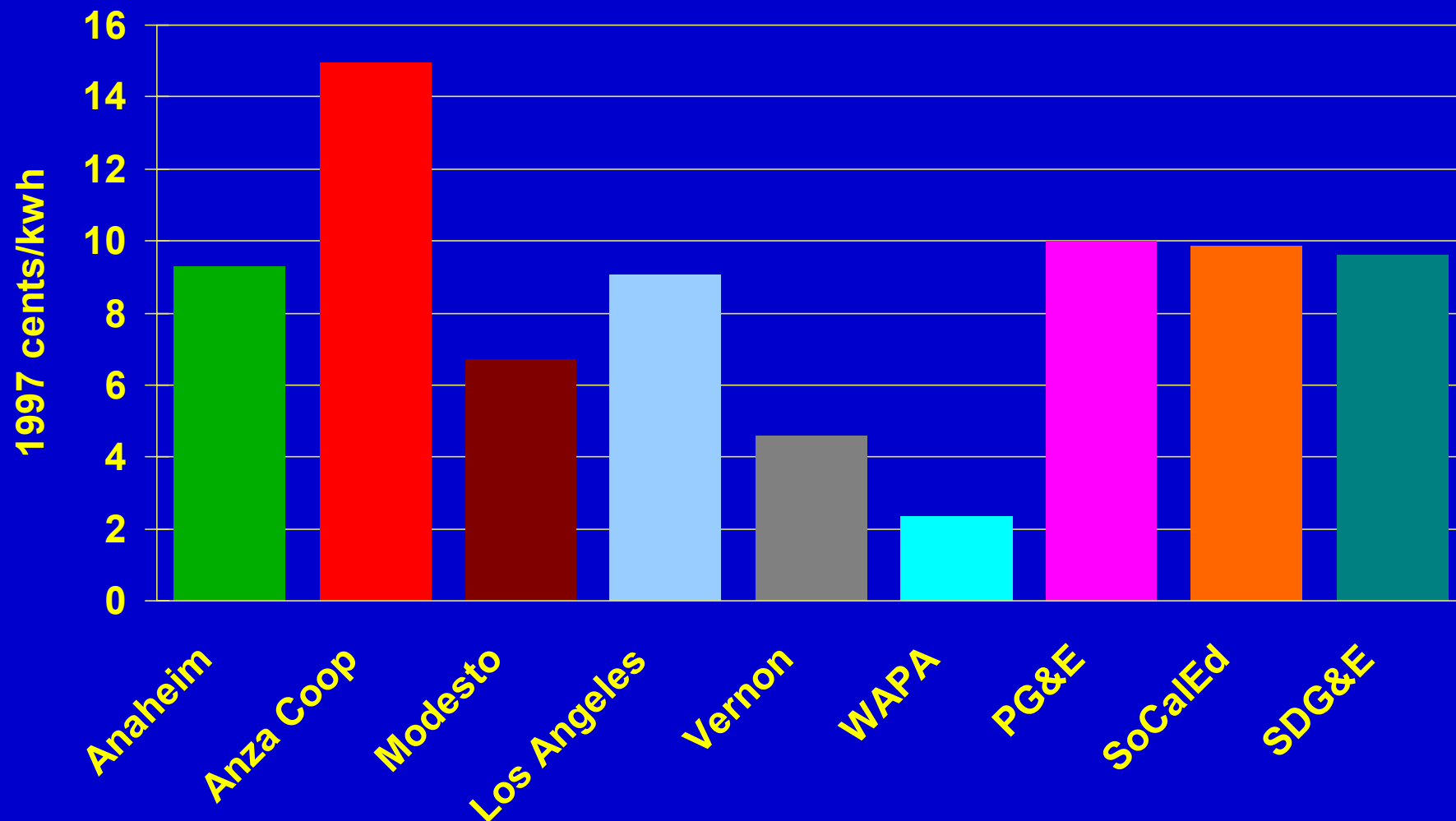
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OUTLINE

- ☐ **The backdrop for the California developments**
- ☐ **Basic thrusts of California restructuring**
- ☐ **Performance of California markets in year 1**
- ☐ **The situation in summer 2000**
- ☐ **The prices in summer 2000**
- ☐ **The December 15, 2000 FERC order**
- ☐ **The winter 2000 - 2001 situation**
- ☐ **The State plan**

1997 AVERAGE RATES IN CALIFORNIA



CALIFORNIA DEVELOPMENTS

- ❑ The December 1995 CPUC restructuring decision and the 1996 enactment of AB 1890 establish the creation of the ISO and PX as two independent entities**
- ❑ All stakeholders – IOU's, municipals, IPP's, marketers, customers, public interest groups – participated in the specification of the restructuring framework and filings**
- ❑ The ISO and PX and the implementation of direct access operational as of March 31,1998**

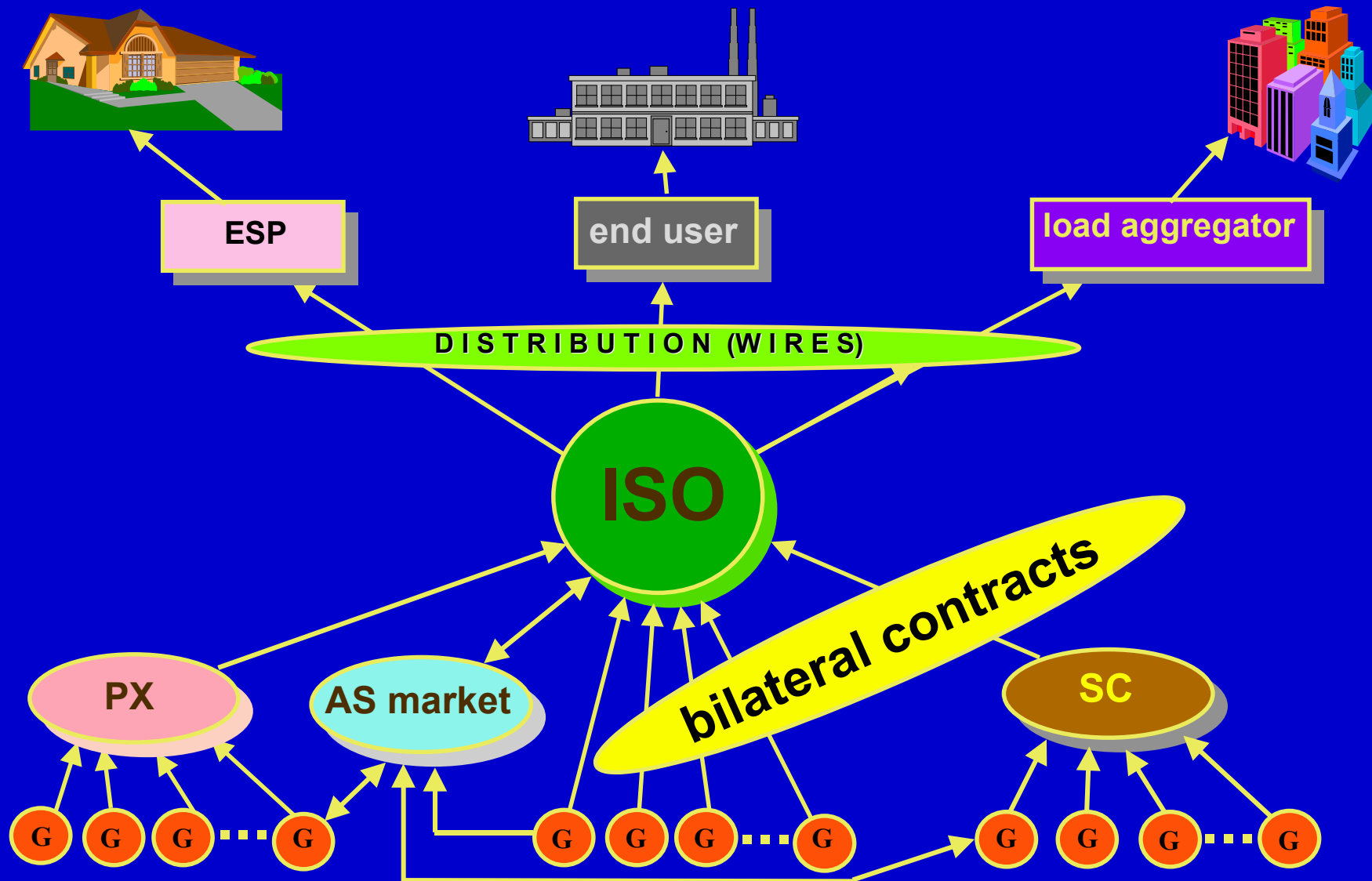
CALIFORNIA DEVELOPMENTS

- ❑ **Financing mechanism was established to allow a 10% rate reduction for residential and small commercial customers**
- ❑ **A rate cap was imposed for large commercial and industrial customers for 1998 - 2001**
- ❑ **Full recovery of stranded costs is possible for all IOU's through the imposition of non-bypassable *competition transition charges***

SALIENT CHARACTERISTICS

- ❑ **Basic principles embodied are**
 - **customer choice**
 - **competition in generation**
 - **open access transmission**
- ❑ **Physical direct access: flow-based bilateral transactions coexist with the PX spot market**
- ❑ **Independence of the ISO and PX: separation of security and economics functions**
- ❑ **ISO has primary responsibility to facilitate transactions while maintaining system reliability/security**

THE CALIFORNIA SYSTEM



THE CALIFORNIA ISO AND THE PX

- ❑ **CALSO** created as a not-for-profit public benefit corporation responsible for
 - transmission system operations and control
 - provision of open access
 - maintenance of system reliability/security
 - operation of real-time energy markets
 - provision of ancillary services
- ❑ **CALPX** is an independent entity responsible for
 - operation of the forward markets
 - balancing buyers' demands and sellers' supplies
 - provision of reference market clearing signals

AB 1890 PROVISIONS

- ☐ IOUs required to divest themselves of fossil-fired generation assets
- ☐ IOUs mandated to sell output from the remaining plants into the PX markets and to purchase all energy in the PX
- ☐ Expressly prohibited the IOUs from entering into long-term contracts
- ☐ Freeze of all retail rates at 1996 levels for the shorter of five years or until all the IOU stranded costs were recovered

THE RESTRUCTURING IMPACTS

- ❑ Failure to induce much competition among energy suppliers at the retail level
 - very small fraction of retail consumers exercising consumer choice
 - failure of new ESPs to lure many customers
- ❑ Stifling of construction of new facilities in generation and transmission due to uncertainty in the recovery of investment costs

CUSTOMER CHOICE IMPACTS: SWITCHING TO ESPs

customer type	percent of	
	switches	demand
residential	1.9	2.3
commercial		
< 20 kW	3.9	4.9
20 < kW < 500	7.2	14.9
industrial > 500 kW	20.1	32.6

Source: CPUC Direct Access Reports; period of 4/1/98 to 3/15/00

CALIFORNIA IOUs' DIVESTITURE OF GENERATION

- ❑ The three IOUs sold 26 GW of generating plants**
- ❑ Generation units sold above book value:**
 - July 1998: PG&E sale to Duke Energy of two gas-fired power plants & one oil-fired unit with a total capacity of 2,645 MW and book value of \$346 million for \$501 million**
 - April 1999: PG&E sale to Southern Energy of three gas-fired power plants with a capacity of 3,065 MW and book value of \$256 million for \$801 million**

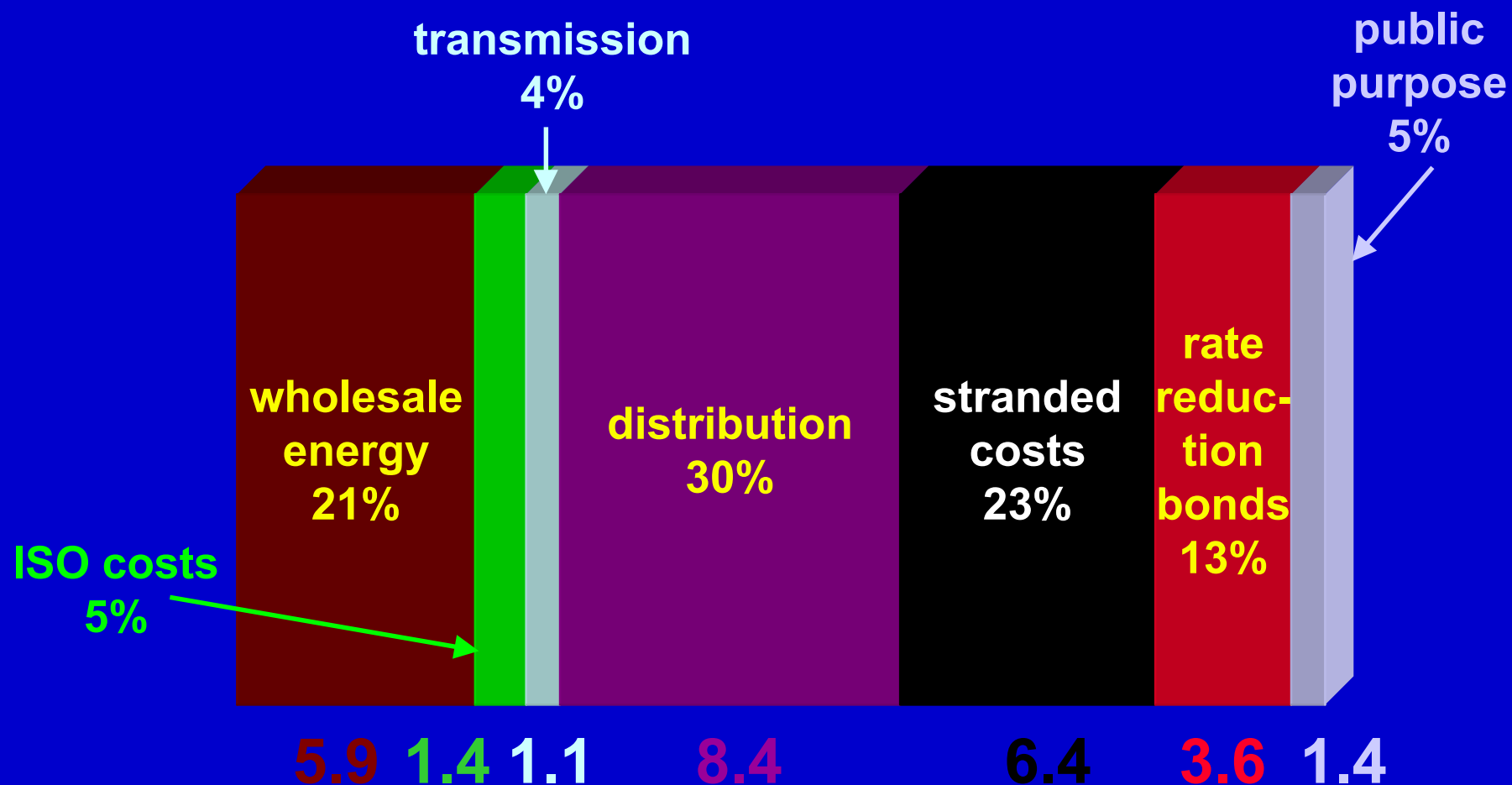
THE SETTING FOR RESTRUCTURING IN CALIFORNIA

- ☐ California's electricity prices among the highest in the nation
- ☐ Lack of self sufficiency in electricity supply: traditional reliance on imports from the neighboring northwest and southwest states
- ☐ Fleet of aging generation resources: 50% of generators are 30 years or older
- ☐ Major bottlenecks in transmission
- ☐ Most restrictive environmental requirements in the nation
- ☐ Booming economies of the state and the region and marked population growth

