



CALIFORNIA ISO

2003 Annual Report on Market Issues and Performance

**Board of Governors Meeting
April 22, 2004**

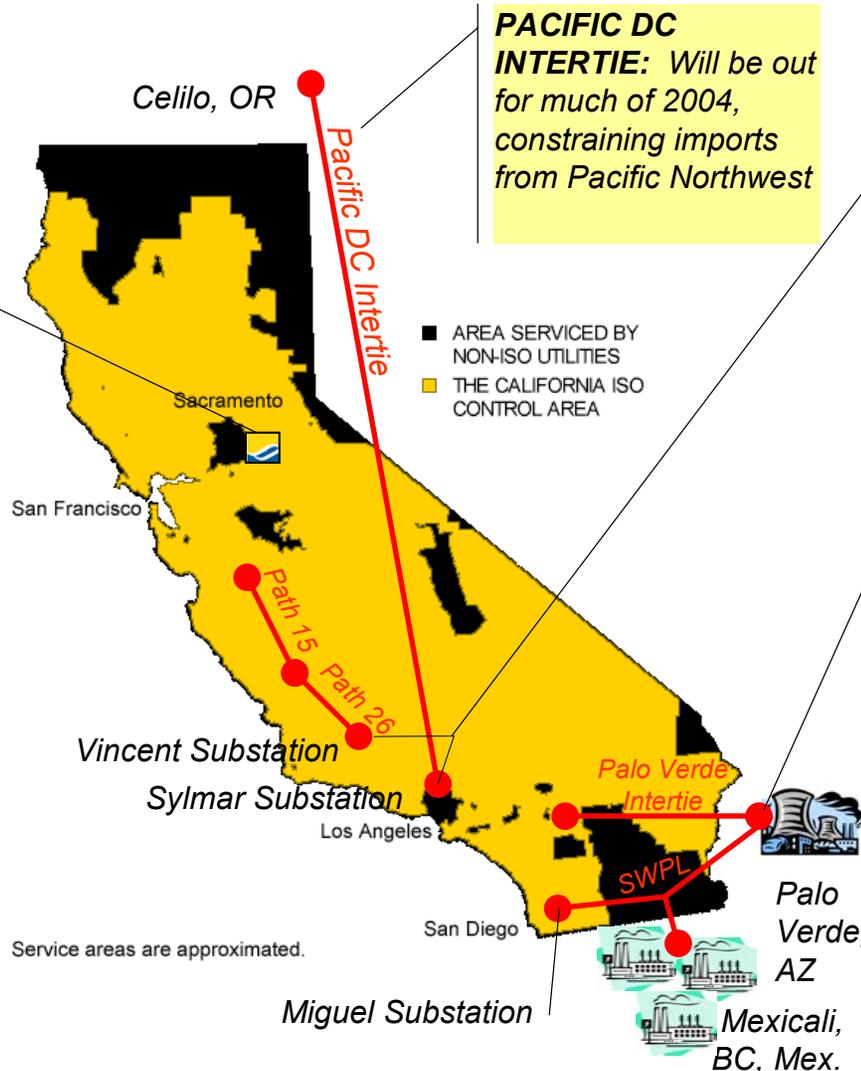
**Greg Cook
Manager of Market Monitoring**



Issues in 2003-04

CALIFORNIA ISO and FERC:

- Continue to work through hurdles regarding MD02 design and implementation, O&I, transmission methodology
- Short-term Energy markets competitive due to strong supply conditions; RT markets mostly decremental
- Approx. 4% Load growth since mid-2003
- Bid insufficiency in A/S and RT decremental balancing energy markets
- System AMP has not mitigated any bids since 10/30/02 implementation
- Intrazonal Congestion was the most significant problem in the ISO markets during 2003



PACIFIC DC INTERTIE: Will be out for much of 2004, constraining imports from Pacific Northwest

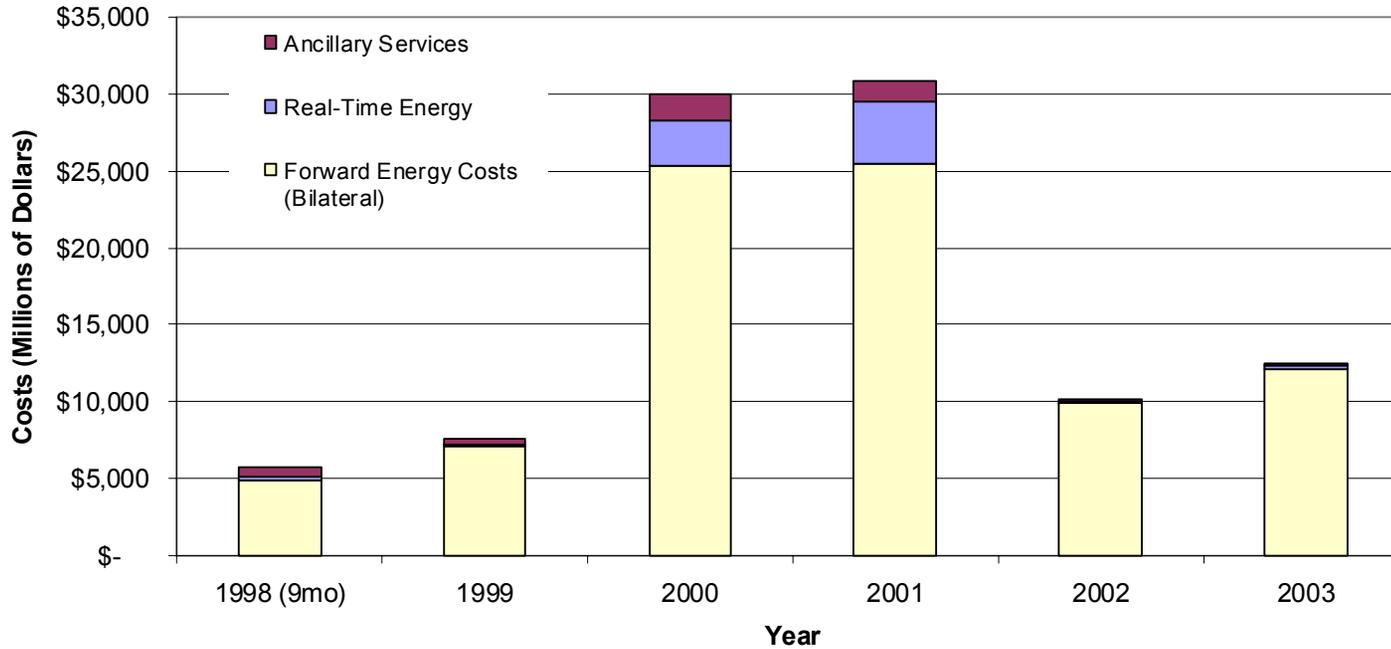
SYLMAR, VINCENT SUBSTATIONS: Each partially out for much of 2003. Resulted in significant intrazonal congestion costs

PALO VERDE / SOUTHWEST POWER LINK: In July 2003, Northern Mexico generation began supplying energy into insufficient transmission at Miguel. This new energy combined with imported energy from Palo Verde resulted in high intrazonal congestion redispatch costs. Newly increased DEC reference levels have resulted in lower intrazonal redispatch premiums.



