



ISO New England State of the Markets Report 2002

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Robert Ethier, PhD
Director, Market Monitoring



Overview of Presentation

- Market Overview 2002
 - Energy Markets
 - External Transactions/Seams Issues
 - Capacity Markets
 - Congestion
 - Ancillary Services
 - Other Topics
- 2003 Market Developments and Look Ahead



Market Overview for 2002

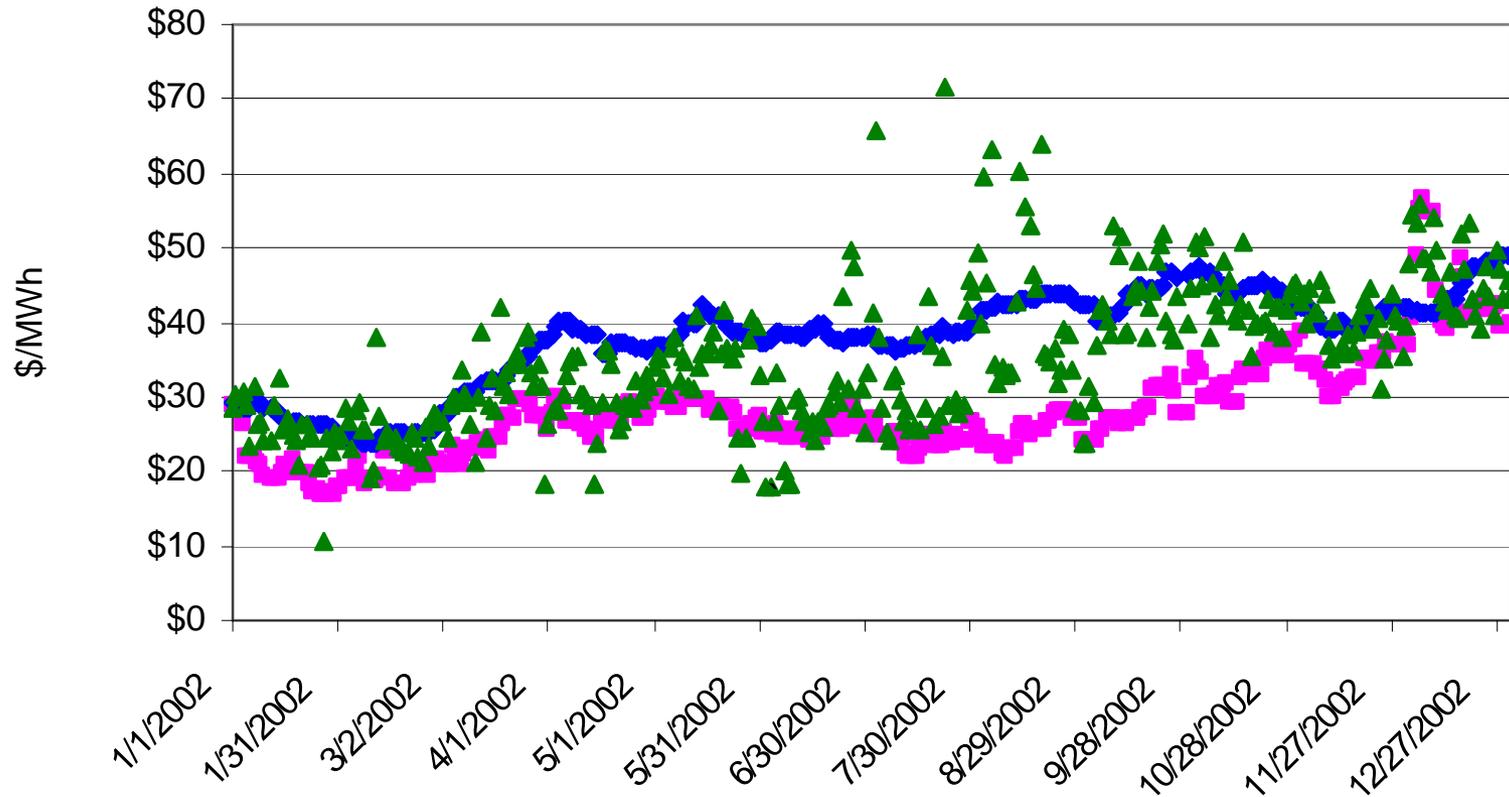
New England All-In Energy Price (\$/MWh)

Market	January-December 2000		January-December 2001		January-December 2002	
	Price (\$/MWh)	Weighted %	Price (\$/MWh)	Weighted %	Price (\$/MWh)	Weighted %
Energy (Average Load-Weighted)	45.95	88.7%	43.03	90.9%	37.52	89.9%
Ancillary (Reserves/AGC)	0.49	0.9%	0.48	1.0%	0.55	1.3%
Uplift	2.03	3.9%	0.94	2.0%	1.18	2.8%
Capacity (Bilateral ICAP)	3.37	6.5%	2.87	6.1%	2.50	6.0%
Total	51.82	100.0%	47.33	100.0%	41.75	100.0%



Market Overview for 2002

*Daily Average ECP vs Variable Production Costs**
January – December 2002



■ Variable Cost: Nat Gas Plant ◆ Variable Cost: Fuel Oil Plant ▲ Avg. Daily ECP

*Variable costs are for hypothetical natural gas plant and hypothetical fuel oil plant. Calculations are consistent throughout, and are meant to illustrate trends, not absolute levels.