CALIFORNIA'S FIRST YEAR

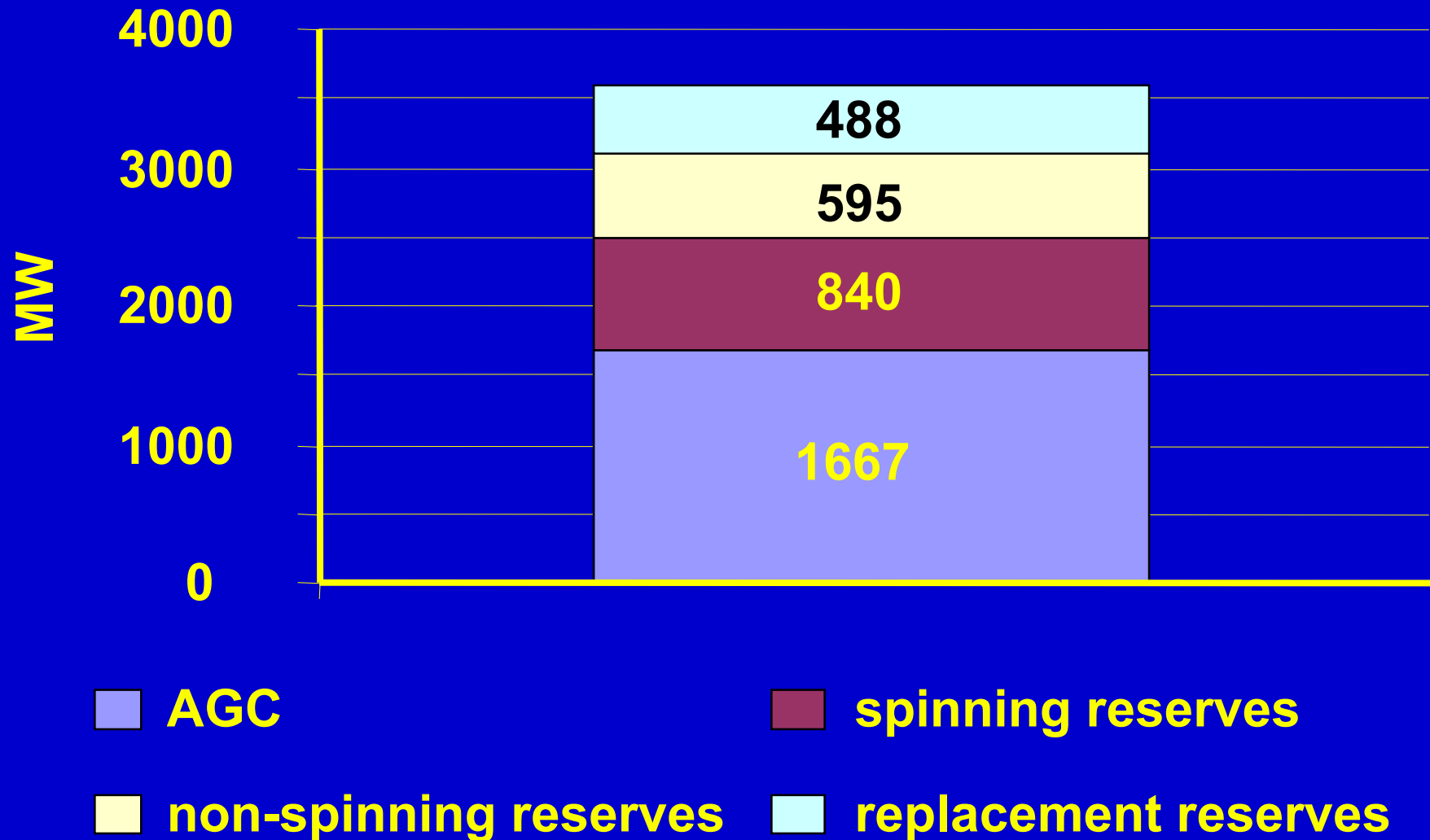
- ❑ ISO and PX operation began March 31, 1998
- ❑ Customer switching: 156,000 residential customers, 48,000 commercial customers and 1,016 industrial customers switched to non-utility suppliers by December 1999; the direct access load represents 13.8% of total demand with annual billings of \$587 million
- ❑ IOU's sold power plants for up to 4 times book value and collected \$2.2 billion
- ❑ SDG&E recovered 100% of stranded costs 2 1/2 years earlier than anticipated

RETAIL ENERGY COSTS 4/1/98 - 3/31/99



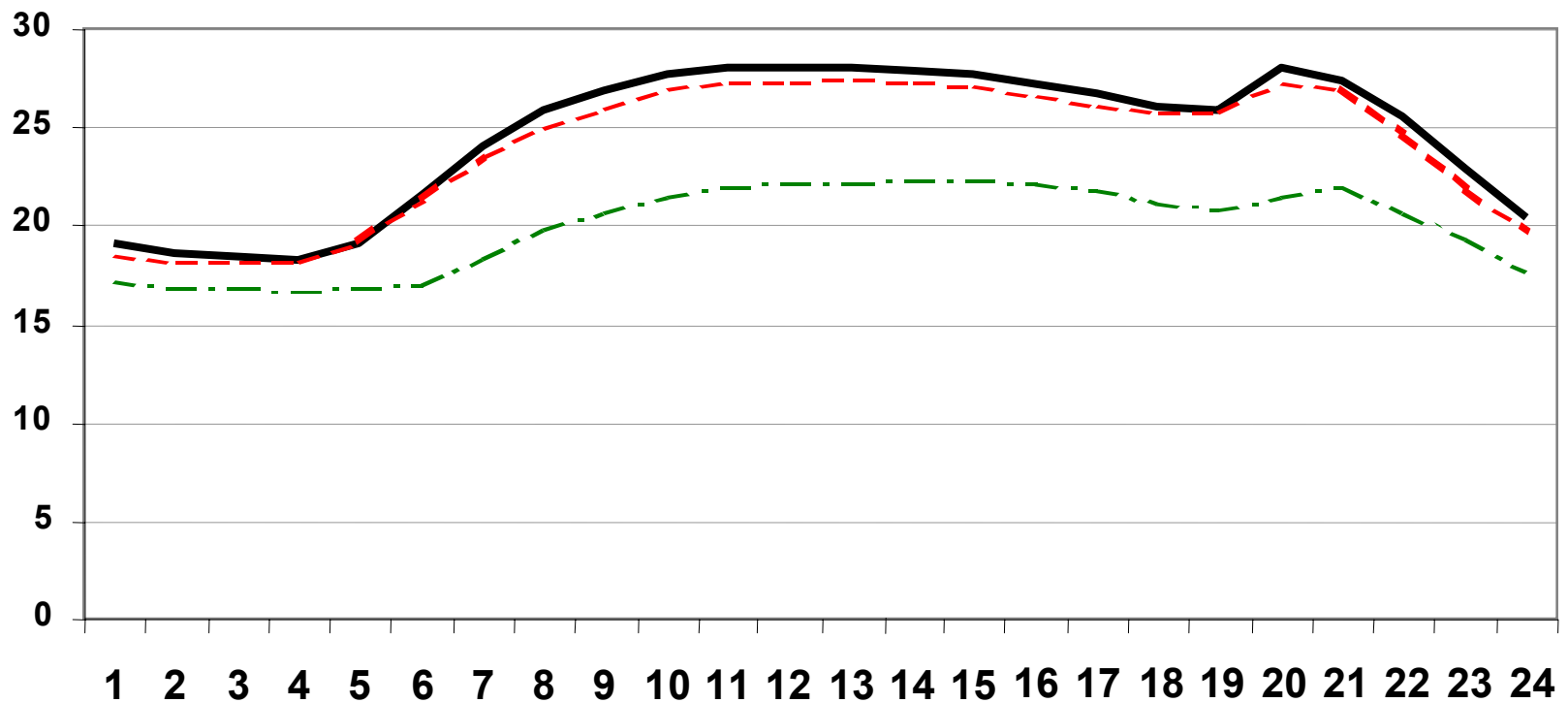
total costs = \$ 28 billion

AVERAGE HOURLY AS PURCHASES



THE 4/23/98 REAL-TIME MARKET

GWh

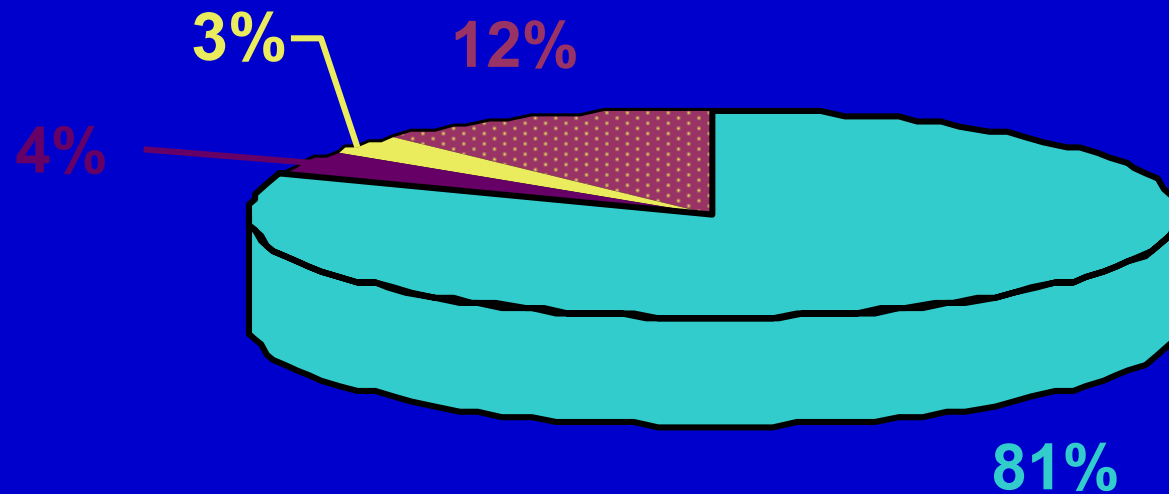


— ISO
forecast

- - - actual
load

- . - forward
market load

REAL - TIME MARKET ENERGY



 supplemental energy
 non spinning reserves

 spinning reserves
 replacement reserves

CA ISO estimates

CALIFORNIA STATISTICS

- ☐ **Between 1990 and 2000, population grew 13.8% by 4.1 million; the 35 million residents make it the nation's most populous state**
- ☐ **The economy grew at 6% in 2000, 1.5% above the national economy leading to a \$5 billion surplus in state coffers**
- ☐ **Between 1990 and 2000, the annual peak demand grew 7800 MW and the annual energy consumption increased 30,000 GWh**
- ☐ **No major new plants have been constructed since 1990**

SUMMER 2000

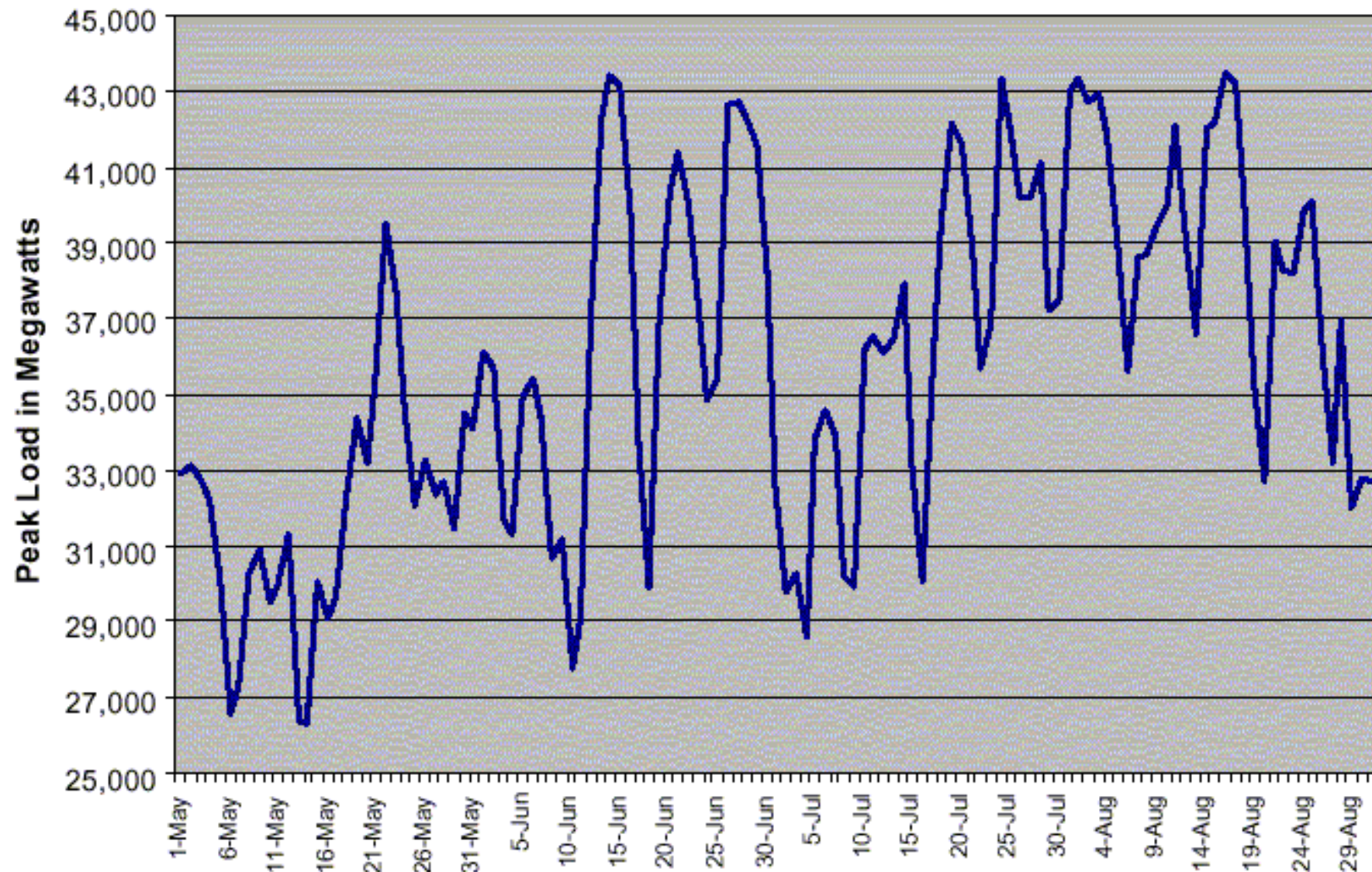
- ❑ The West experienced unusually high prices during summer 2000 with large spikes in May and June and high average prices in May - September
- ❑ Many end users, except those in the SDG&E area, were insulated from the high prices
- ❑ California IOU's financial positions significantly weakened
- ❑ Principal factors contributing to the high price:
 - market design problems;
 - competitive market forces; and,
 - market power exercise

SUMMER 2000 MARKET RESULTS

month	demand (TWh)	total purchases (\$billion)			average price (\$/MWh)	
		energy	AS	combined	energy	combined
May	20.0	1.161	0.063	1.224	58.05	61.22
June	21.6	3.171	0.436	3.607	146.81	166.96
July	21.9	2.458	0.125	2.583	112.24	117.77
August*	21.8	3.746	0.274	4.020	171.83	184.52