**Total Cost \$12.1 Billion in 2003, v. \$10.1 Billion in 2002;
Increase in costs affected by natural gas prices**

Wholesale Energy and Ancillary Service Costs, 1998-2003





Estimating Forward Costs

Forward-scheduled (non-ISO) costs not visible to ISO, estimated as follows:

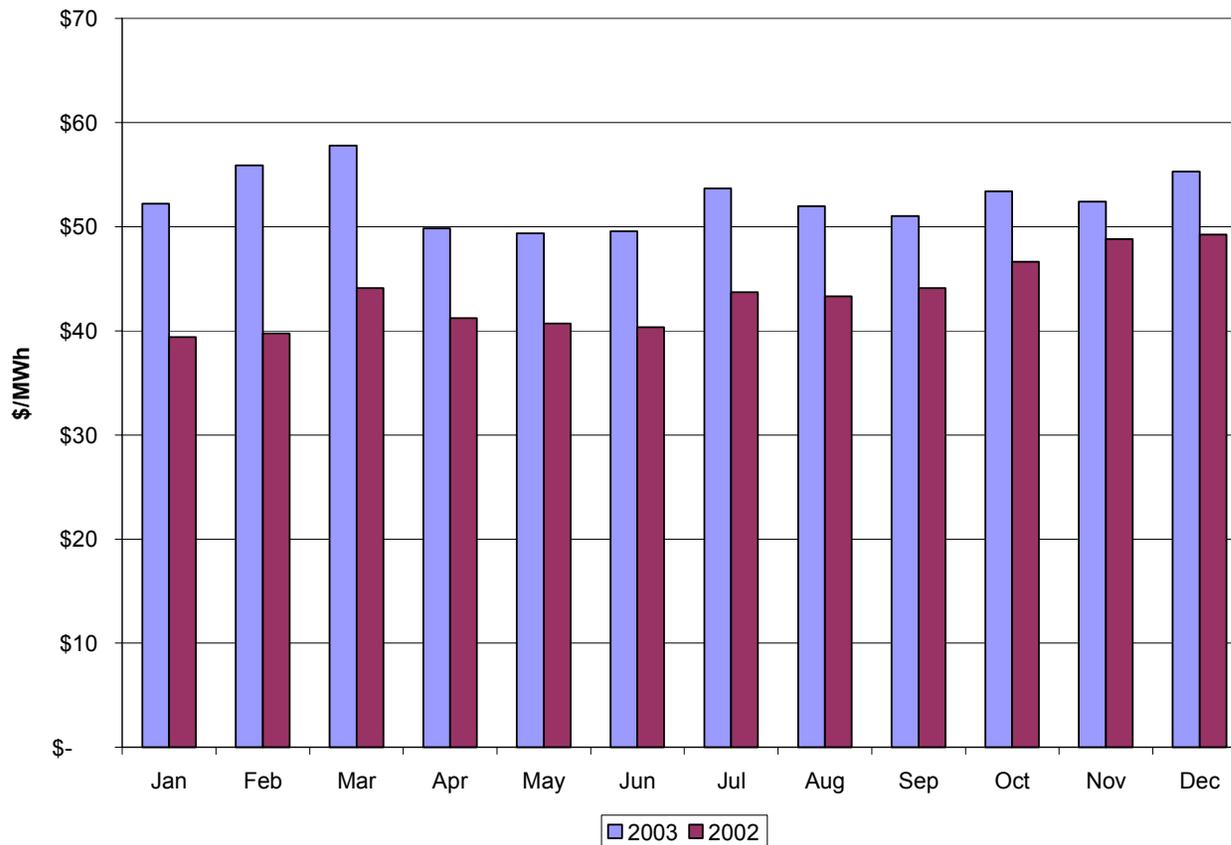
- Cost of energy delivered under State Long-Term Contracts estimated based upon 2002 dispatch patterns, since 2003 information not available; adjusted for 2003 natural gas prices
- Cost of energy from utility-retained generation based on estimated production costs
- Cost of energy from other bilateral purchased estimated at hour-ahead California hub prices from Powerdex survey information service



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2003 Average Monthly Cost of Energy and A/S between \$49 and \$58/MWh

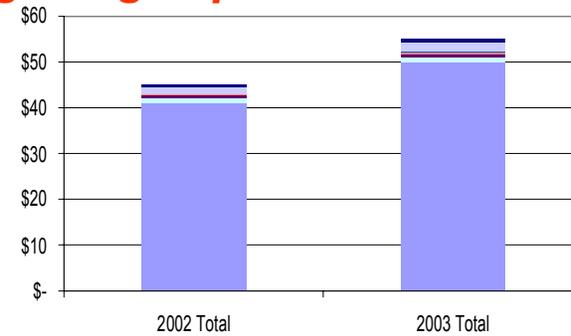
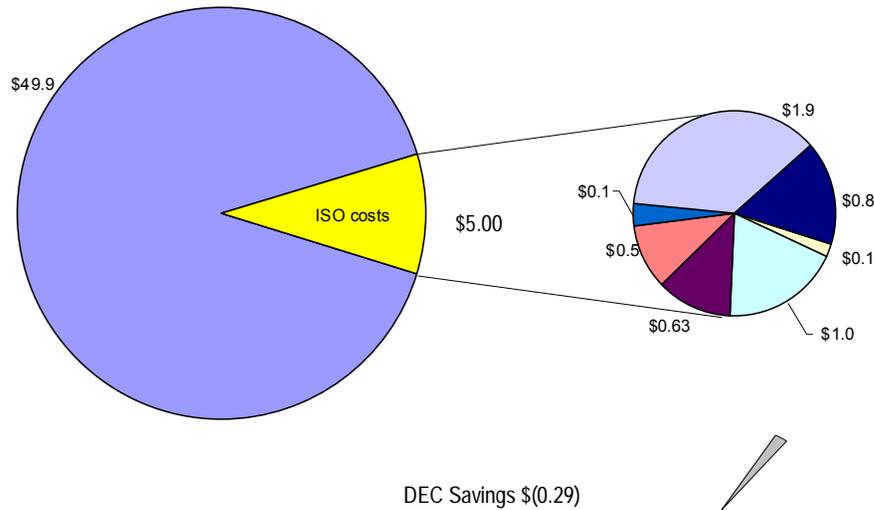
2002 and 2003 Average Monthly Wholesale Energy and Ancillary Service Costs





All-In Price Index was \$54.92/MWh in 2003, compared to \$45.06/MWh in 2002; increase due largely to change in gas prices

All-In Price Index 2003 by Cost Contribution



	2002 Total	2003 Total	Growth Rate
Est Forward-Scheduled Energy Costs excl. Cong. And GMC (\$/MWh load)	\$ 40.92	\$ 49.92	22%
Interzonal Cong. Costs (\$/MWh load)	\$ 0.18	\$ 0.12	-37%
GMC (\$/MWh load, all charge types, including RT)	\$ 1.00	\$ 1.00	0%
In-Sequence Incremental RT Energy Costs (\$/MWh load)	\$ 0.49	\$ 0.63	29%
Explicit MLCC Costs (Uplift) (\$/MWh load)	\$ 0.26	\$ 0.54	108%
Out-of-Sequence RT Energy Premium Costs (\$/MWh load)	\$ 0.02	\$ 0.19	931%
RMR Costs (\$/MWh load, include adjustments from prior periods)	\$ 1.60	\$ 1.95	22%
Less In-Sequence Decremental RT Energy Savings (\$/MWh load)	\$ (0.08)	\$ (0.29)	246%
Total Energy Costs (\$/MWh load)	\$ 44.39	\$ 54.06	22%
A/S Costs (\$/MWh load, self-provided A/S valued at ISO market costs)	\$ 0.68	\$ 0.86	28%
Total Costs of Energy and A/S (\$/MWh load)	\$ 45.06	\$ 54.92	22%
A/S % of All-In Price	1.5%	1.6%	