Market Overview for 2002

ISO Benchmark Model Price Measures – 2002

Price Measure	Price (\$/MWh) 2002	Quantity-Weighted Lerner Index 2002
Competitive Benchmark Price	32.38	
Energy Clearing Price (ECP) : time-weighted	35.58	11%
Aggregate Bid-Intersection Price	34.24	6%



Market Overview for 2002

Net Revenue for Hypothetical Generators

Generator	Marginal Cost	Heat Rate	2002 net energy revenue (\$/MWh)	Annual Fixed Costs – New Unit
Representative CC/gas-fired	Daily fuel cost times heat rate	6,800 Btu/kWh	\$81,000	\$100,000 – 125,000/MW
Representative CT/gas-fired	Daily fuel cost times heat rate	10,500 Btu/kWh	\$25,000	\$60,000 – 80,000/MW
Approximate revenue from capacity sales	\$9,000 – 12,000/MW			
Approx. ancillary services revenue	\$5,000/MW			

- **Bottom Line:**

CC **Approx. \$16,000/MW Shortfall**

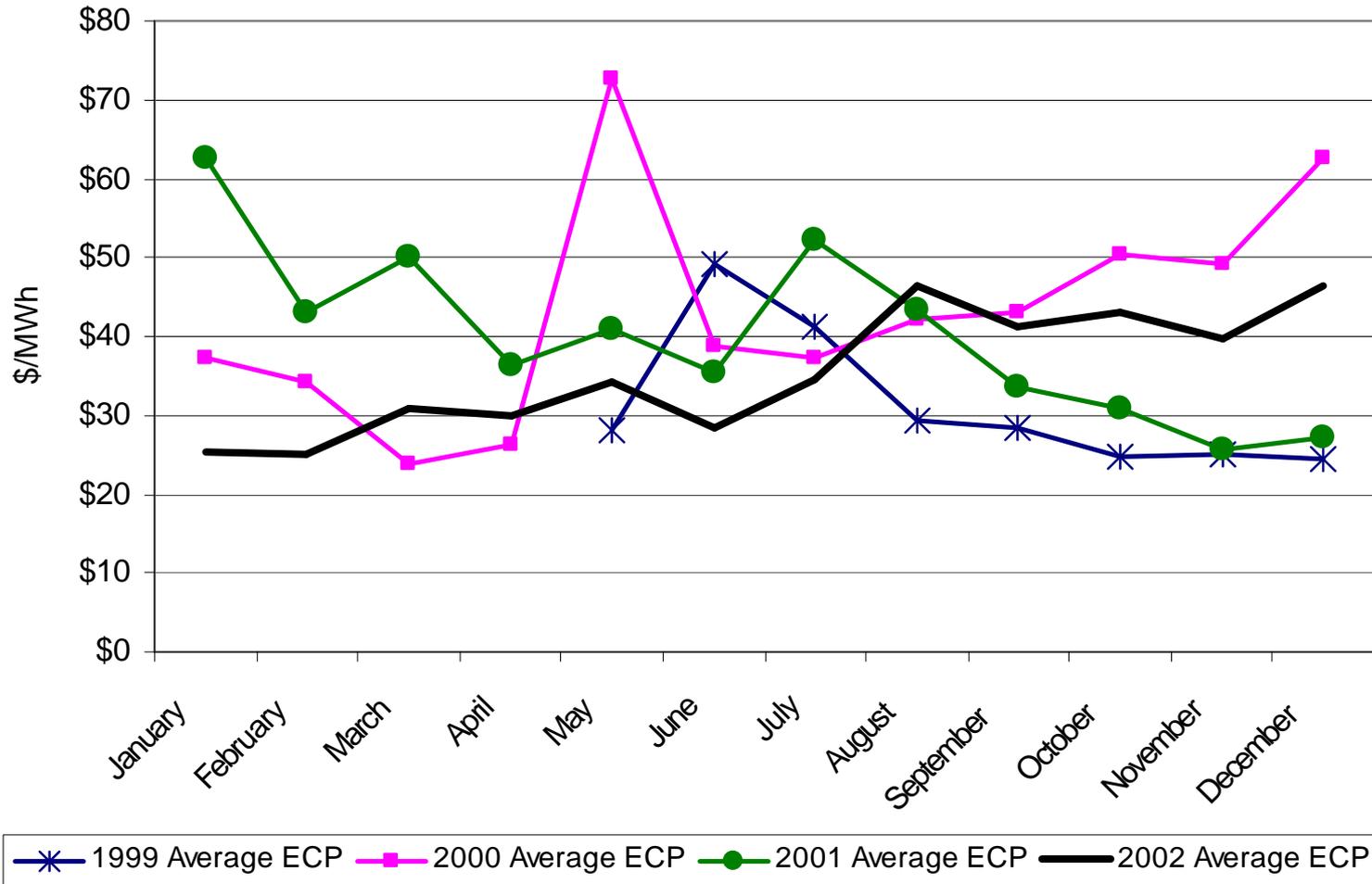
CT **Approx. \$30,000/MW Shortfall**

- **Consistent with New England Reserve Margins**

Energy Markets



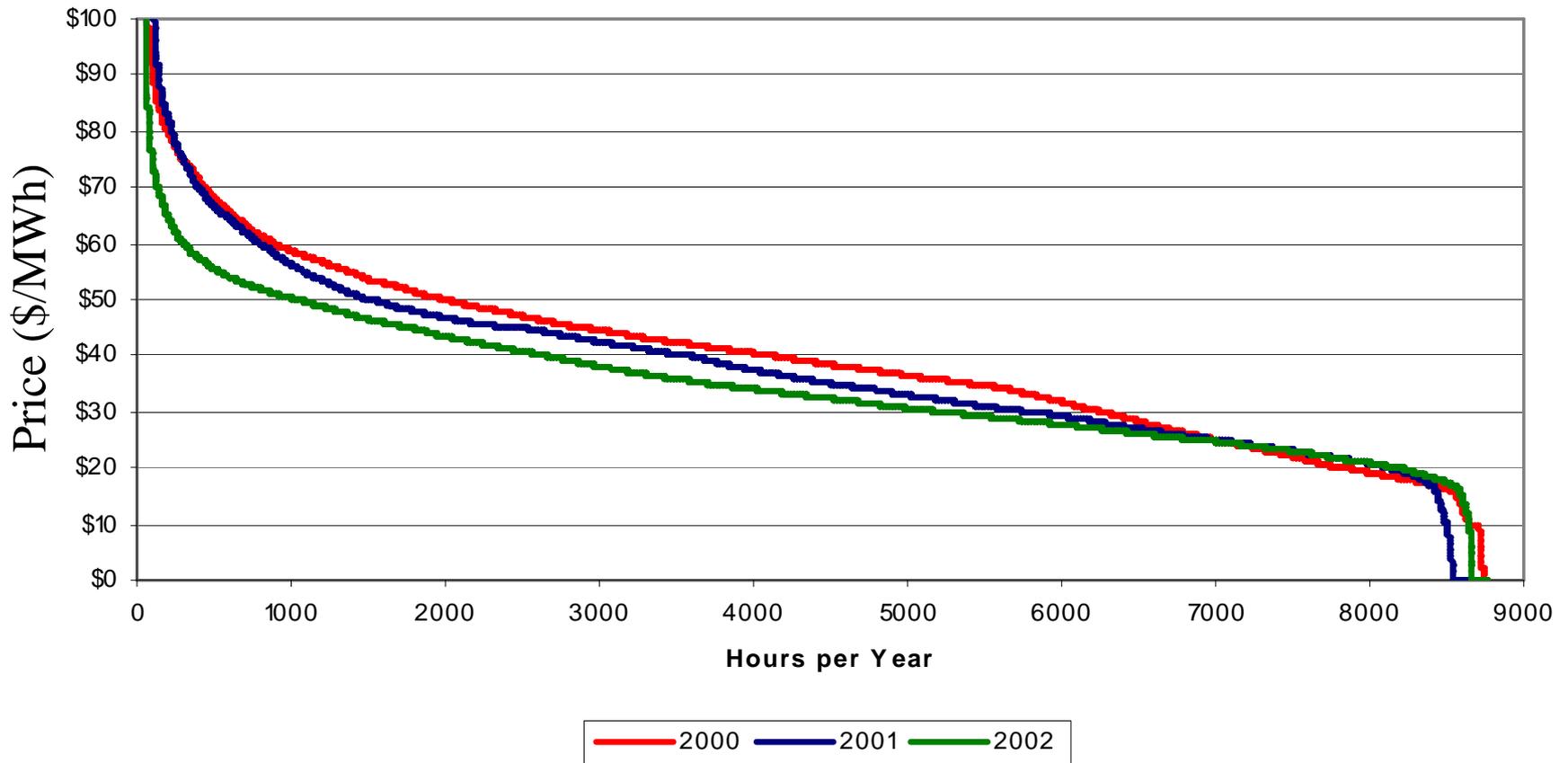
Monthly Average ECP 1999 – 2002



Energy Markets



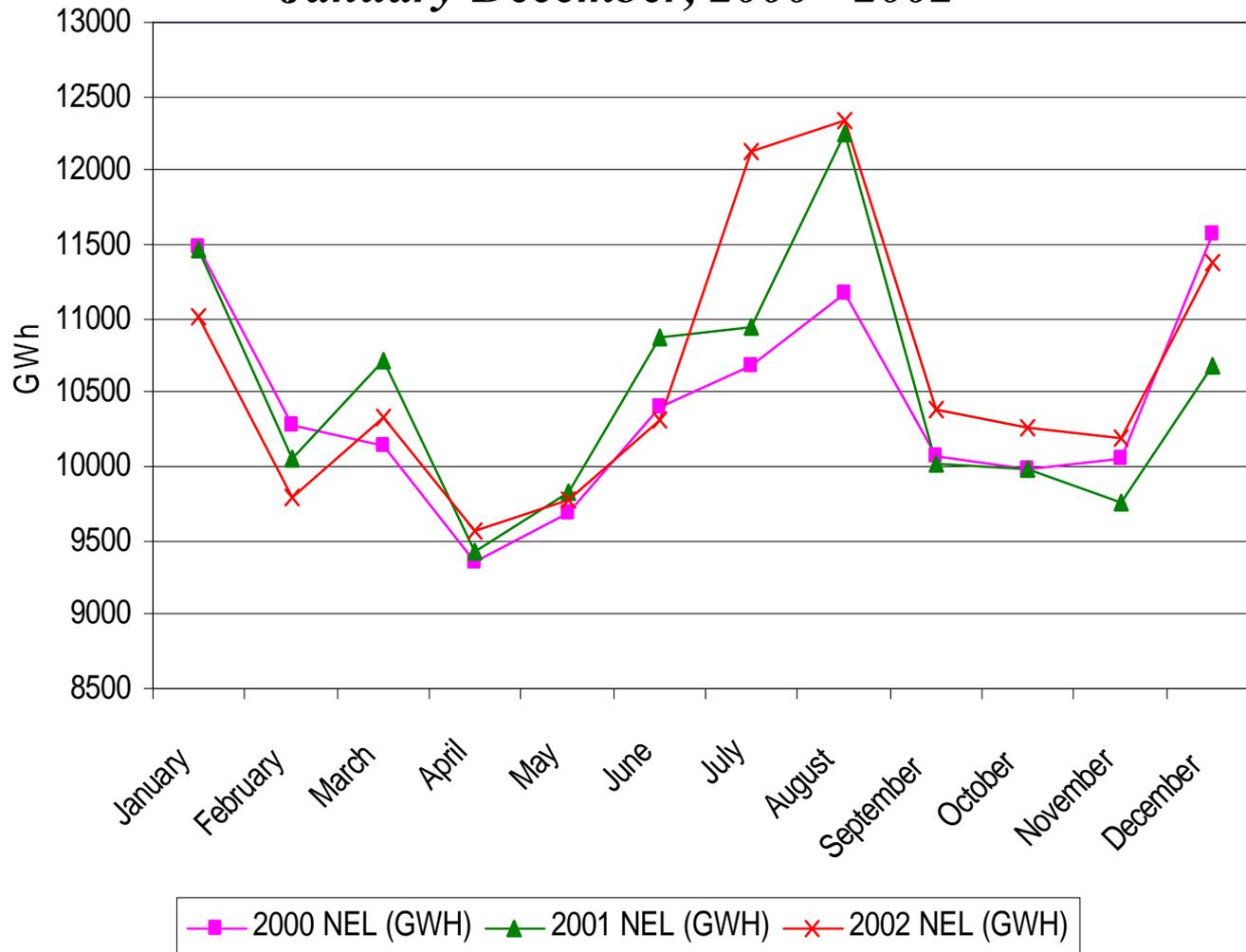
Energy Clearing Price Duration Curve Prices Below \$100: 2000-2002