*August data is up to August 29 only

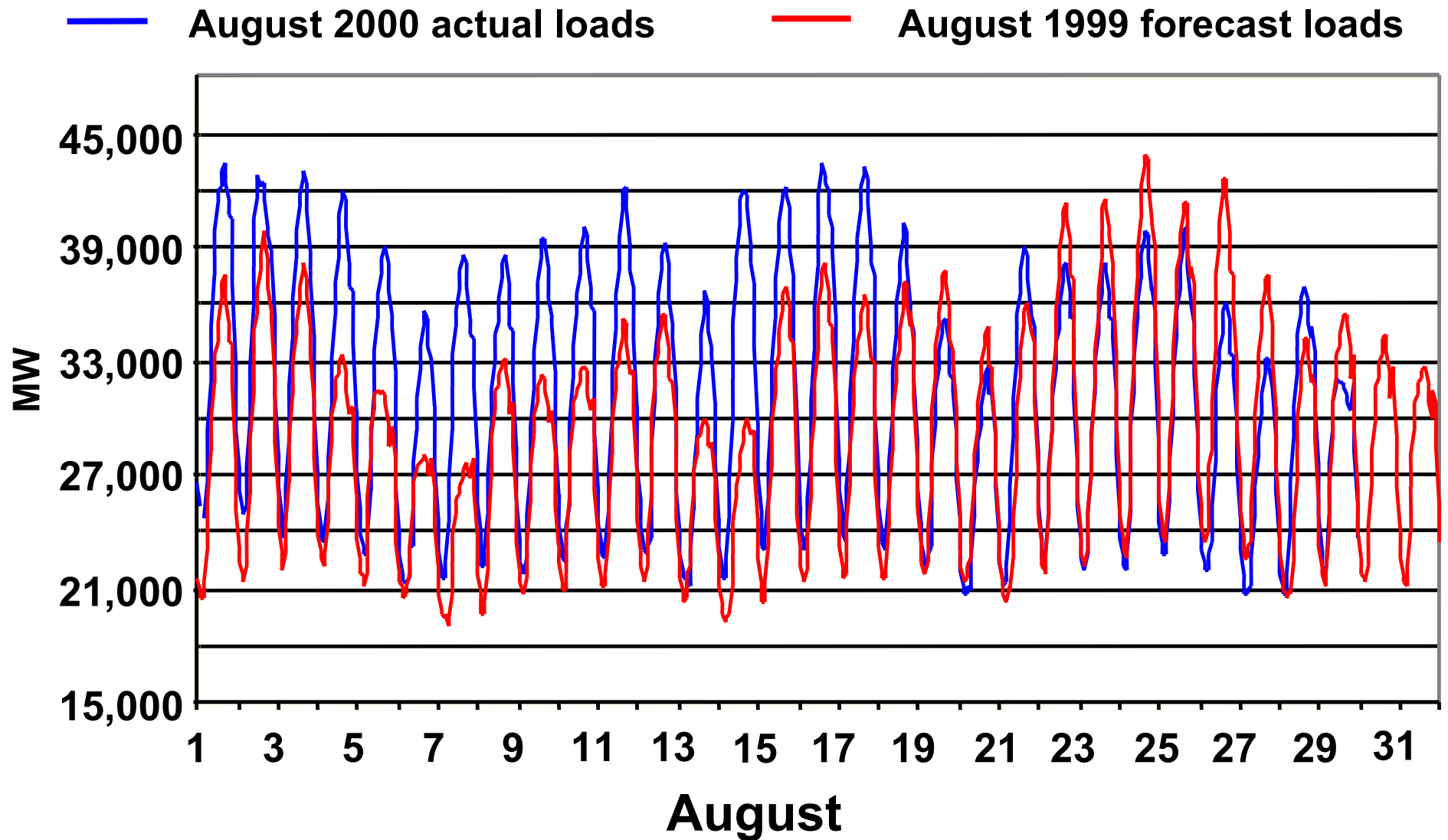
VOLATILITY OF SUMMER 2000 LOAD



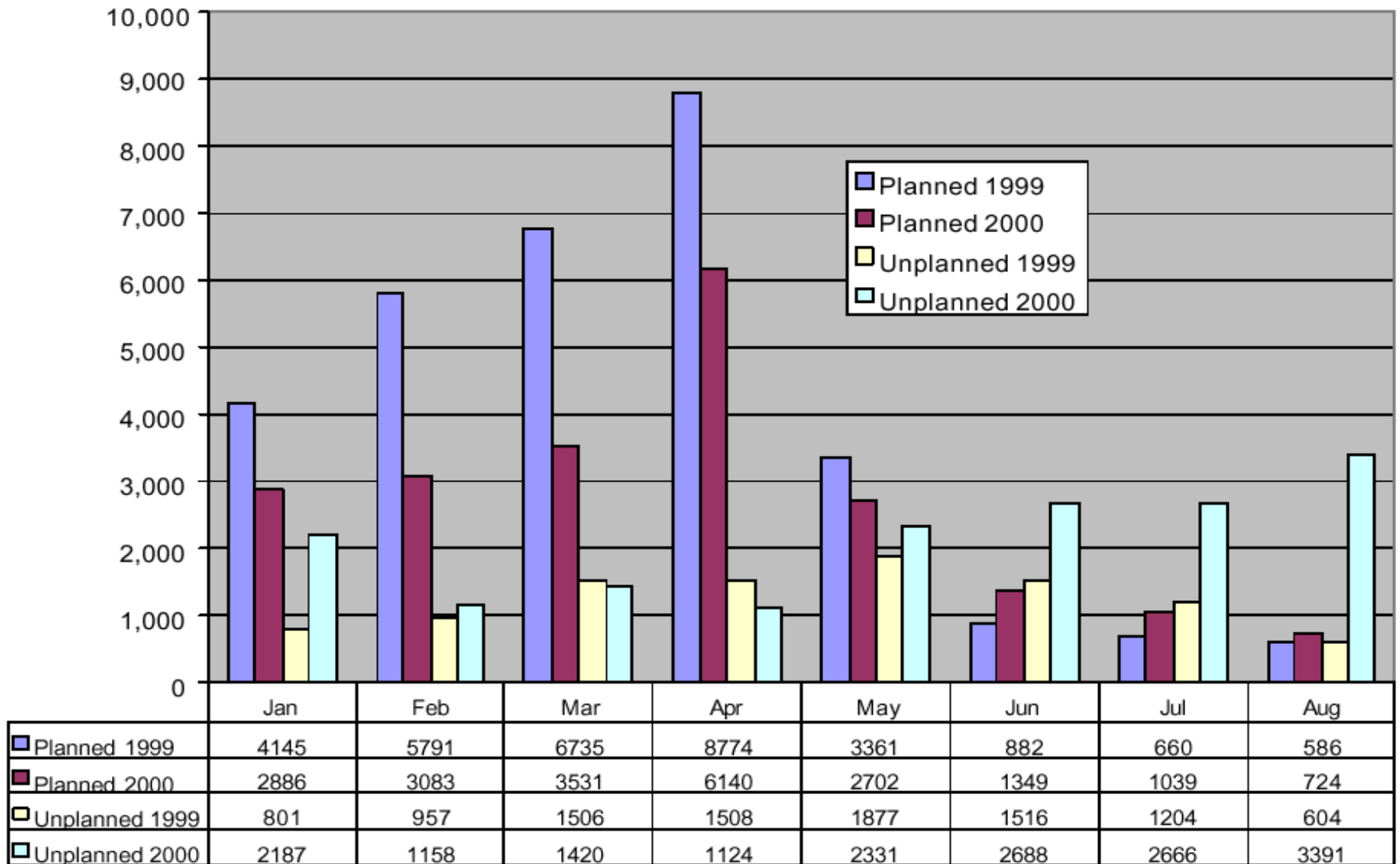
SUMMERS 2000 AND 1999 LOAD AND ENERGY DEMAND COMPARISON

month	percent change with respect to 1999		
	average daily peak	monthly peak	energy demand
May	13	21	6
June	15	6	14
July	3	-5	2
August	9	-1	7

AUGUST '00 VS. AUGUST '99 LOADS



CA ISO OUTAGED CAPACITY

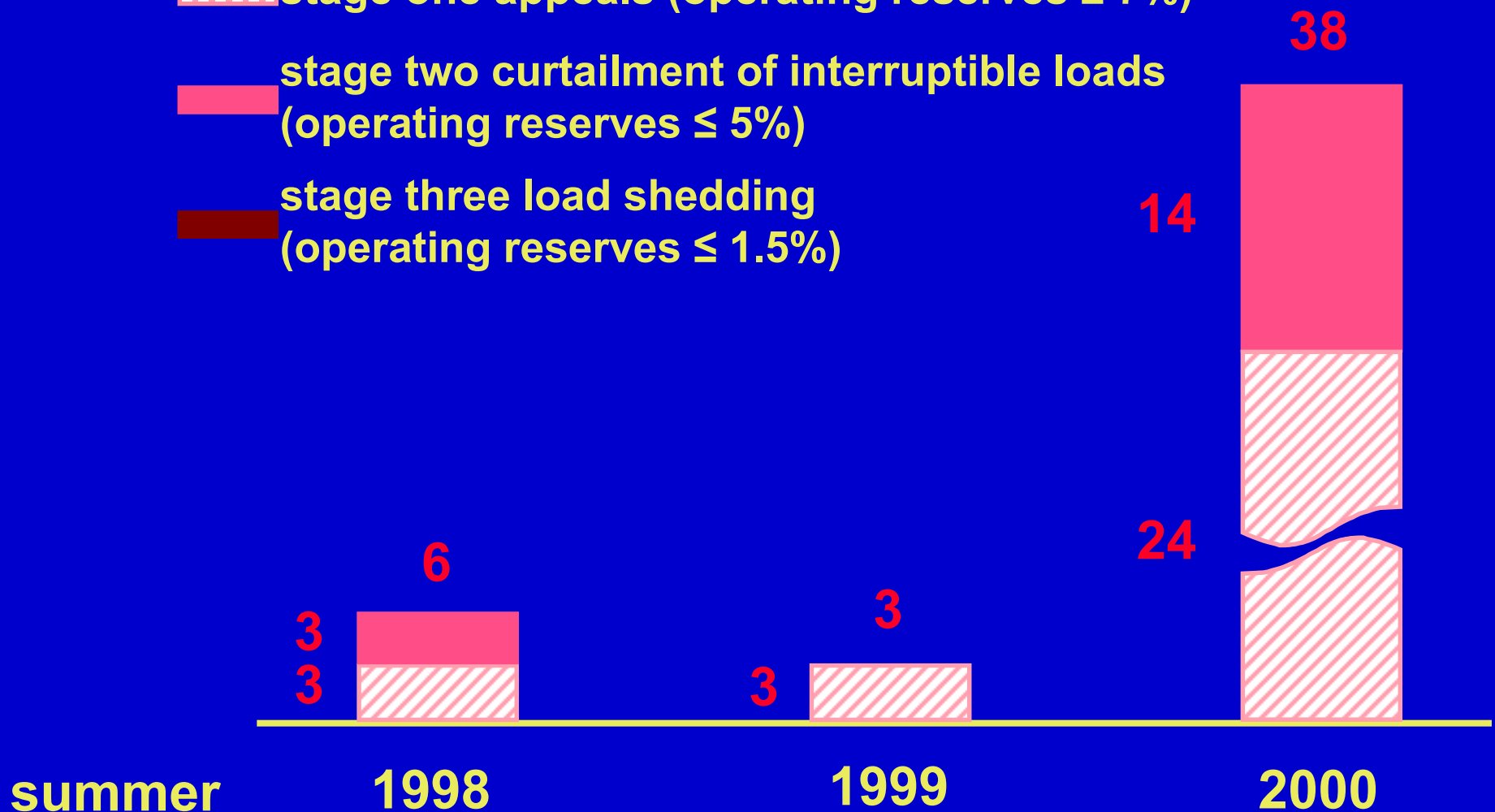


CA ISO EMERGENCY DECLARATIONS

 stage one appeals (operating reserves $\leq 7\%$)

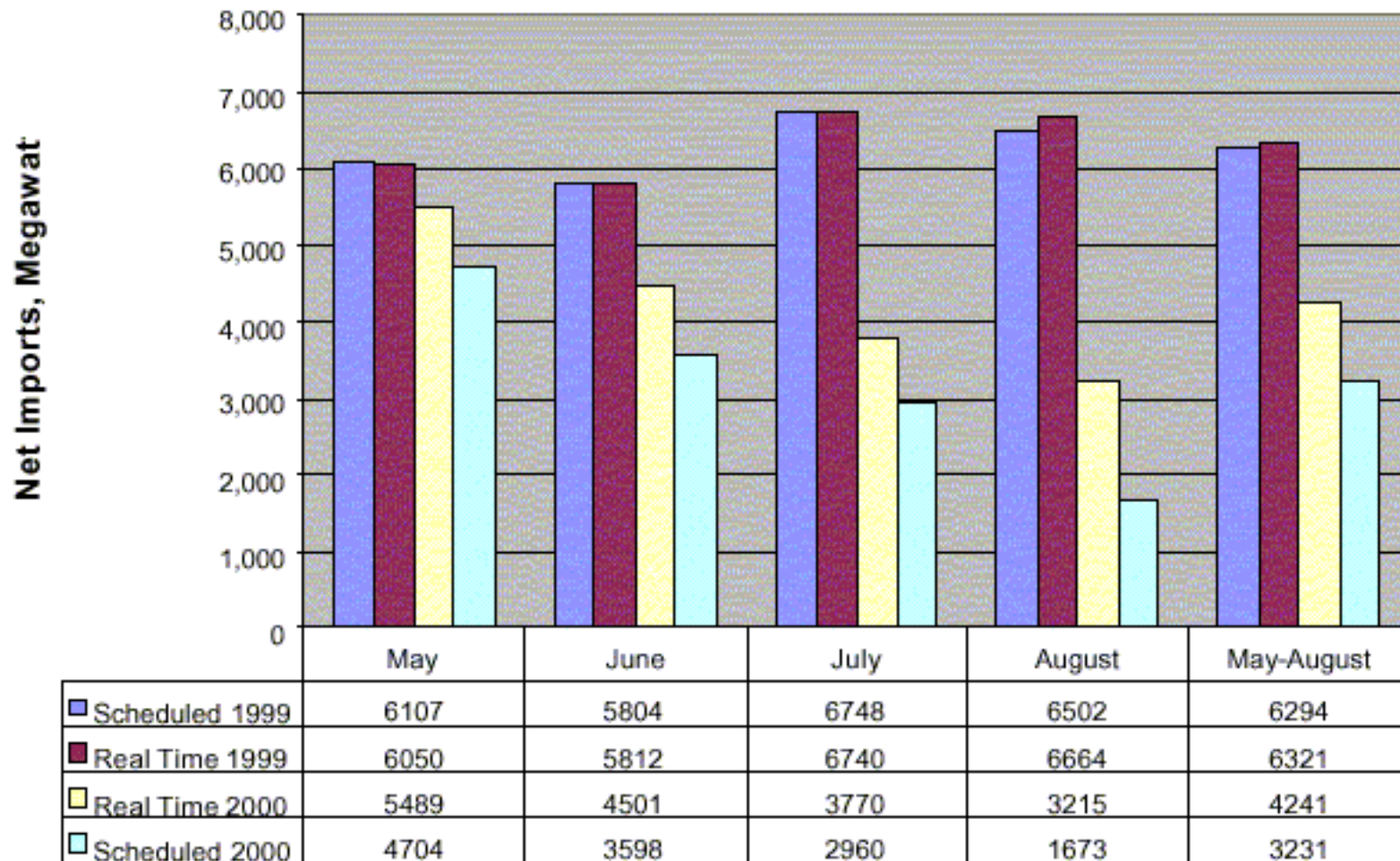
 stage two curtailment of interruptible loads
(operating reserves $\leq 5\%$)

 stage three load shedding
(operating reserves $\leq 1.5\%$)