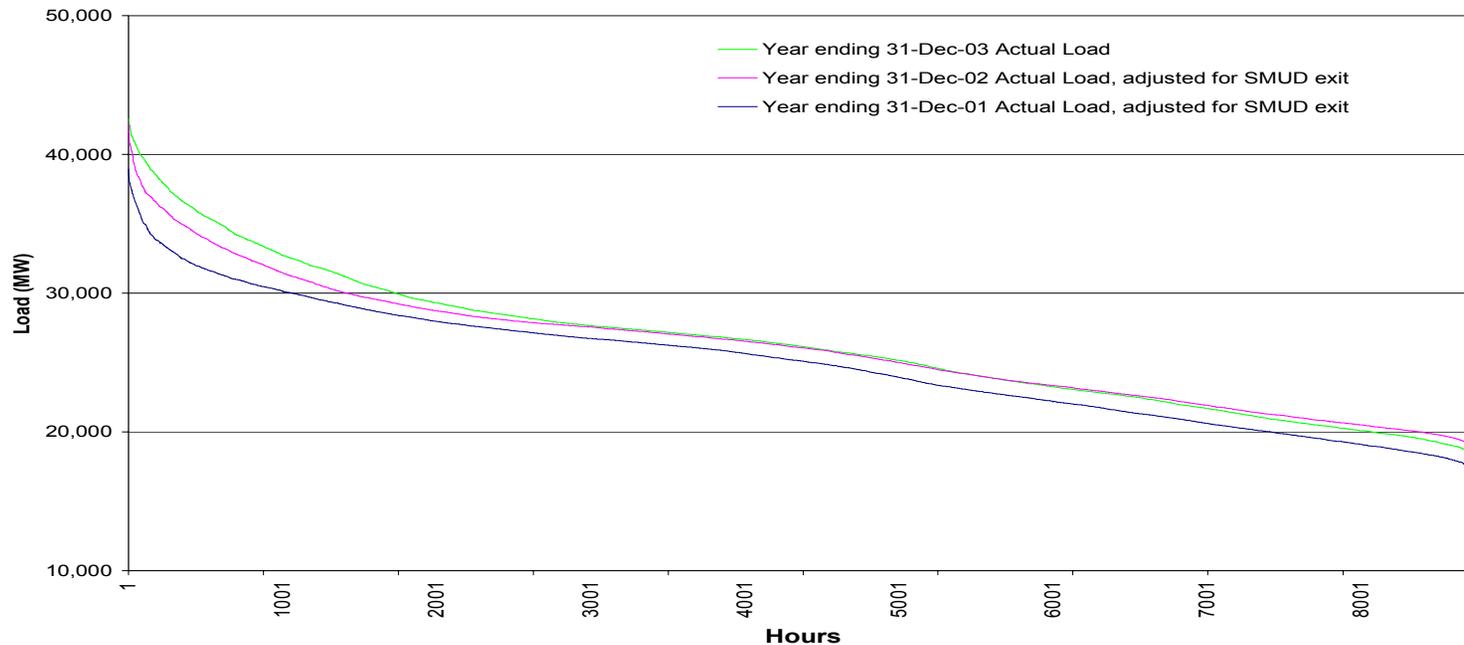
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2003 Supply and Demand Conditions



2003 Loads increased in second half of the year over 2002 levels due to recovering California Economy

2001-2003 Load Duration Curves

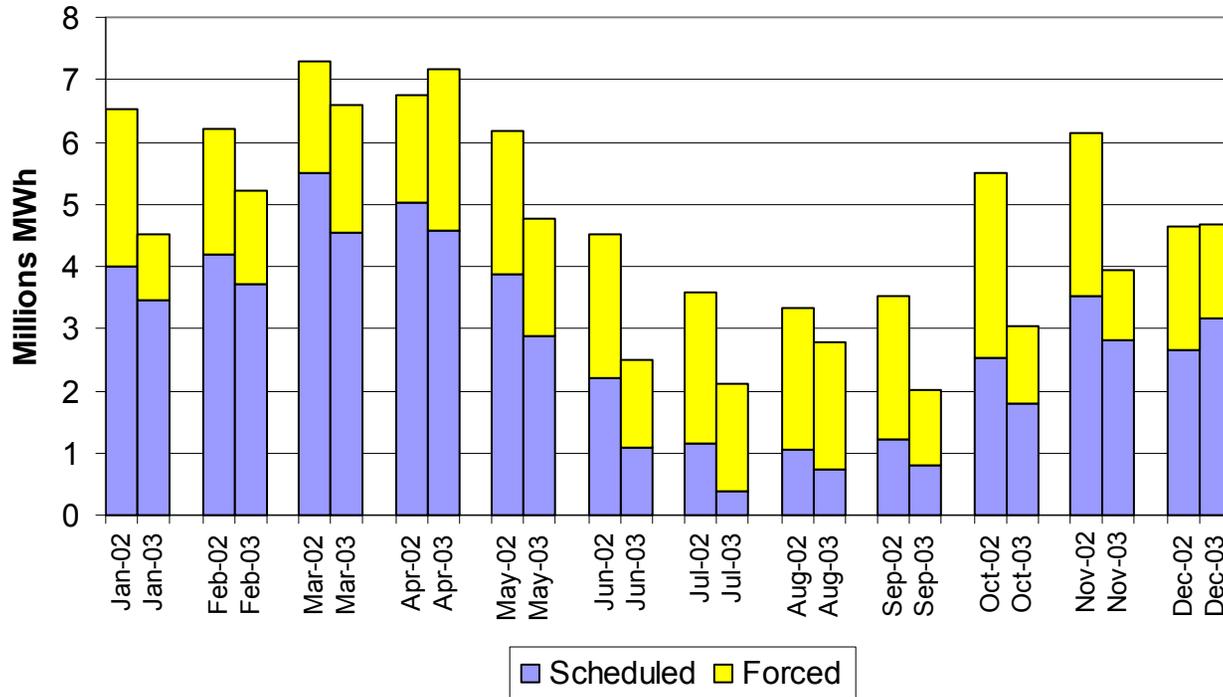


Year	Avg. Load (MW)	% Chg.	Annual Total Energy (GWh)	% Chg.	Annual Peak Load (MW)	% Chg.
2001	24,878		217,905		38,975	
2002	26,065	4.8%	228,339	4.8%	42,352	8.7%
2003	26,329	1.0%	230,649	1.0%	42,581	0.5%