Energy Markets



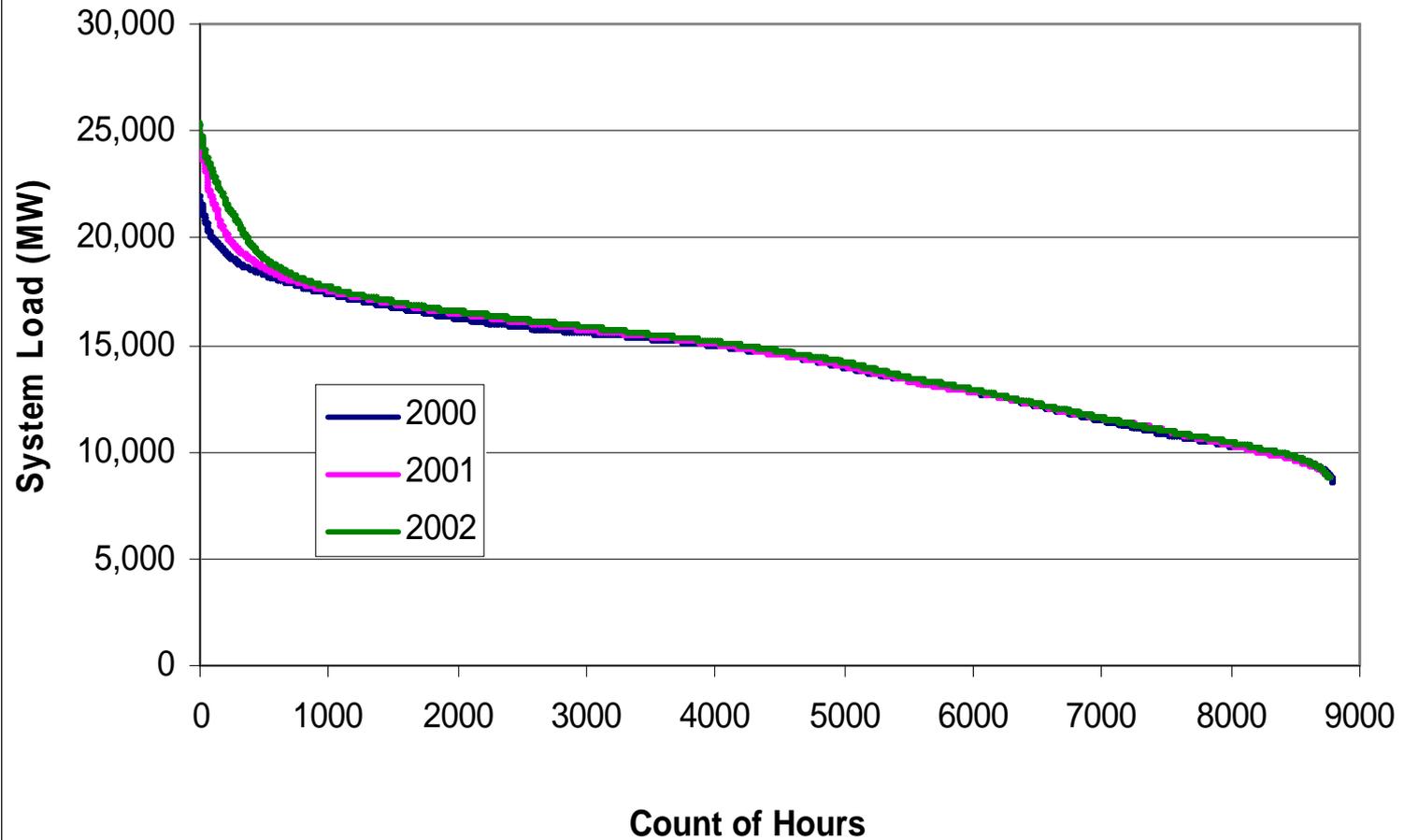
*Monthly Actual Net Energy for Load
January-December, 2000 - 2002*



Energy Markets



**New England System Load
Duration Curves: 2000, 2001, 2002**



Energy Markets



2002 Demand Response Program