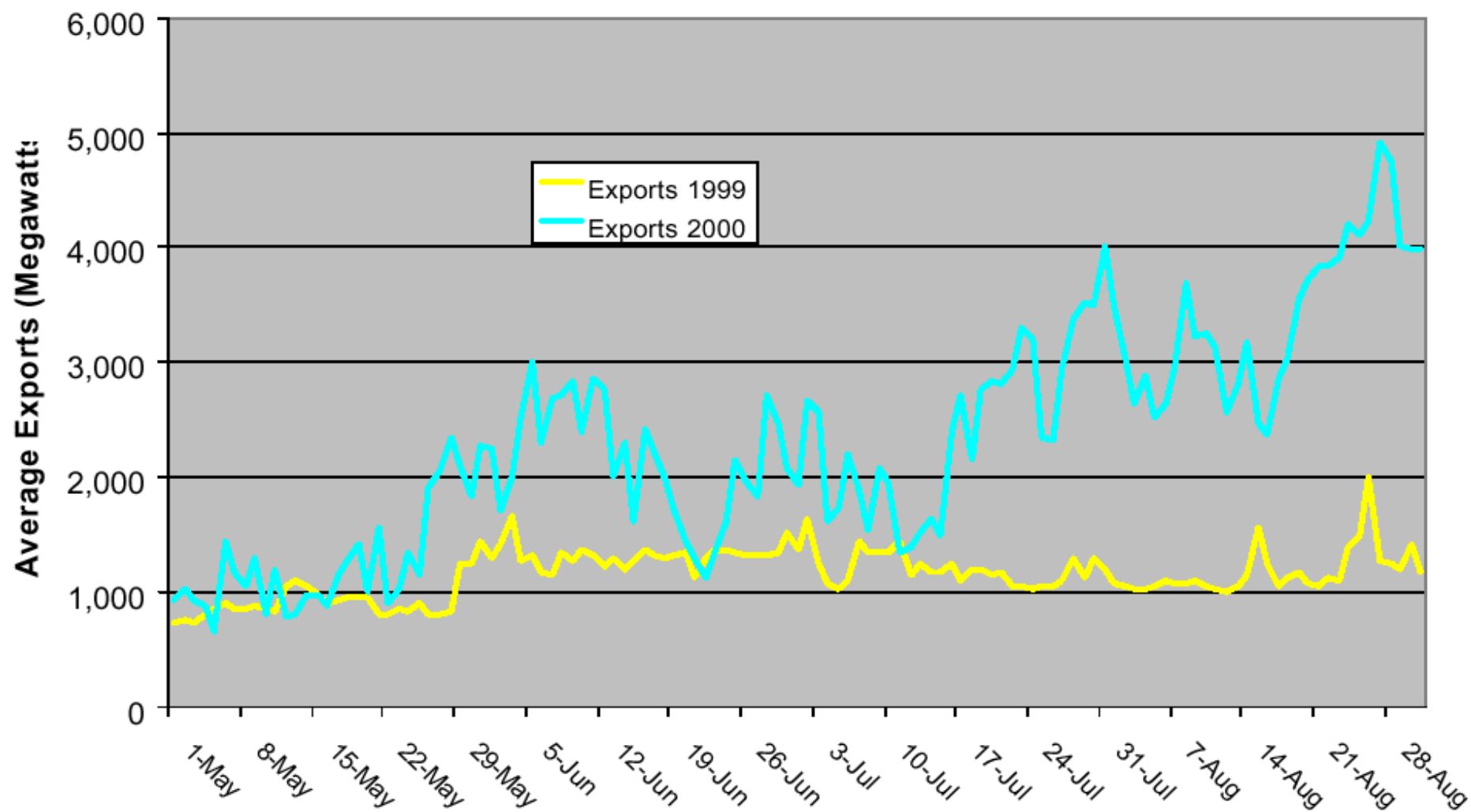


CA ISO AVERAGE HOURLY NET IMPORTS

Average Hourly Net Energy Imports, Scheduled and Real Time



AVERAGE HOURLY OFFPEAK EXPORTS FROM CALIFORNIA



SCARCITY OF SUPPLY

period	number of hours of scarcity	percent of total hours	percent of total payments
June 1 - June 30	28	4%	19%
July 1 - Aug 5	59	7%	25%
Aug 6 - Aug 25	52	11%	22%

CALIFORNIA MARKET: KEY RESULTS

- ❑ Market sales in 2000 are triple those of 1998
- ❑ About 60% of the California electricity market is exposed to spot price volatility (vs. 10% of the PJM market)
- ❑ The lack of forward contracting increases price exposure in the market; the threat of CPUC prudence review is a key barrier
- ❑ The rapid increases in input prices contribute to the high electricity prices
 - natural gas to as high as \$10/MMBtu from \$2/MMBtu
 - NOx emission effect credits to \$45/lb from the \$6/lb level

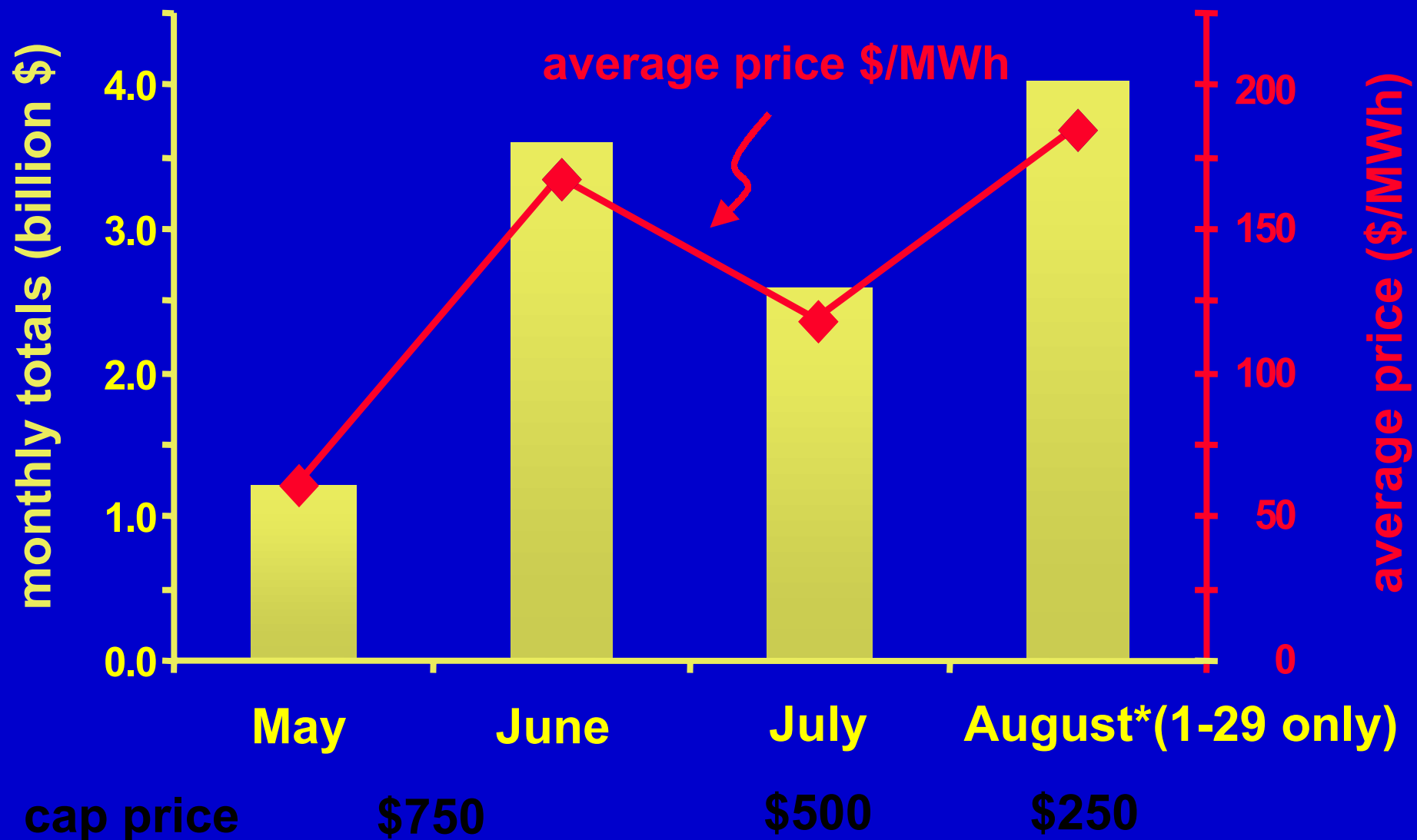
CALIFORNIA MARKET: KEY RESULTS

❑ Supply scarcity is a key concern:

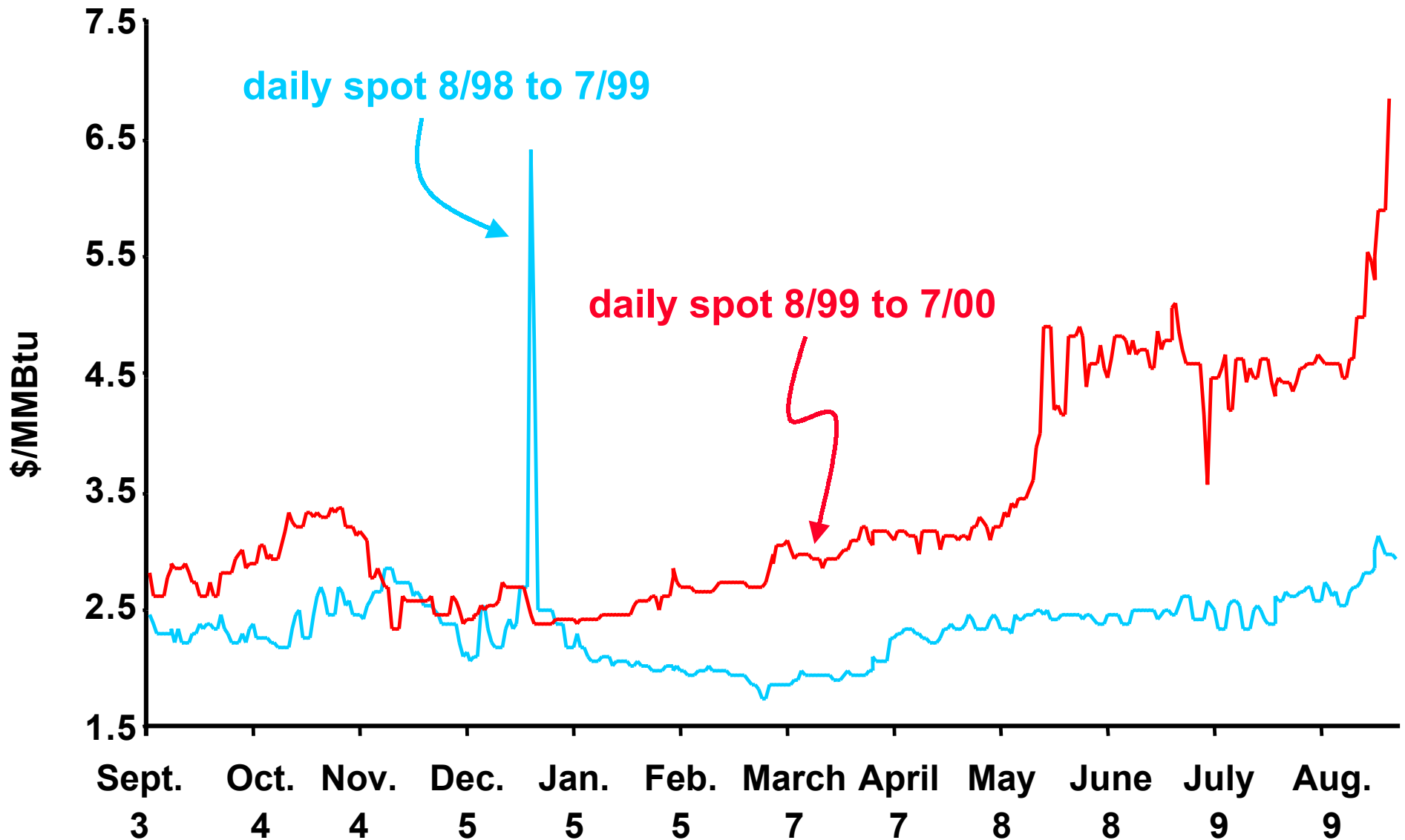
- summer 2000 required multiple appeals to customers and curtailment of interruptible load**
- summer 2001 may be tighter since no more than 1500 MW supply will come on line and load is forecast to grow more**