Generation Availability Increased in 2003 Compared to 2002 Levels

2002 and 2003 Outage Comparison





***Third straight year of net generation additions
greater than 2,500 MM***

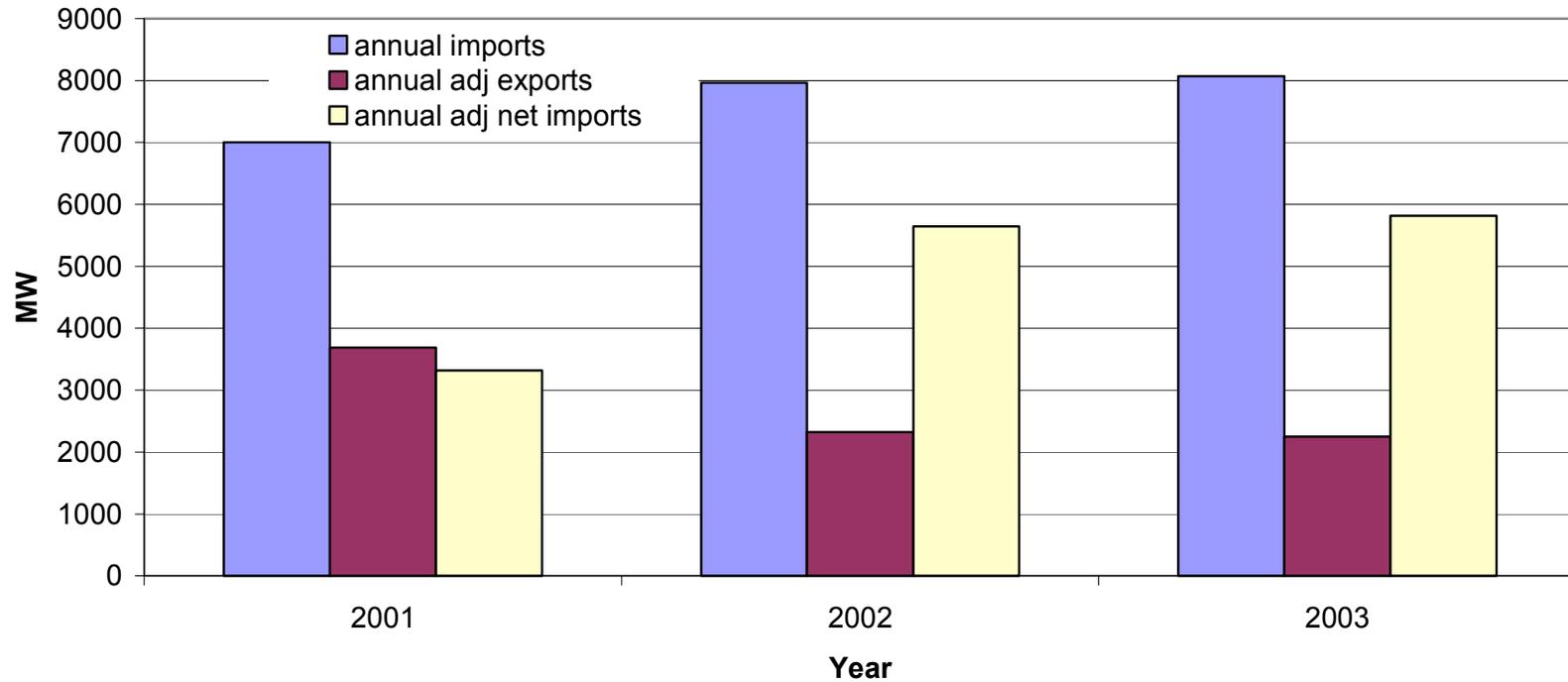
Generation additions and retirements by zone

Congestion Zone	Generation Additions (MW)	Generation Reductions (MW)	Net Change
NP-15	853	-638	215
SP-15	2,247	-1,171	1,075
ZP-26	1,729	-342	1,387
ISO Control Area	4,829	-2,151	2,678



Net imports strong for second year in a row

2001 through 2003 Average Annual Net Imports

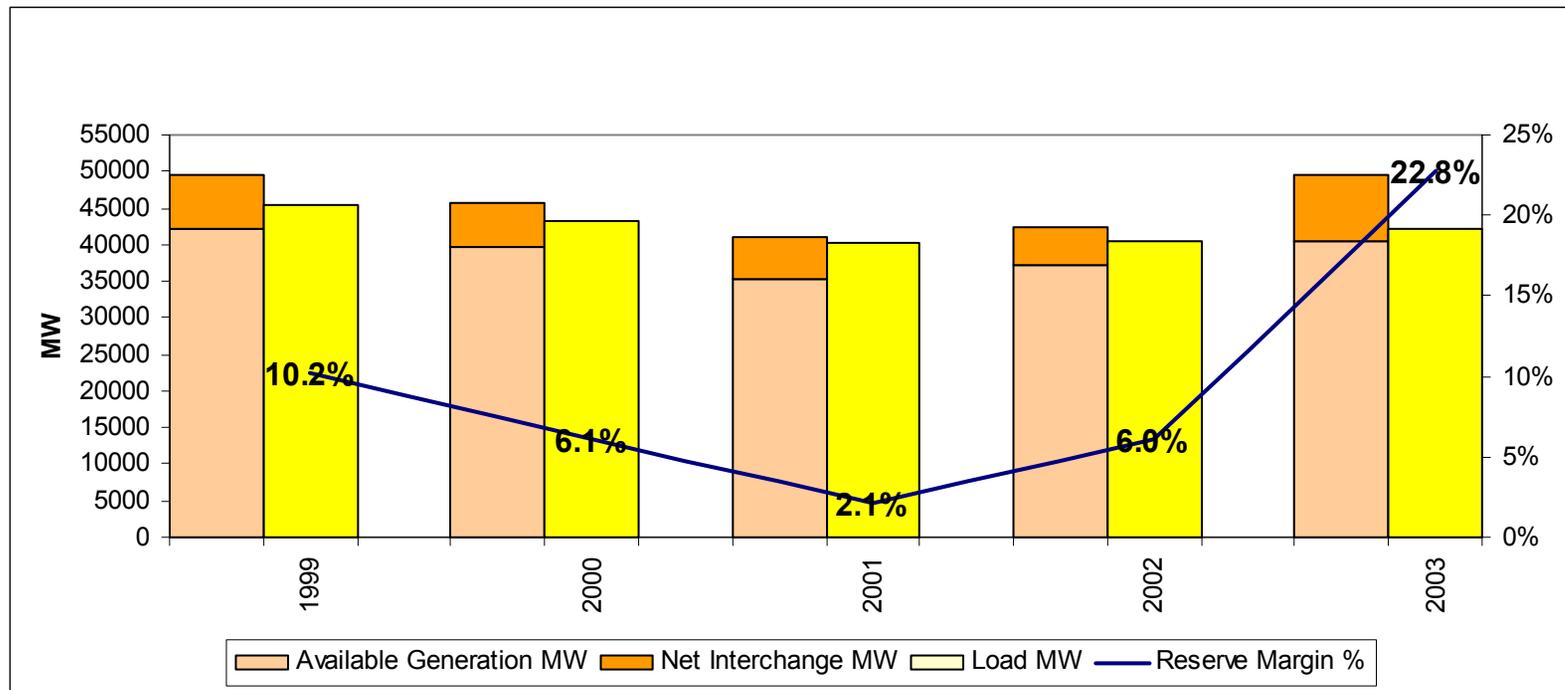




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Peak reserve margin increased in 2003 due to strong supply conditions, indicating greater availability of resources during peak periods than in previous years, due largely to new thermal units