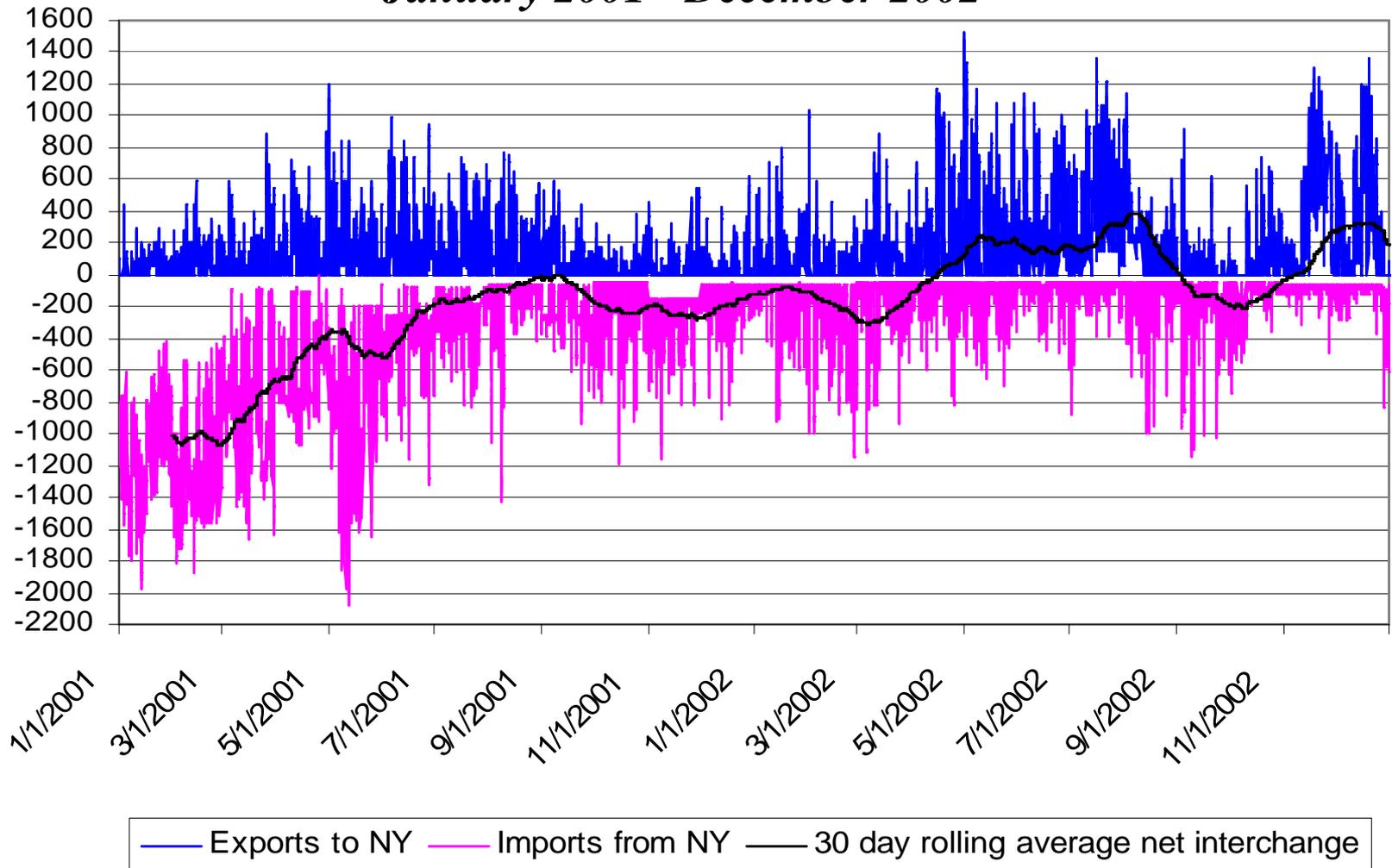
Program	Southwest CT (52 Cities /Towns)			Other New England		Totals	
	Customers	MW	ECS MW ^[1]	Customers	MW	Customers	MW
Demand (Class 1)	39	7	84	38	21	77	112
Price (Class 2)	13	7	N/A	131	66	144	73
Total	52	14	84	169	87	221	185