❑ Demand responsive load is a critical need

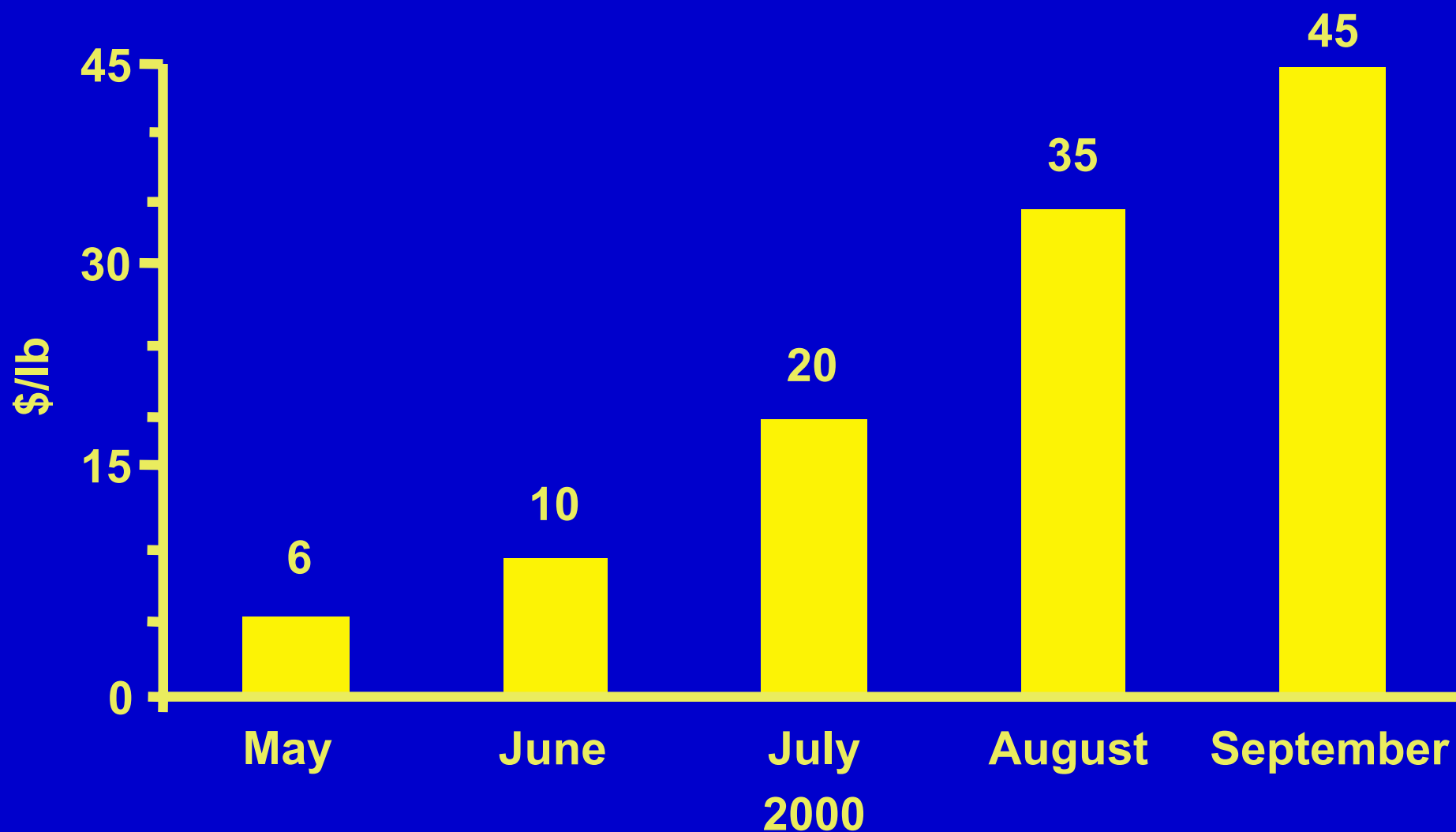
THE SUMMER 2000 MARKETS



PG&E CITY GATE NATURAL GAS SPOT PRICES

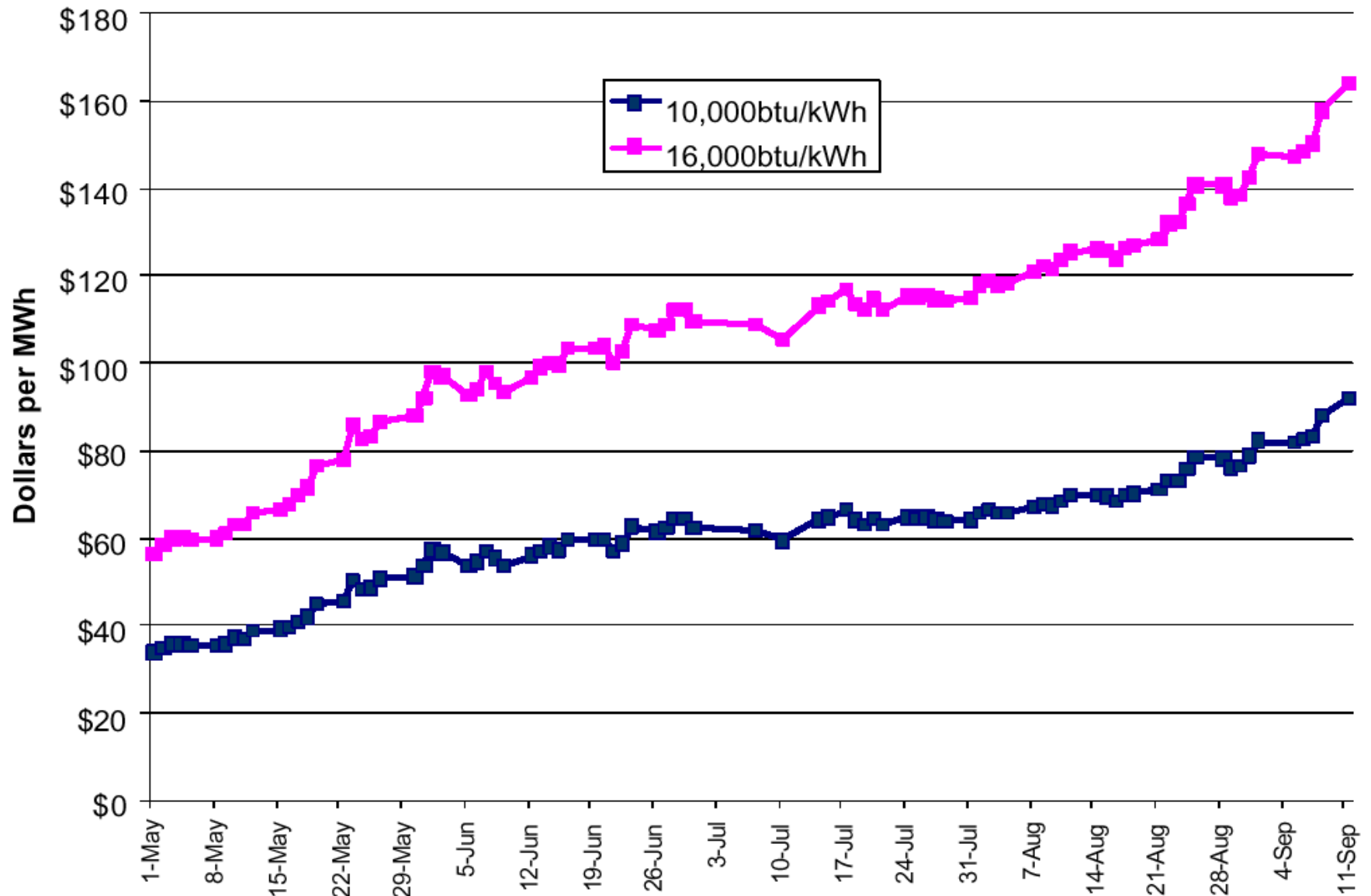


AVERAGE NO_x CREDITS PRICES FOR SCAQMD

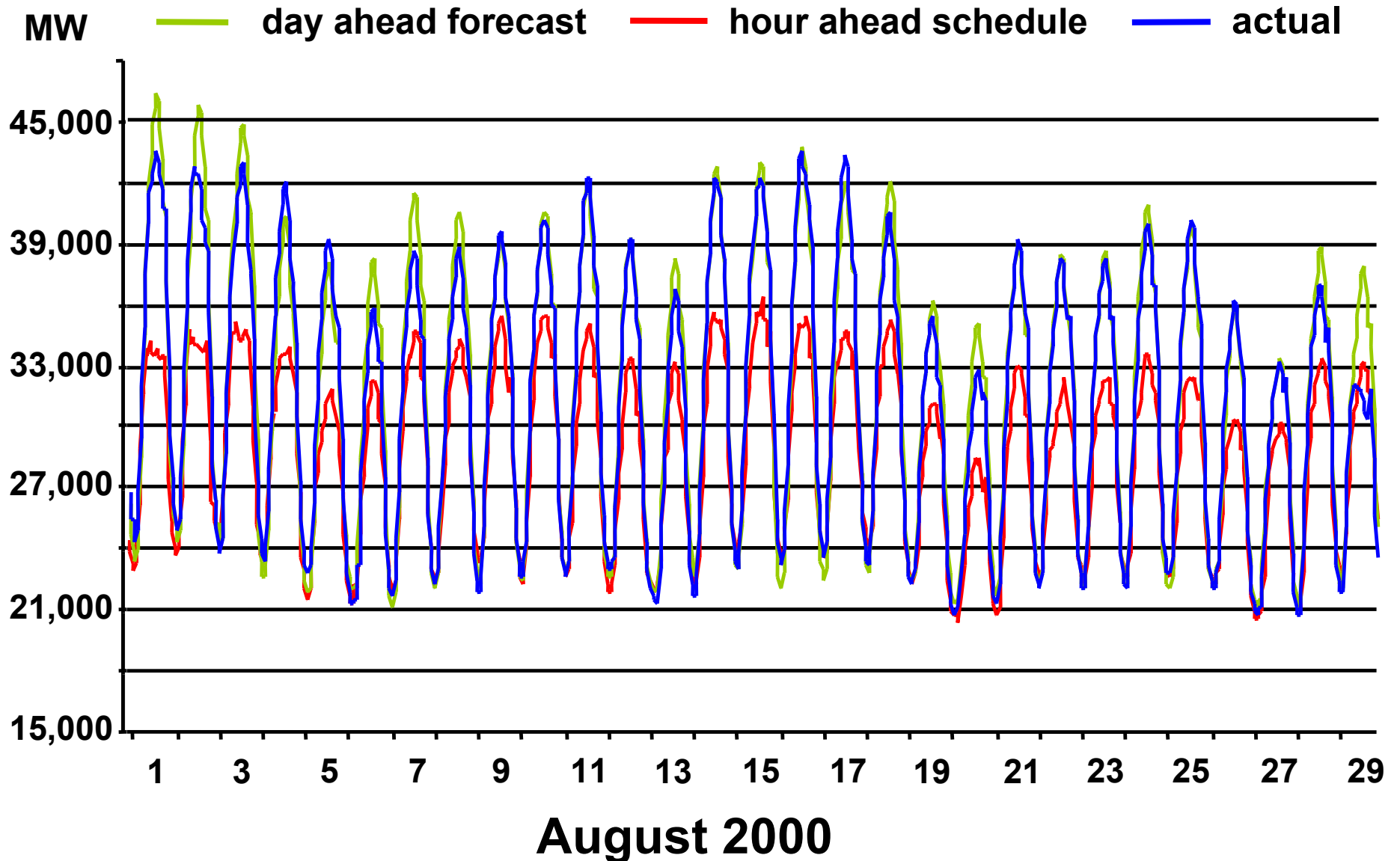


Source : Cantor Fitzgerald Environmental Brokerage Services

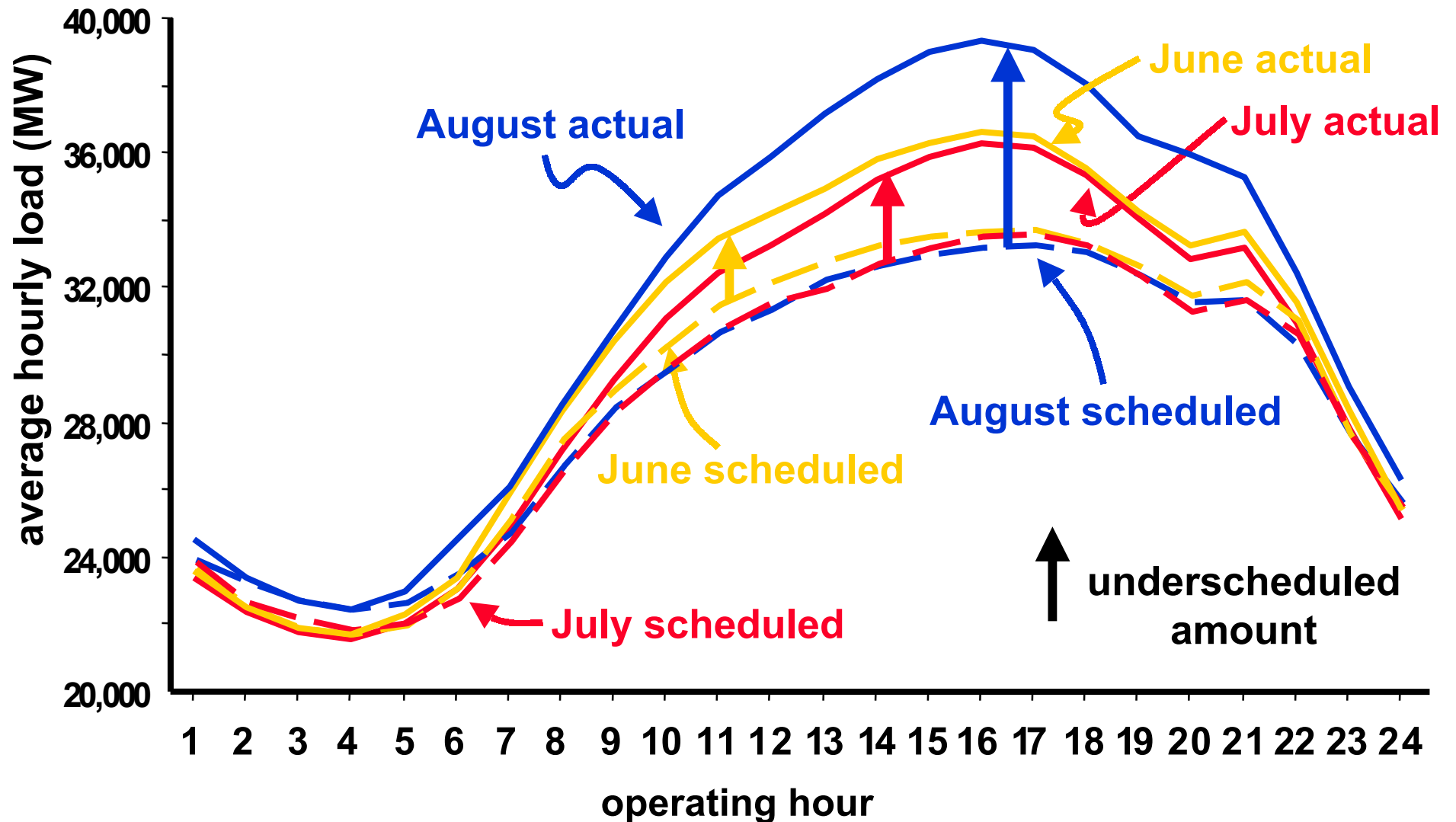
SOUTHERN CALIFORNIA GAS-FIRED GENERATION RUNNING COST ESTIMATES