1999-2003 Reserve Margin During Annual Peak Load Hour





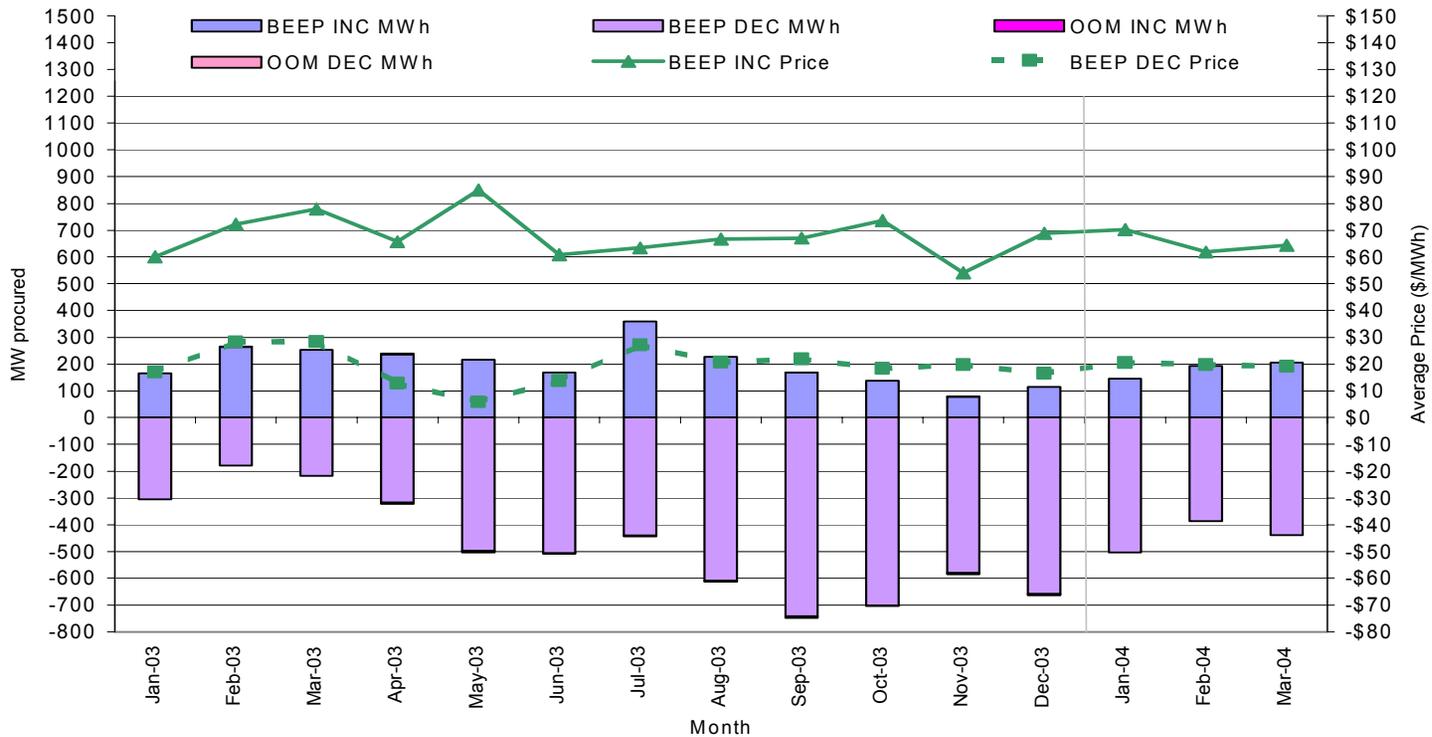
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Market Performance



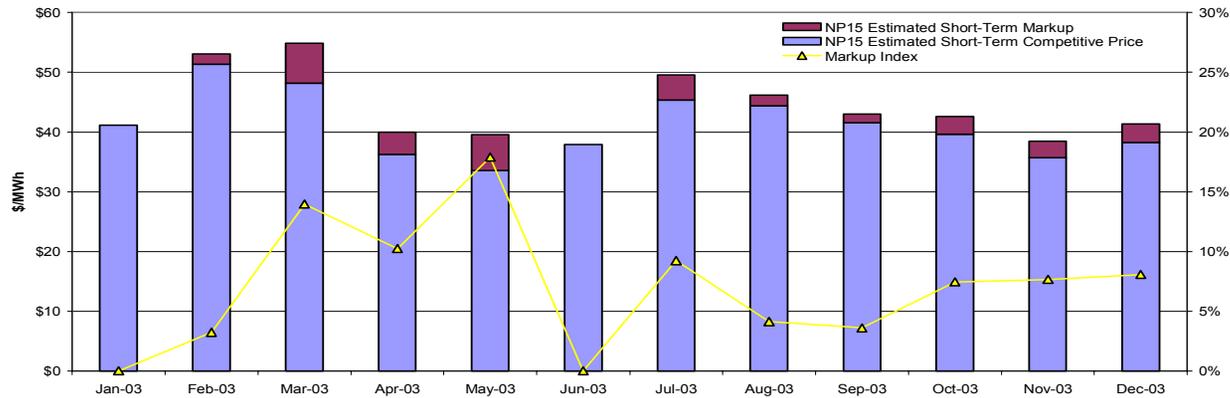
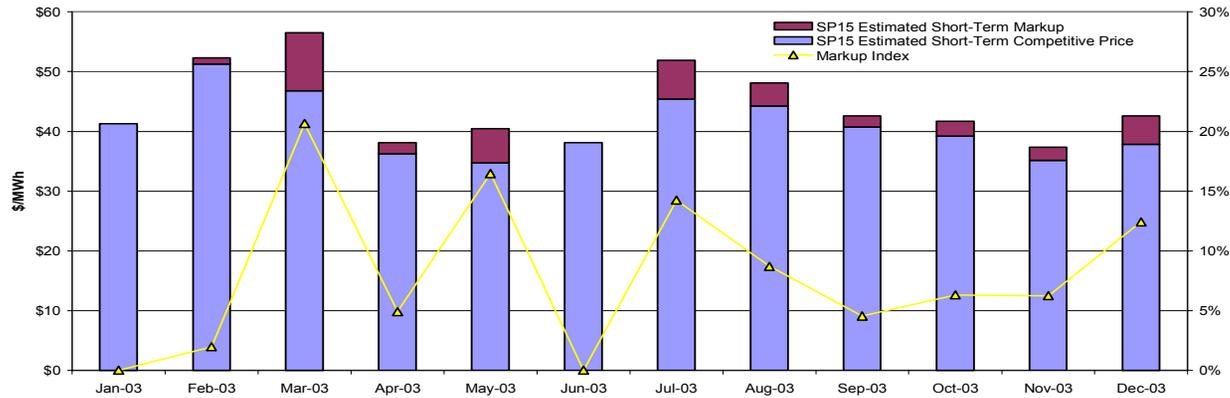
2003 Real-time Market Volume DEC:INC volume ratio 5:2