^[1] Emergency Capability Supplement program to procure sufficient emergency resources to reduce the number of hours that Southwest Connecticut was exposed to possible outages.

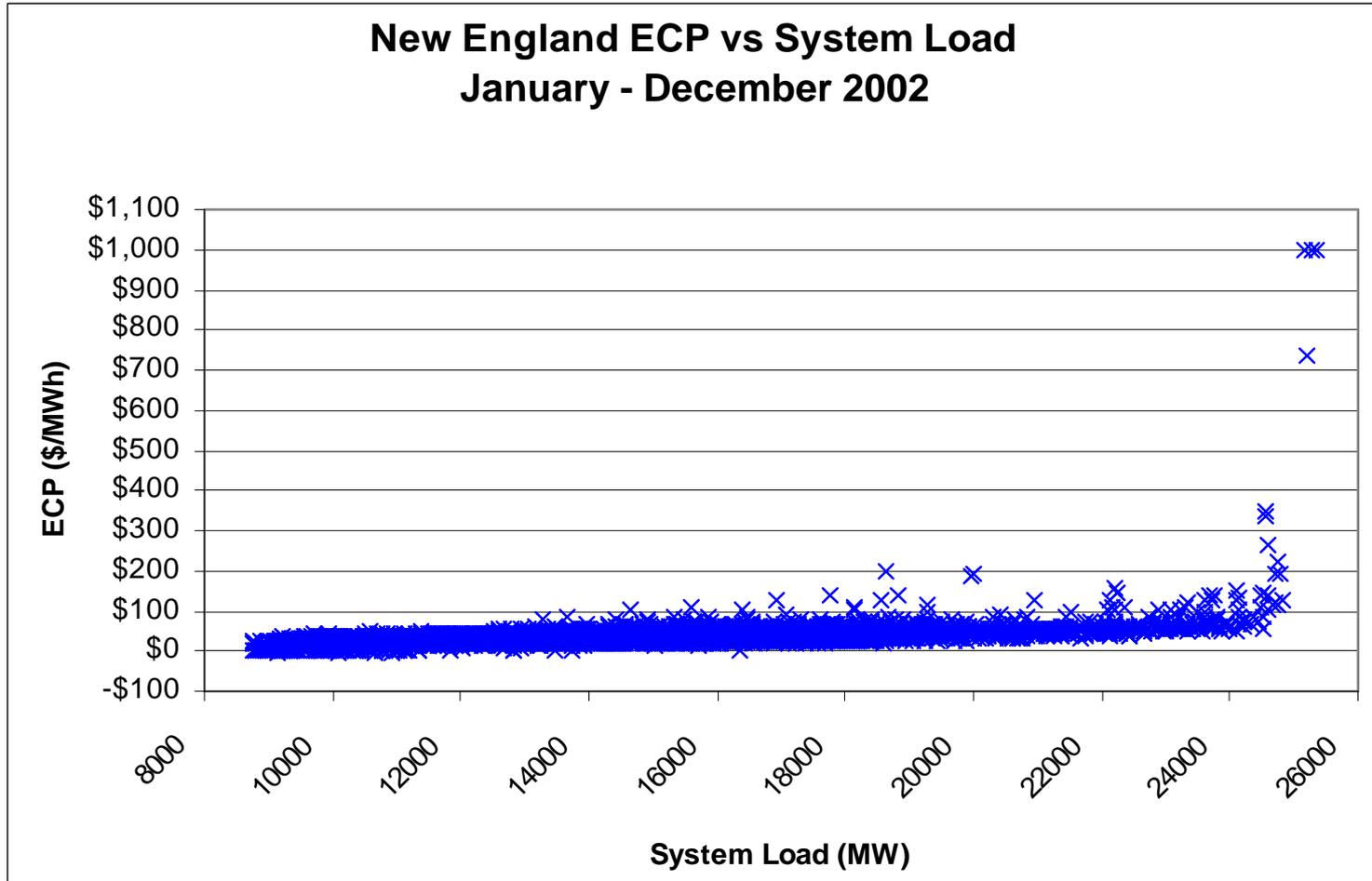
Energy Markets



*Imports from and Exports to New York
January 2001 - December 2002*



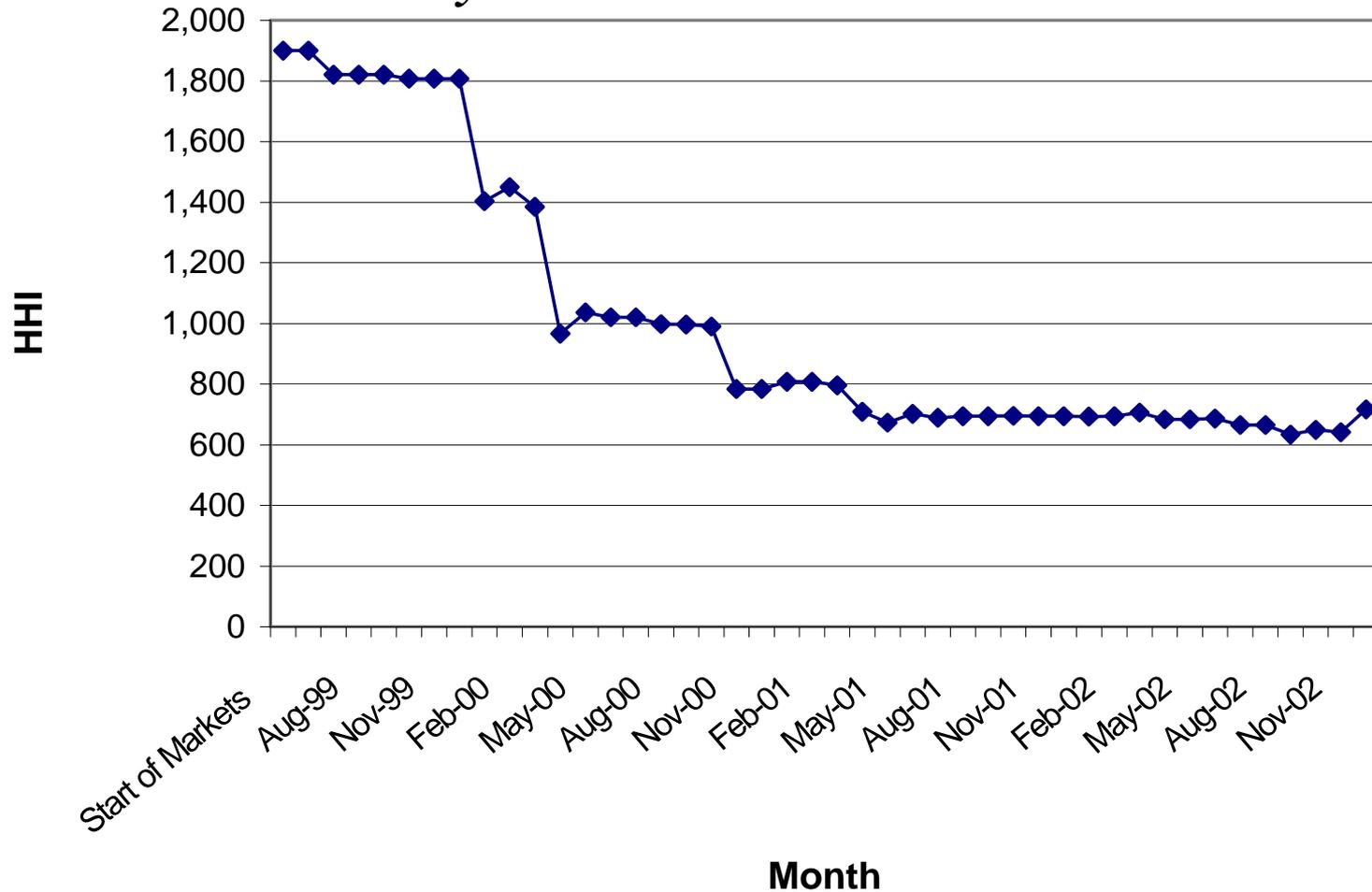
Energy Markets



Energy Markets



*New England HHI
May 1999 to December 2002*



Energy Markets



Residual Supply Index by month: May 1999 and selected months in 2002

	Number of hours RSI < 110	Number of hours RSI < 100	Average monthly RSI for largest participant	Minimum RSI for largest participant
Beginning of Markets: May 1999	248	18	121%	95%
January 2002	8	0	136%	107%
May 2002	0	0	154%	118%
July 2002	263	169	116%	83%
August 2002	165	82	123%	87%
December 2002	2	0	140%	109%