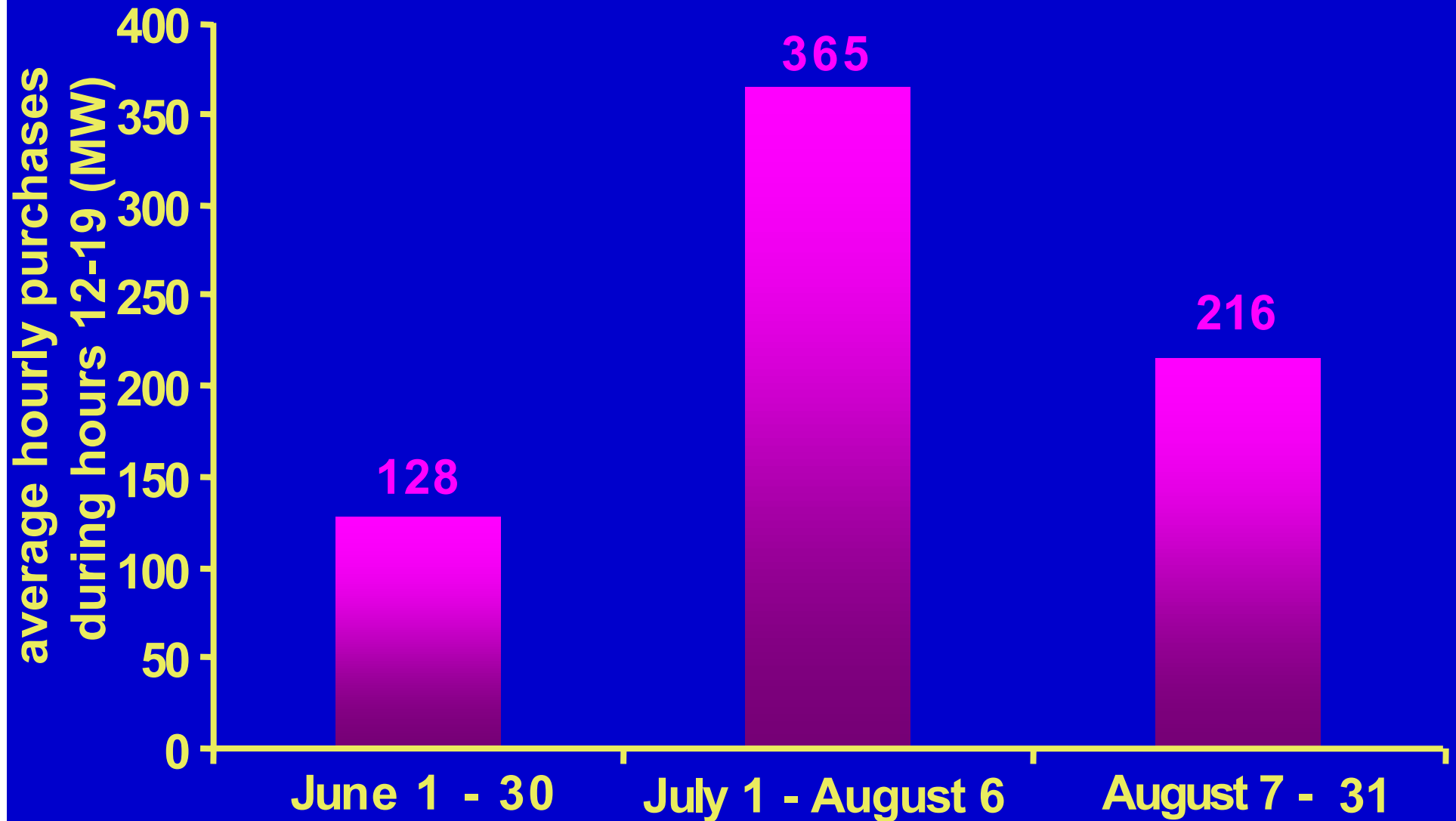
AUGUST 2000 FORECAST, SCHEDULED AND ACTUAL LOADS



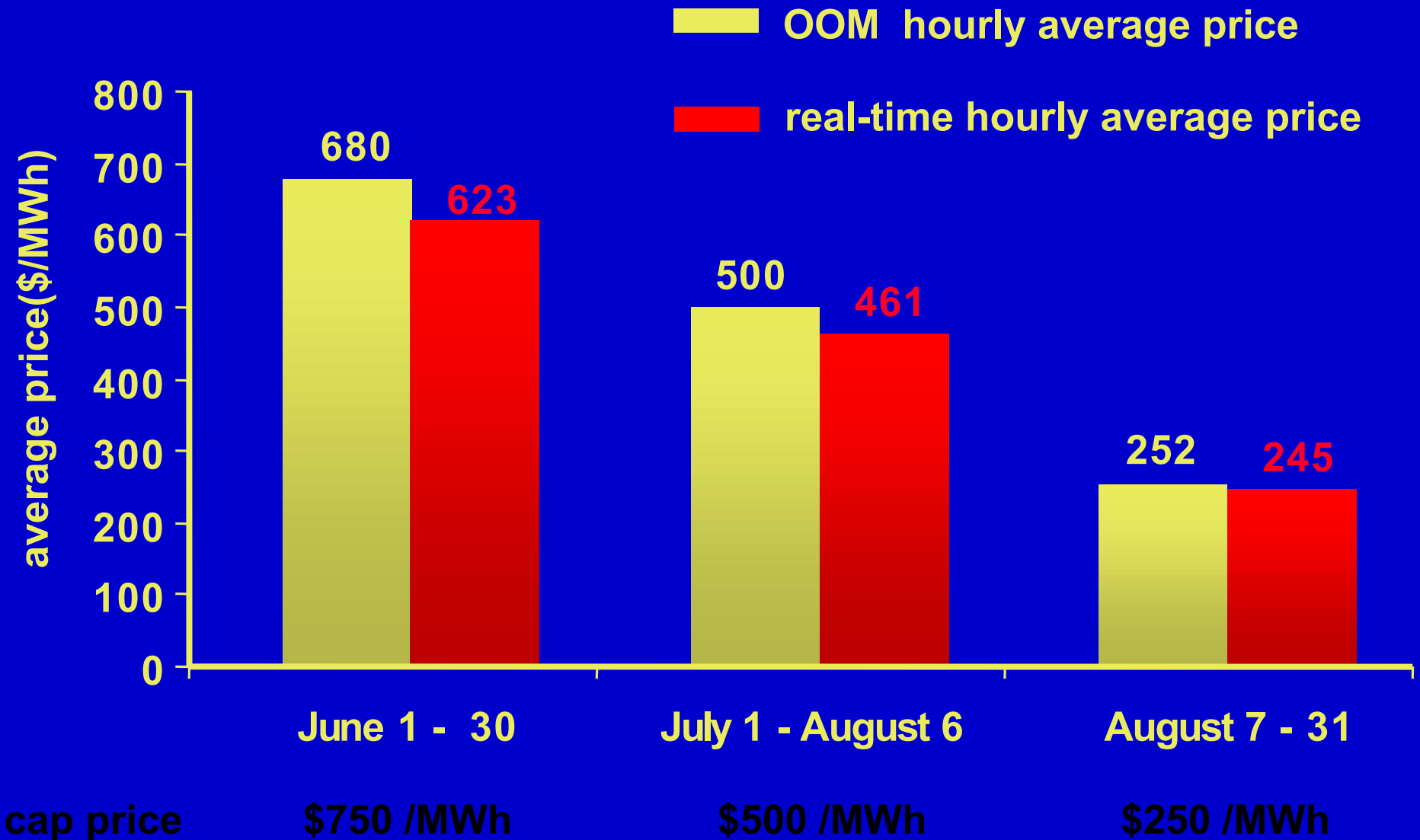
SUMMER 2000 SCHEDULED AND ACTUAL LOADS



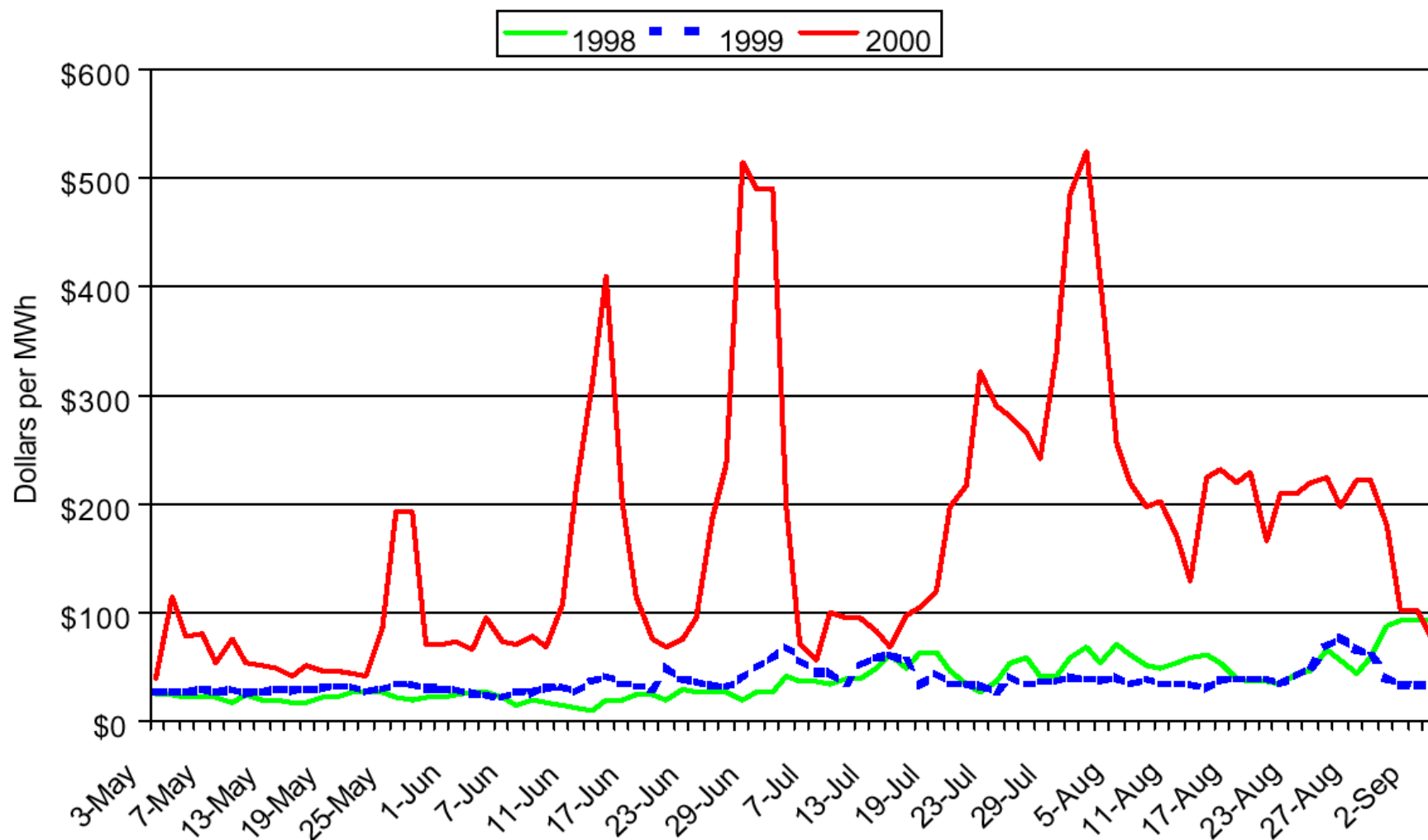
OUT-OF-MARKET PURCHASES



OUT-OF-MARKET PURCHASE PRICES

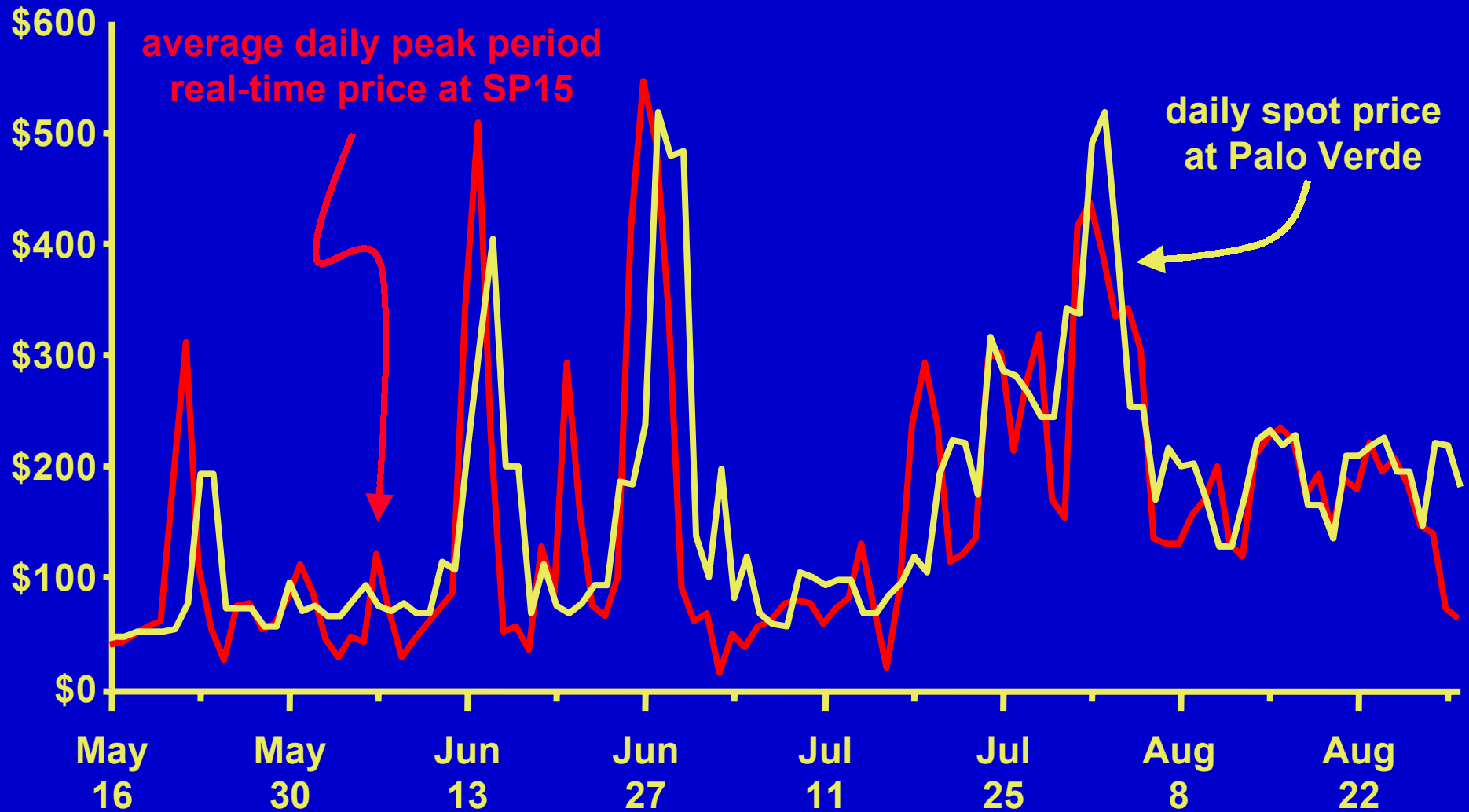


PALO VERDE BILATERAL INDEX PRICES

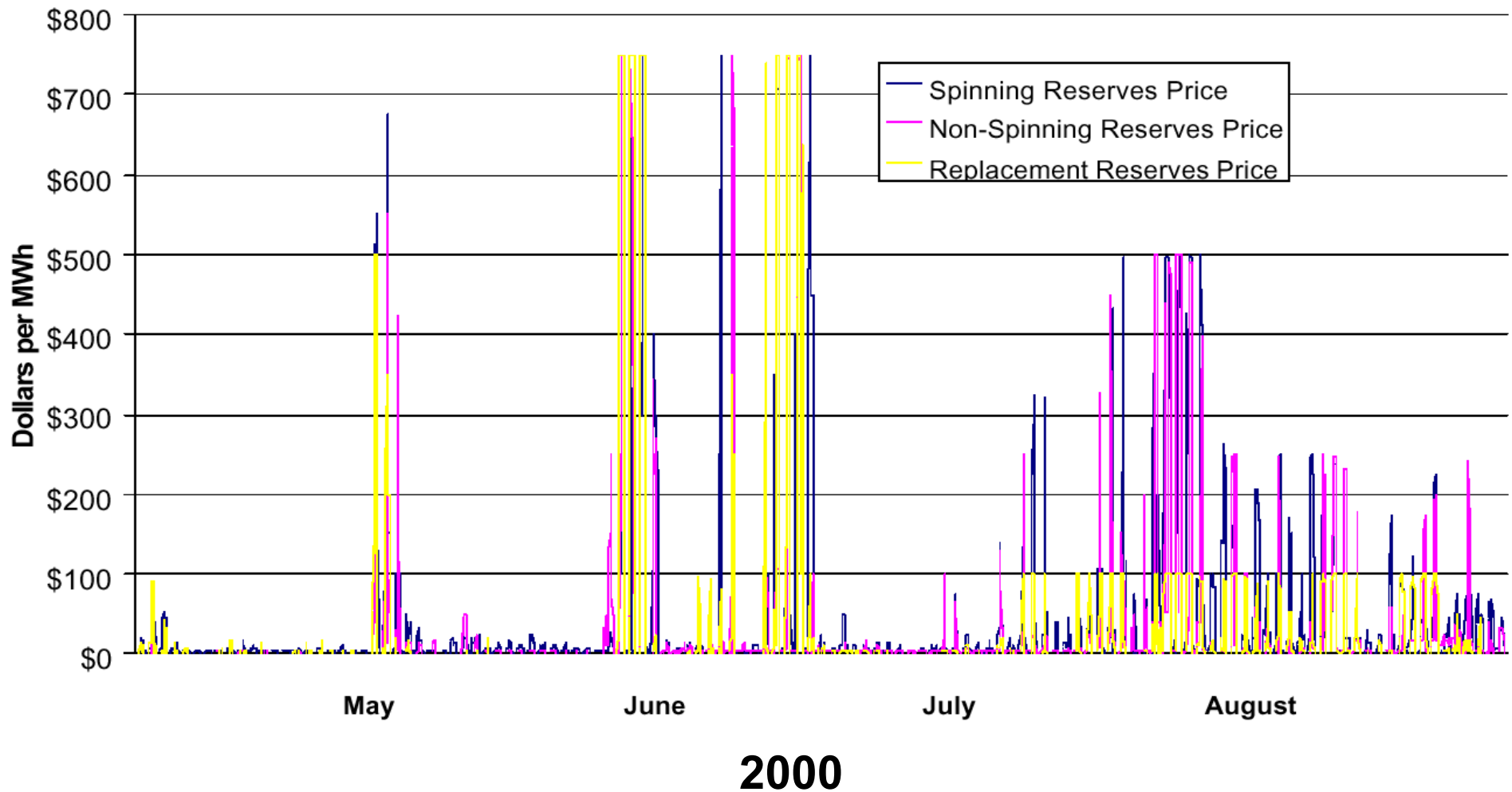


Source: Power Markets Week.