Monthly Average ISO Real-Time Volume: 2003 and Q1 2004





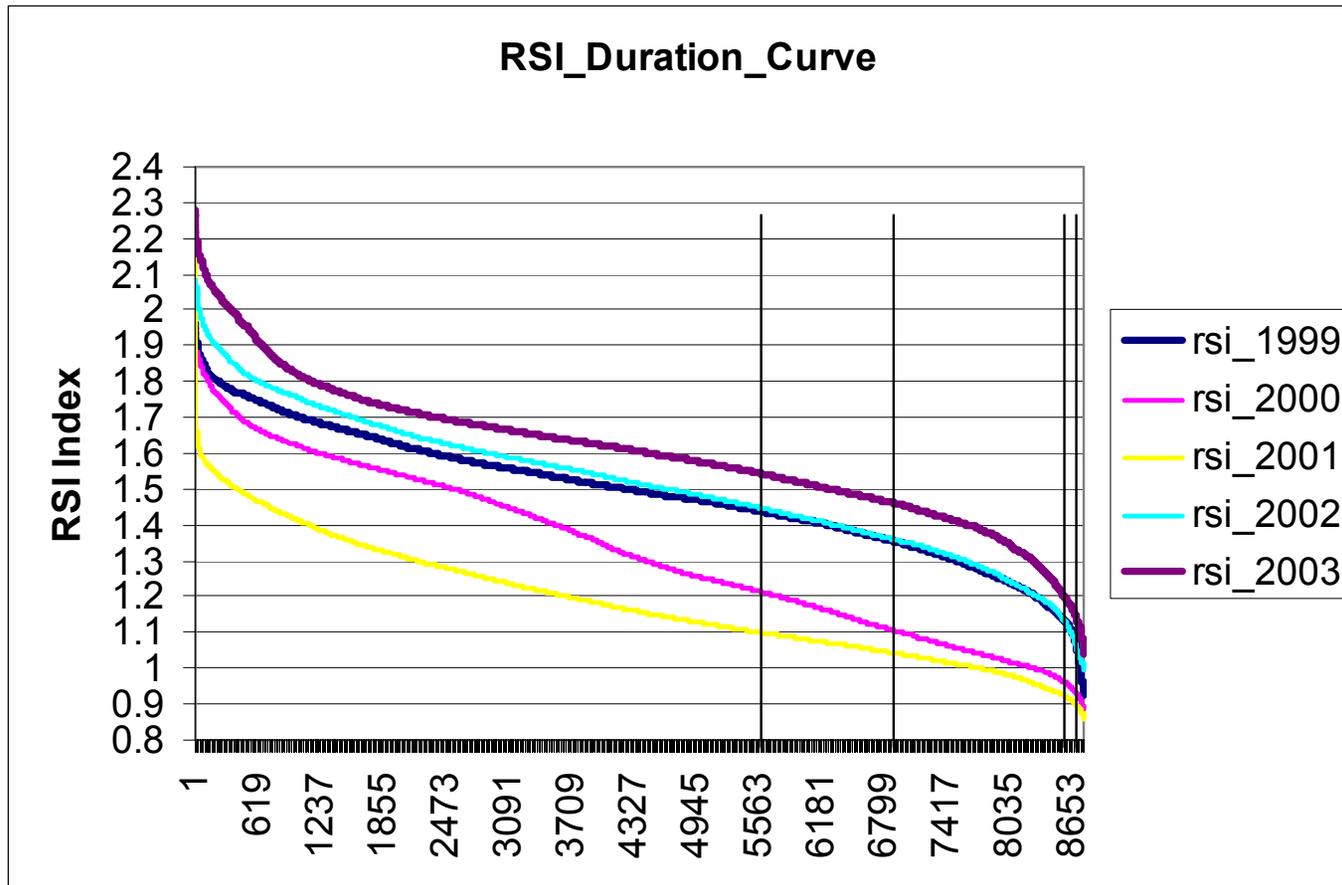
2003 Est. short-term price-to-cost markups 7% in NP15, 8% in SP15
Short-Term Markup Indices: SP15 (top) and NP15 (bottom)





High RSI levels in 2003 indicate a healthy market with suppliers pivotal in fewer than 0.5% of the hours of the year

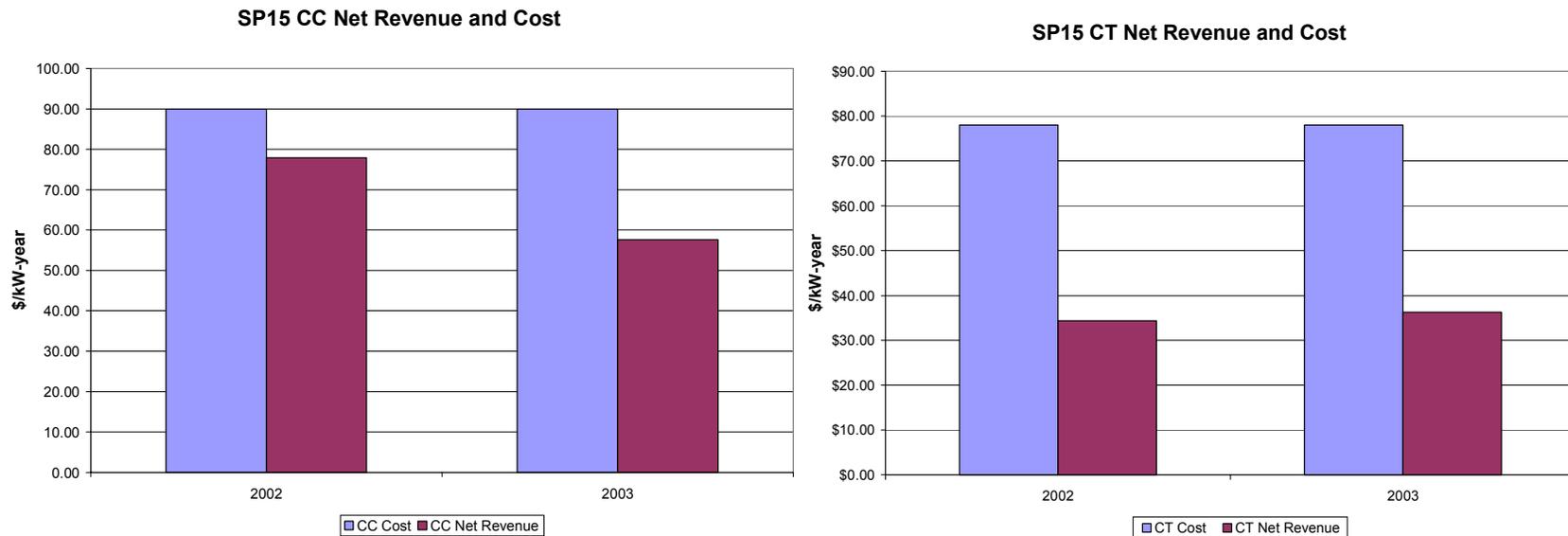
Hourly Residual Supplier Index 1999-2003





Profits for a new typical combined cycle generation unit fell 30 percent in 2003, combustion turbine unit profits stable*

Net Revenue Analysis, 2002 and 2003

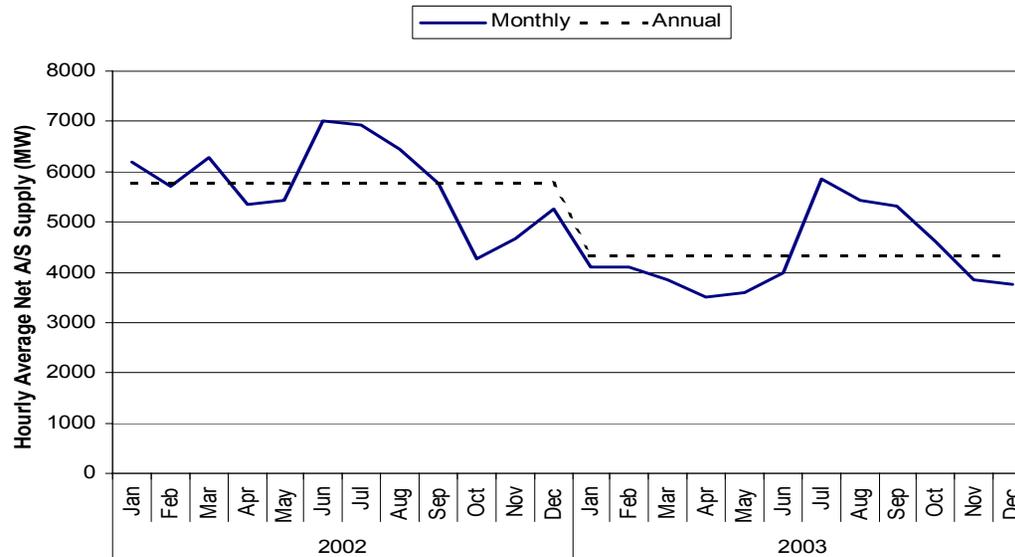


*Net revenue analysis based on units selling solely into ISO imbalance energy and ancillary service markets. Typically, a significant portion of fixed cost recovery would be covered by a long-term bilateral contract.