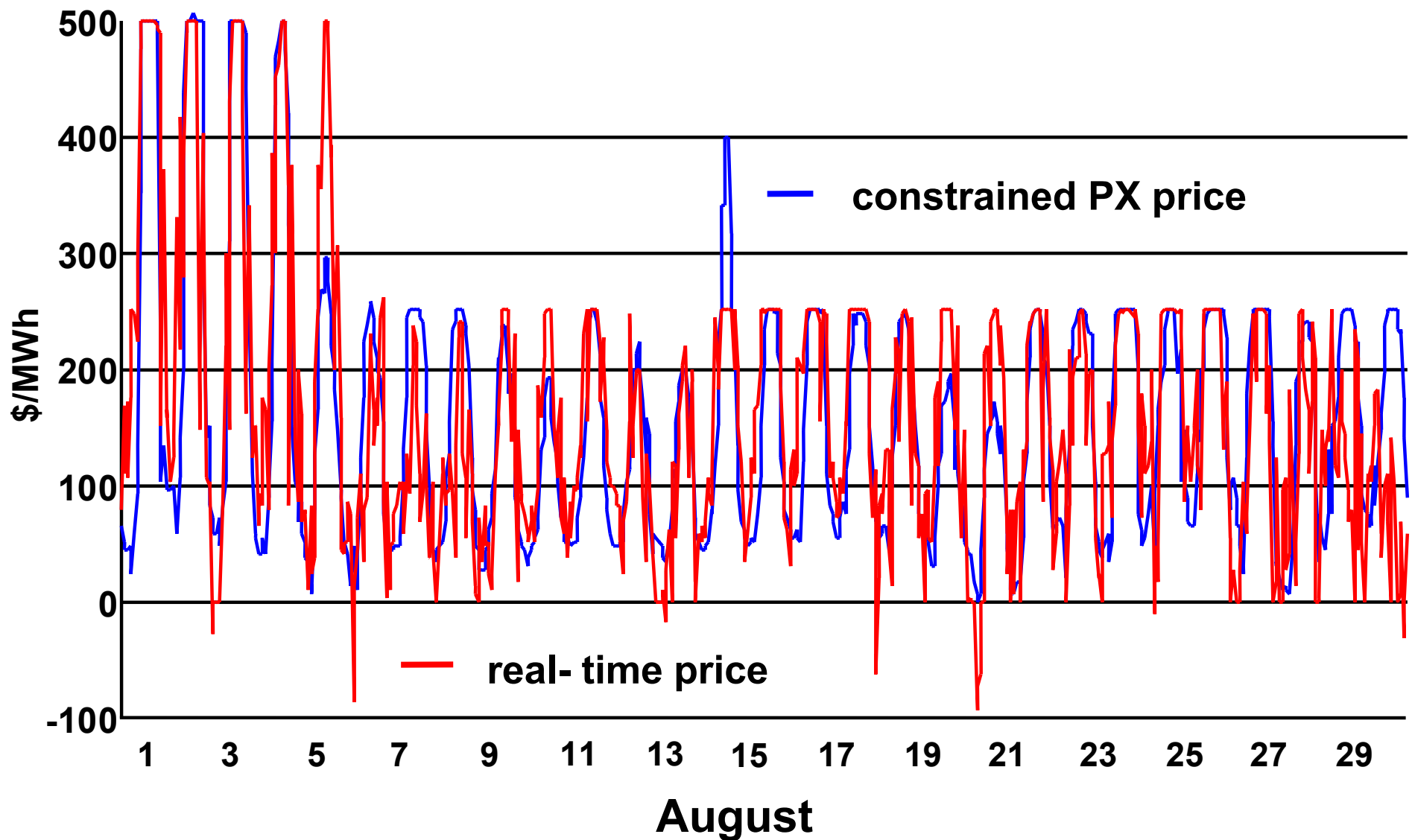
REAL-TIME AND SPOT MARKET PRICES



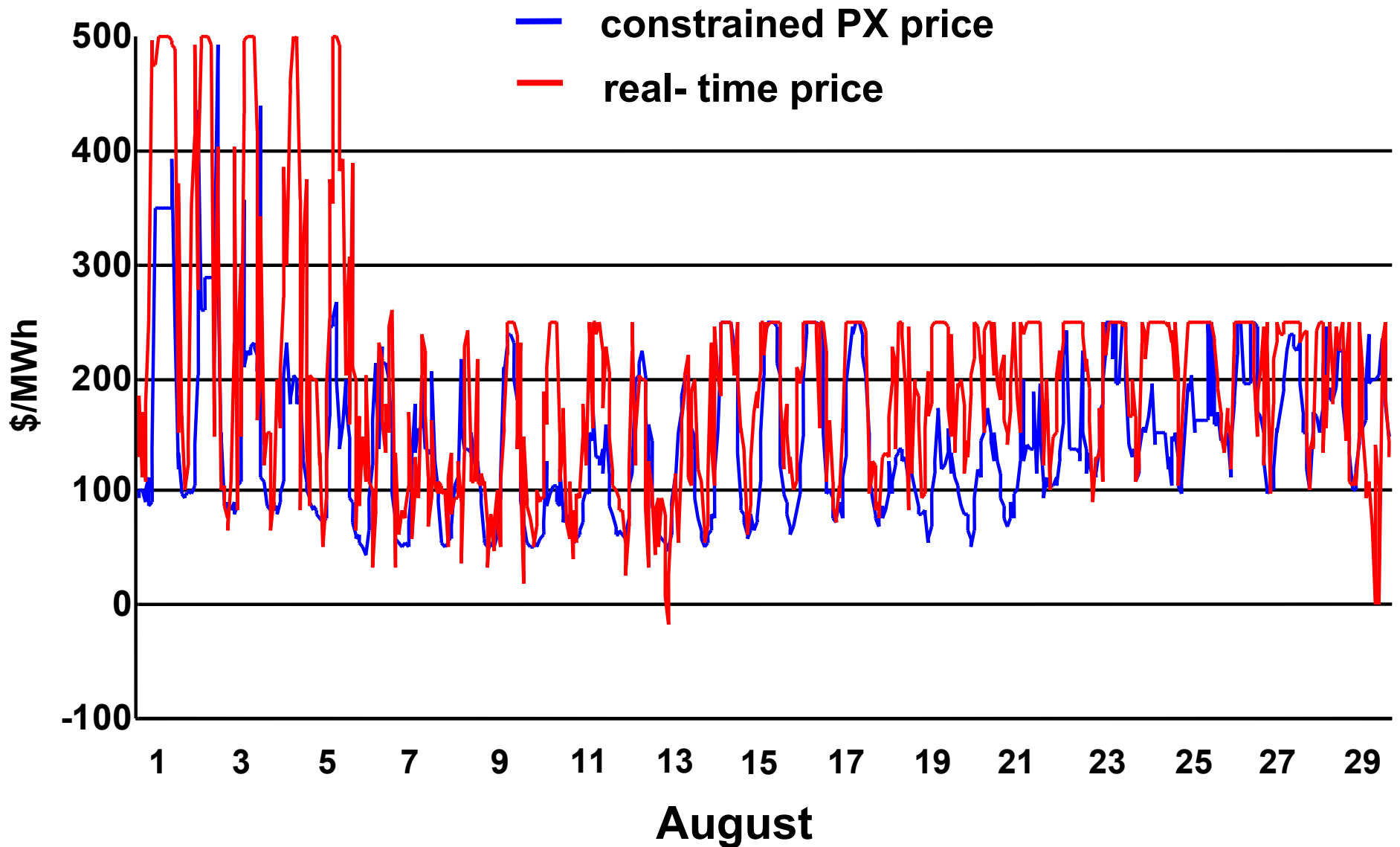
DAY-AHEAD RESERVES PRICES



AUGUST 2000 SP15 PX AND REAL-TIME PRICES



AUGUST 2000 NP15 PX AND REAL-TIME PRICES



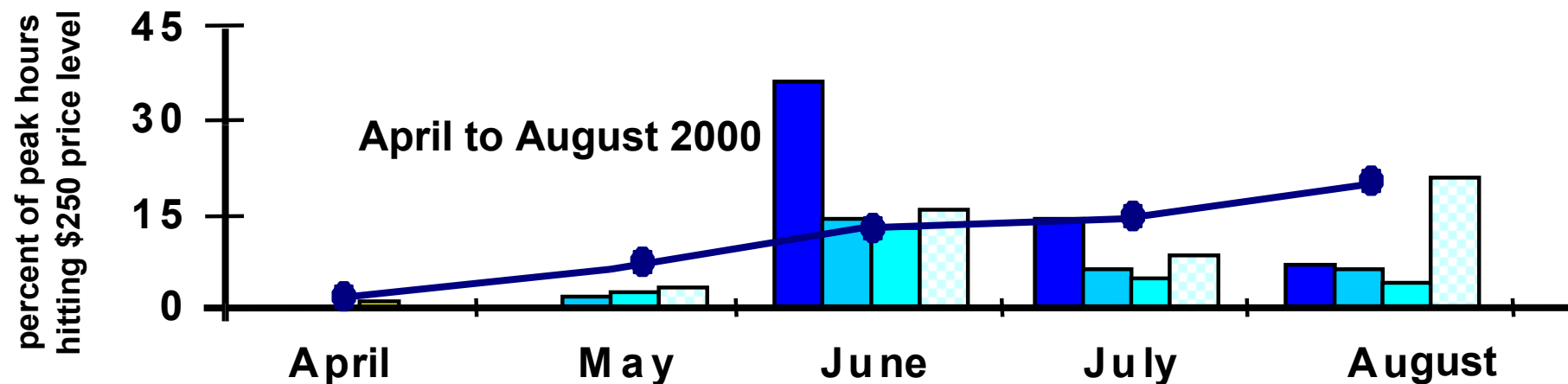
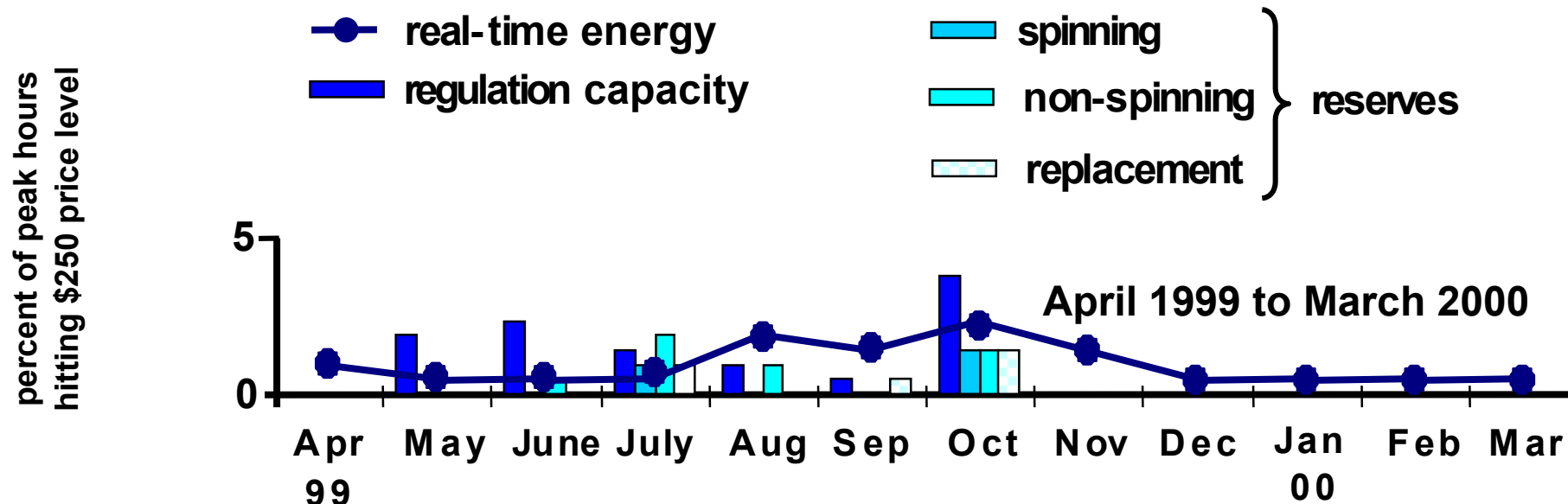
AUGUST 2000 NP15 PX AND REAL-TIME PRICES

year	quantity	NP 15 prices (\$/MWh)		
		peak period	off-peak period	overall average
2000	constrained PX	169.08	93.28	143.81
	real time	229.4	133.54	196.99
1999	constrained PX	40.32	23.31	34.65
	real time	43.63	21.75	36.34

AUGUST 2000 ENERGY PRICES

quantity		average price (\$/MWh)				percent of hours with zonal pricing
		system wide	zone			
			NP15	SP15	ZP26	
real-time	peak period	215.51	229.40	201.62	201.52	33
	off-peak period	105.37	133.54	77.20	77.20	51
	all hours	178.27	196.99	159.55	159.49	39
PX constrained	peak period	185.94	169.08	202.80	166.80	67
	off-peak period	78.40	93.28	63.52	63.52	89
	all hours	150.10	143.81	156.38	132.37	74

PRICES AT OR ABOVE \$250 LEVEL



FERC'S DECEMBER 15, 2000 ORDER

- ❑ FERC determined that the California market structure is “severely flawed” and proposed measures to restructure the markets and remedy the electricity pricing problems; measures to become effective January 1, 2001 for 24 months
- ❑ The remedies aim to
 - dampen extreme price volatility
 - provide a stable environment for generation investment
 - ensure *just and reasonable* wholesale rates

FERC'S KEY REMEDIES FOR THE CALIFORNIA MARKET

- ❑ Elimination of the requirement that the three IOUs trade through the PX
- ❑ Requirement that market participants schedule 95% of their transaction in the forward markets with a penalty of up to \$100/MWh for scheduling deviations above 5% of hourly load requirements
- ❑ Imposition of a \$150/MWh or \$150/MW/h “soft” cap or *breakpoint* price but allowing bids above \$150 on a pay-as-bid basis and subject to FERC scrutiny
- ❑ Replacement of existing governing boards of the PX and ISO by non-stakeholder boards

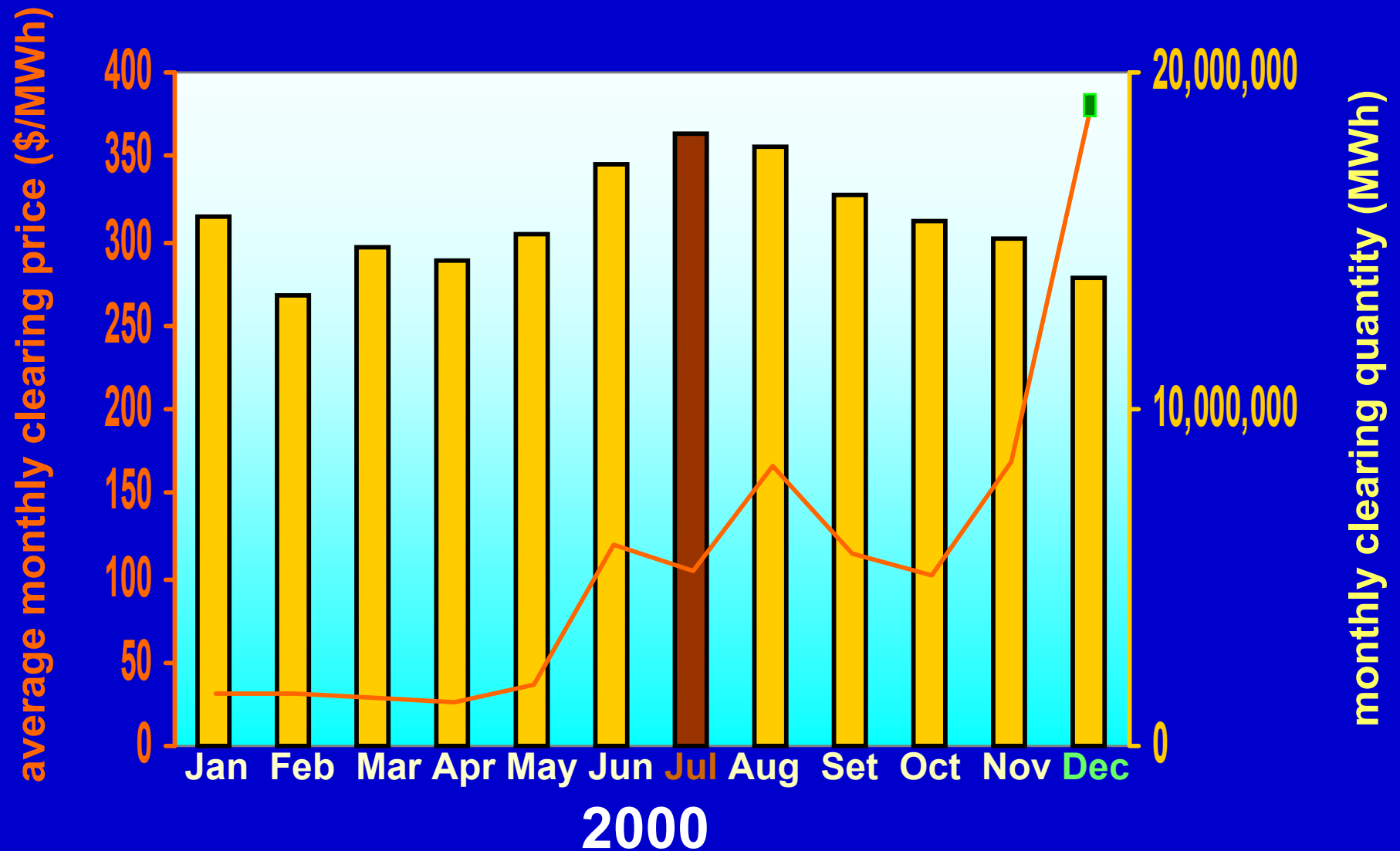
FERC REQUESTS FOR SUPPORT FROM CALIFORNIA POLICY MAKERS

- ❑ Additions of generation and transmission resources**
- ❑ Implementation of demand response programs**
- ❑ Assurance of sufficient reserve requirements**
- ❑ Permission for load serving entities to engage in securing power supplies on a more forward basis**

CALIFORNIA EVENTS

- ❑ Governor Gray Davis request that FERC
 - order retroactive refunds to consumers; and ,
 - lower the price cap for the next 3 yearswas not met
- ❑ PG&E and SCE ended up on the brink of bankruptcy by undercollecting some \$13 billion from retail customers
- ❑ Since December 5, 2000 California has been on *stage 2* and *stage 3* alert almost continuously
- ❑ The utilities received a temporary rate hike allowing them to raise rates between 9 - 15 % for 90 days
- ❑ The PX shut its doors as of January 31, 2001
- ❑ The State becomes a major purchaser of electricity

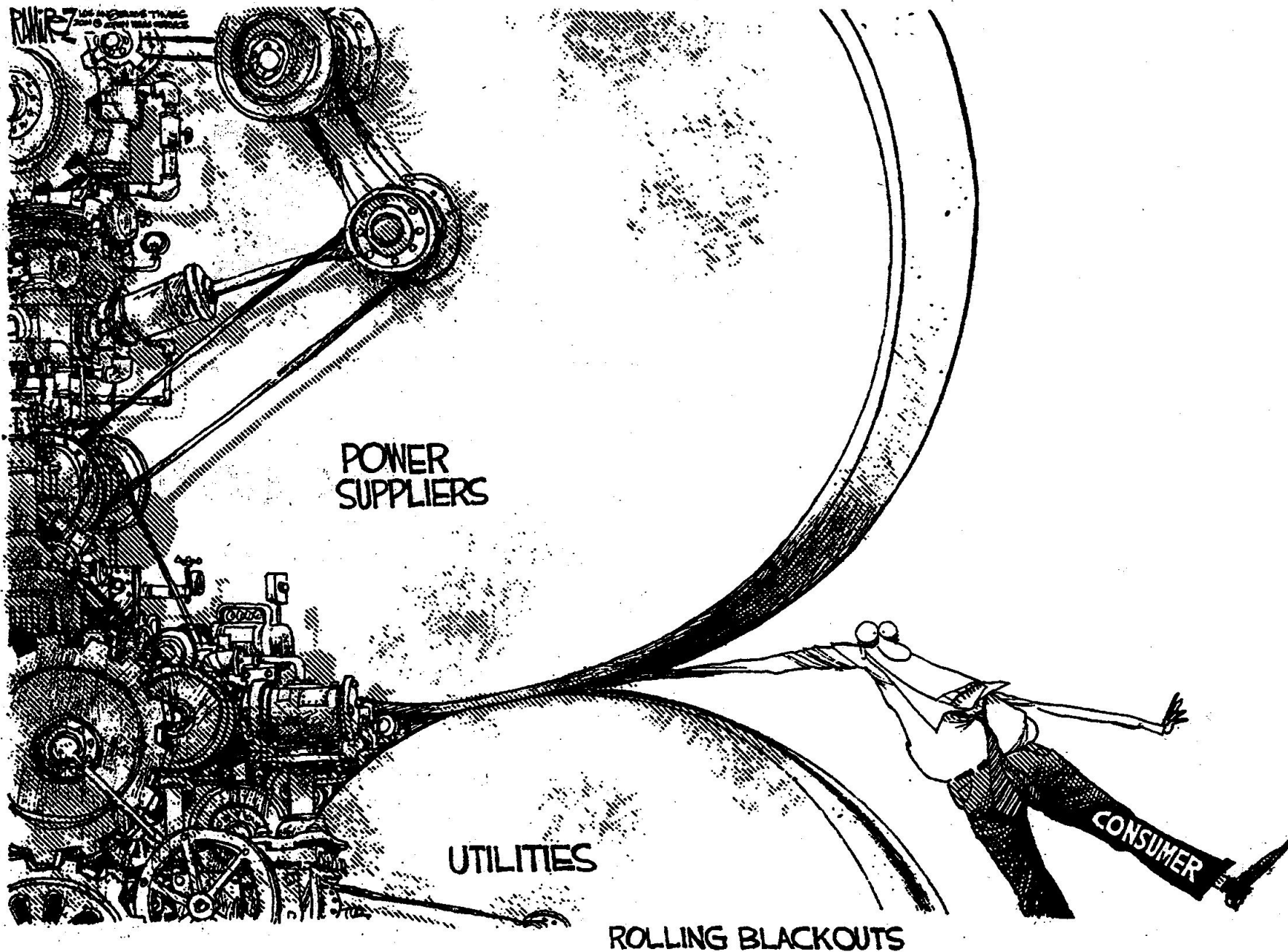
PX DAY-AHEAD MONTHLY MARKETS



Source: California PX

BOON FOR MARKETERS: EXAMPLES

- ❑ **Powerex (BCHydro) revenues -- in large part from sales to California -- nearly quadrupled from April to September 2000, to about \$1.5 billion**
- ❑ **Dynegy pretax earnings from operations that include California plants in 2000 Q3 rose to \$106.4 million from \$22 million in 1999 Q3**
- ❑ **Reliant Energy made \$90million in operating income from California in 2000 Q3, over 200% increase over the 1999 Q3 figures**



ROLLING BLACKOUTS

CALIFORNIA TODAY

- ❑ 9 new plants under construction representing a total of 6,723 MW and 22 more are in the regulatory pipeline; however, only in 2003 will CA have sufficient installed capacity to meet summer peak demand
- ❑ The new plants, by and large, are being built in places where local officials welcome them as an economic boom or where the opponents lack the clout to prevent them from being approved
- ❑ State officials moved aggressively to cut regulatory procedures and Governor Davis persuaded the Legislature in fall 2000 to pass the “fast track” approval measures

THE CALIFORNIA ENERGY PLAN

- ❑ **The State Legislature enacted a \$10 billion plan to let the state buy power through long-term contracts**
- ❑ **The Act authorizes the state to issue revenue bonds - the largest bond program in California's history - to buy bulk power at prices below those available in the daily/hourly markets and to sell the electricity to utility customers**
- ❑ **The State plans to sell the bonds to**
 - **cover the difference between the price the State will pay for power and at which it will resell to the utilities**
 - **pay for short-term power purchases**

CONSERVATION MEASURES

- ❑ Governor Davis promulgated a series of aggressive conservation proposals
- ❑ An executive order in which he invoked his emergency power makes it compulsory to curtail outdoor lighting at retail businesses and allows the *power police* to impose fines up to \$1,000 per day
 - order exempts lighting deemed “necessary for the health and safety of the public, employees and property”
 - goal is to reduce retail outdoor lighting by 50%

THE CALIFORNIA CUSTOMER CHOICE

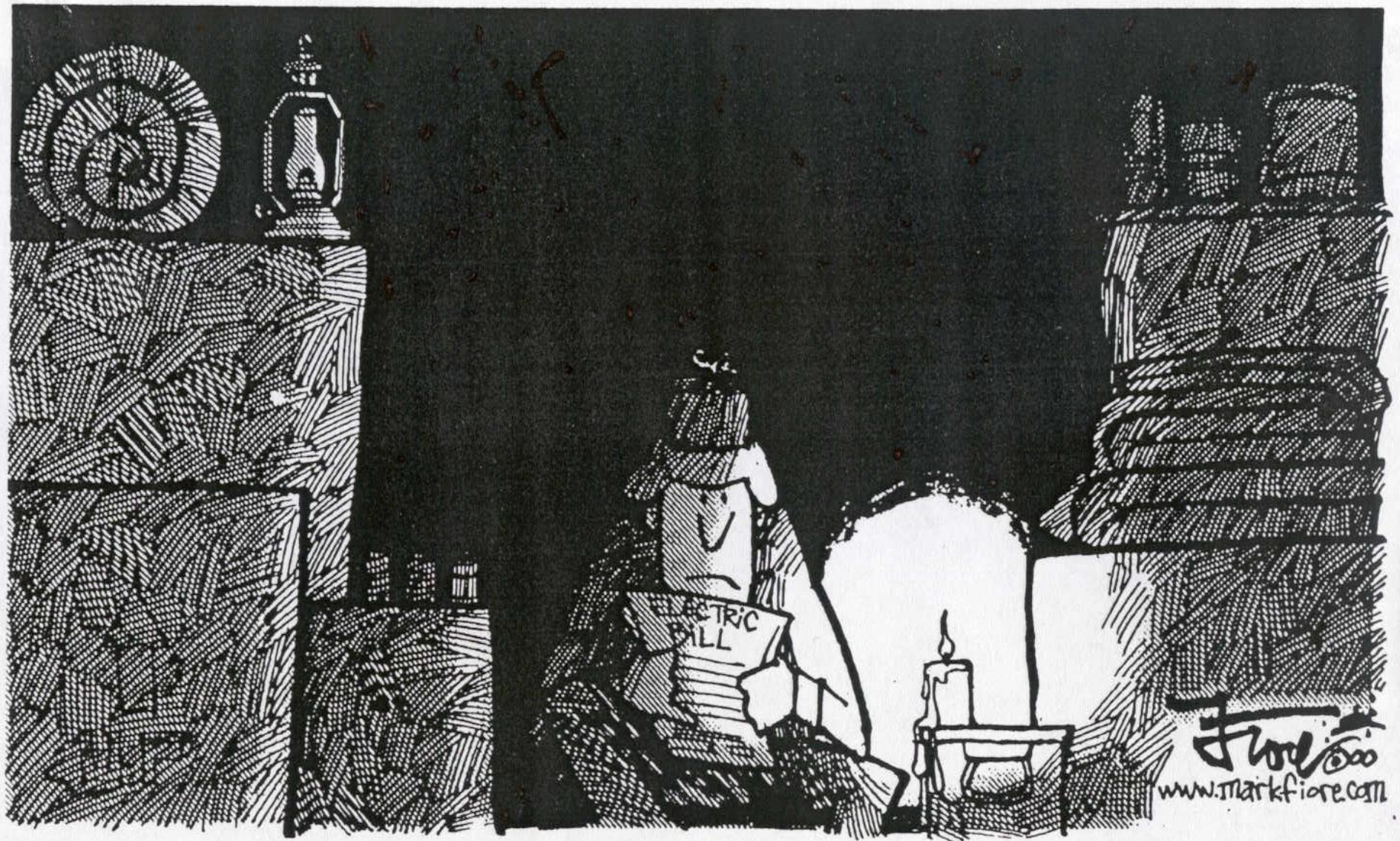


STABILIZATION PLAN FOR THE CALIFORNIA IOUs

- ❑ Governor Davis' plan calls for the state to purchase the IOUs' transmission network at a yet-to-be-determined price as part of the resolution of the problem of the utilities' accumulated debts; the book value is above \$3 billion
- ❑ The State would sell bonds to finance the purchase; the compensation for the network is expected to be insufficient to cover the utilities' debts
- ❑ The State would also allow the utilities to sell bonds guaranteed by a dedicated portion of the revenue stream from customers
- ❑ The parent companies of the utilities are expected to cover a significant portion of the utilities' debts

KEY LESSONS

- ❑ **Partial *deregulation* can lead to a disastrous situation: free markets must be allowed to work and be free of price controls and strict regulations**
- ❑ **Rate caps do not work**
- ❑ **Demand side response is crucial: importance of price signals in influencing demand**
- ❑ **New supply is critically important: tradeoffs between environmental desires and adequate energy supply must be struck**
- ❑ **The vital importance of electricity to the economic well being and lives of the people is clear**



MARK FIORE, San Francisco

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