Ancillary service supply dropped 25% in 2003 from 2002 levels

Average Hourly Net A/S Supply by Month, 2002-2003



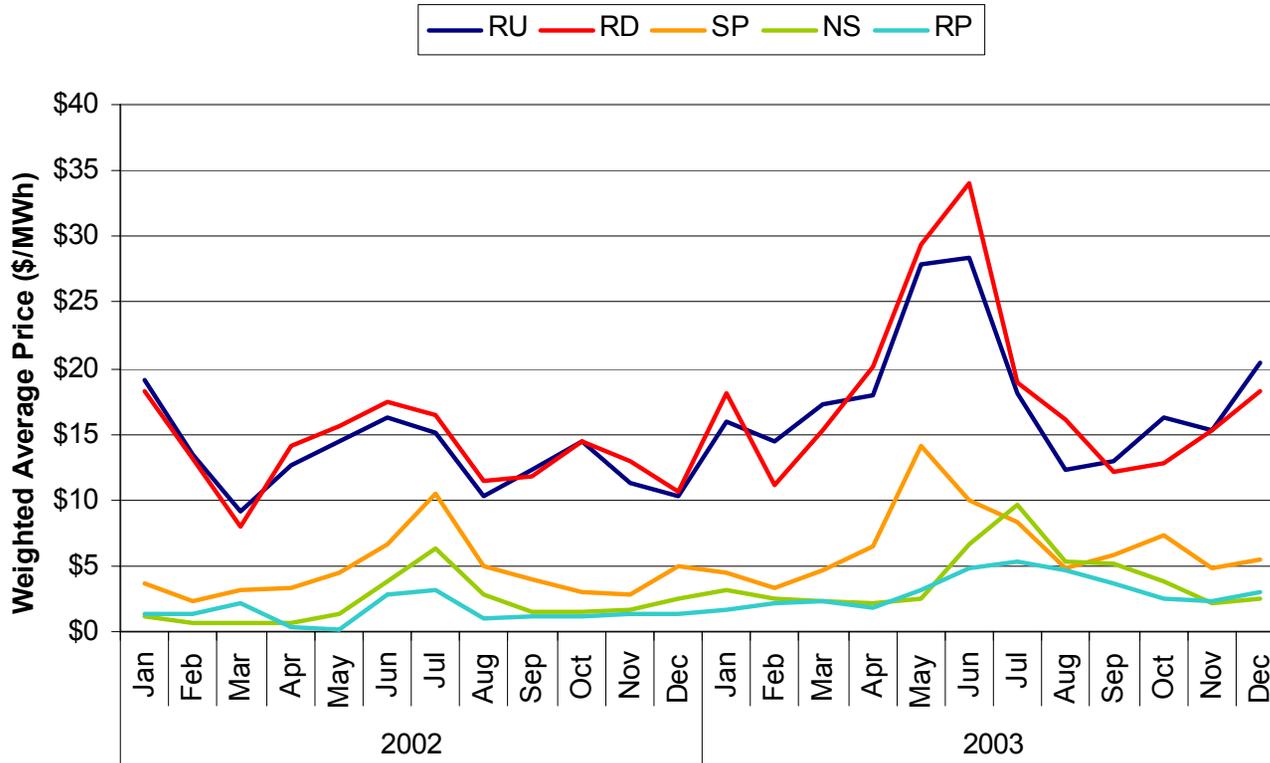
Frequency of Bid Insufficiency 2002-2003

	RU	RD	SP	NS
2002	0.9%	4.9%	0.8%	0.3%
2003	1.1%	3.3%	3.3%	0.8%



Reduced ancillary service capacity resulted in higher prices and increased bid insufficiency in 2003 compared to 2002

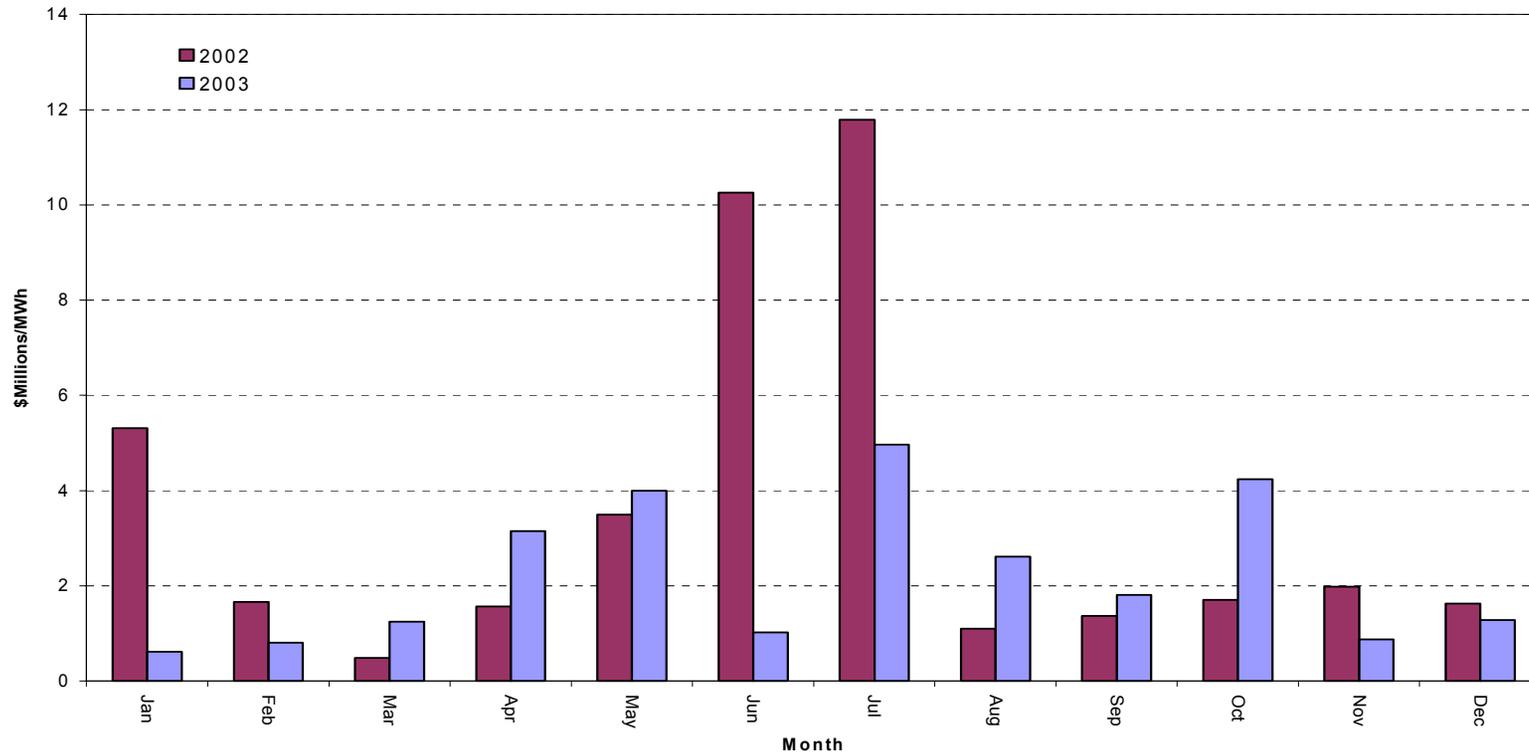
Monthly Weighted Average Ancillary Service Prices, 2002-2003





Interzonal congestion costs dropped 33% in 2003 v. 2002 levels

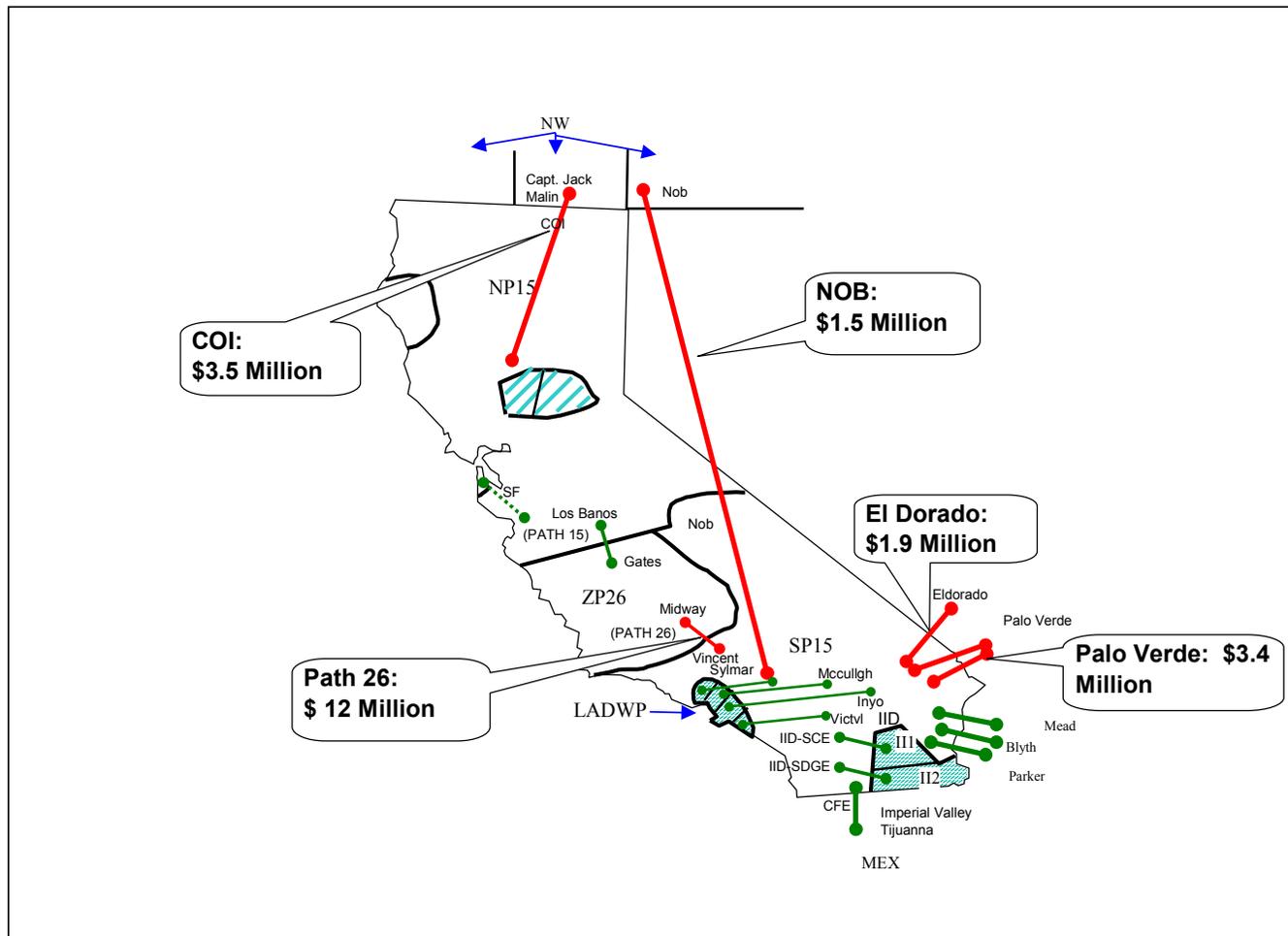
2002 and 2003 Monthly Interzonal Congestion Costs





Majority of interzonal congestion costs incurred on Path 26

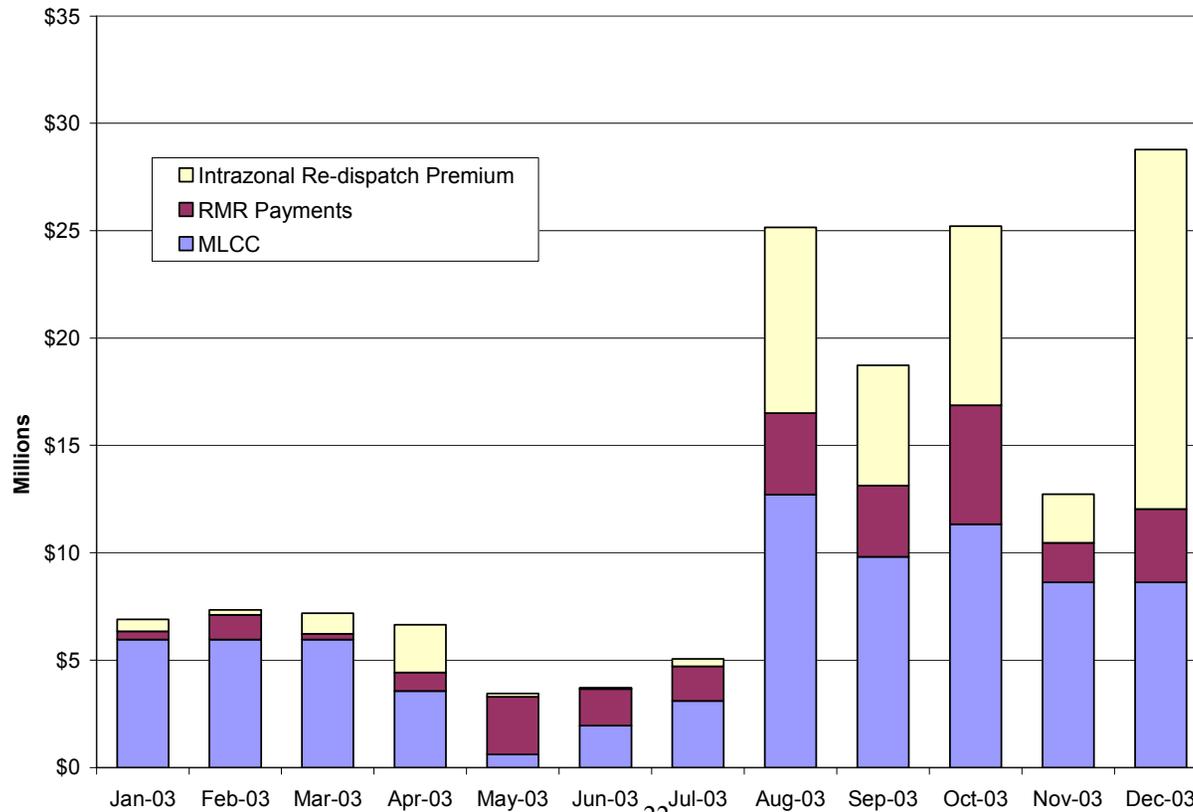
2003 Interzonal Congestion Revenues on Selected Paths





Intrazonal congestion costs surged in August as new generation came online in Northern Mexico and Arizona, and overwhelmed local transmission facilities

2003 Monthly Total Intrazonal Congestion Costs





Intrazonal congestion costs became very expensive due to congestion at Miguel, Sylmar, and Lugo substations

Intrazonal Congestion Redispatch Premiums and Volume through Feb-04