External Transactions/Seams Issues



- New England has 3 major interfaces:
 - New Brunswick
 - Hydro Quebec
 - NY ISO
- Two Canadian ties are primarily import interfaces
- NY interface is only connection to another competitive electricity market

SMD ICAP Market Overview



- Set Annual Pool Requirement
- Calculate Customer Contributions to Previous Peak
- Set Monthly Requirement for Each Participant
- Communicate Requirements to Participants
- Two Week Bilateral Period
- Supply Auction
- Additional Bilateral Period
- Deficiency Auction
- Account for Load Shifting



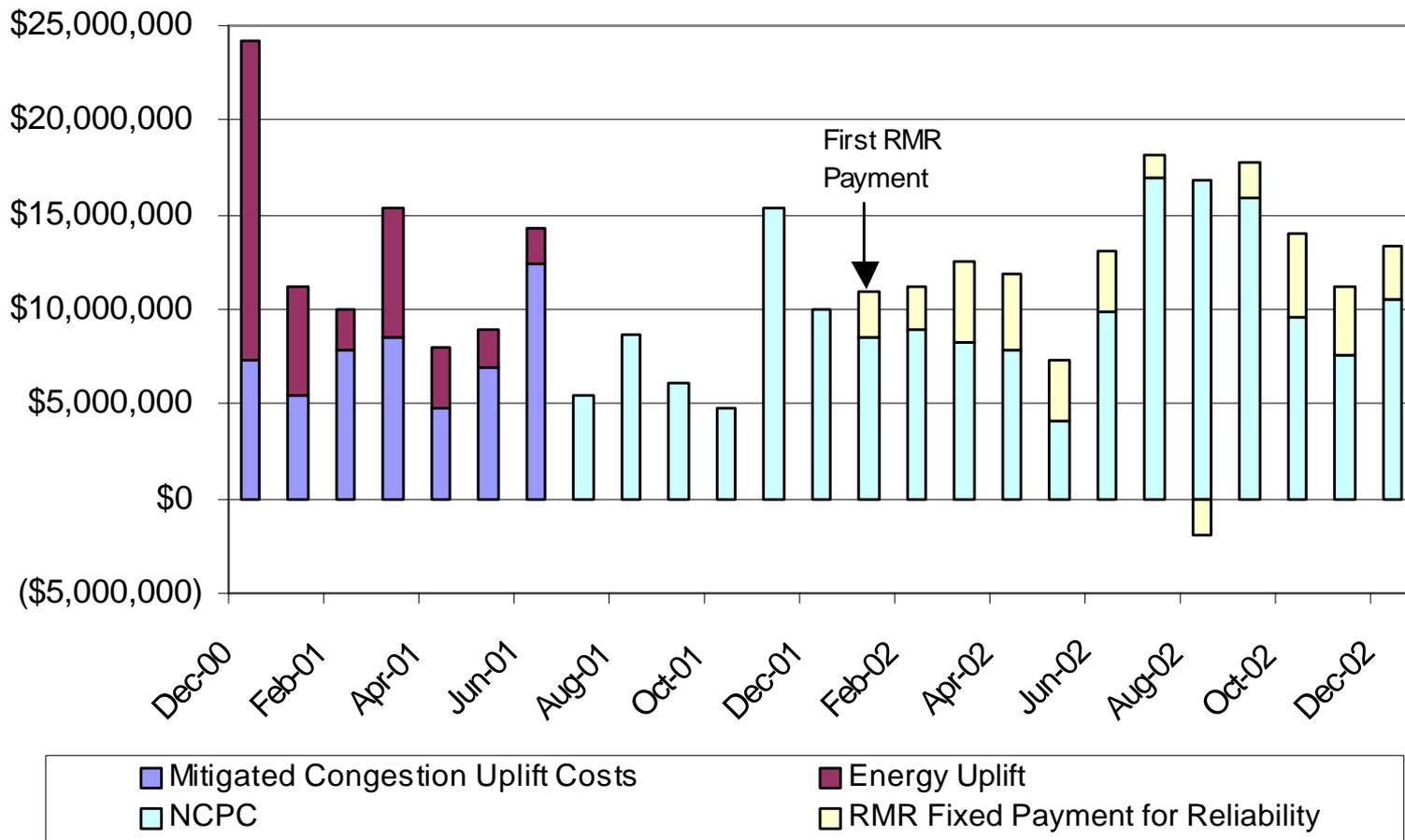
SMD ICAP Market Results to Date

- March Auctions (for April Delivery)
 - Supply Price \$0.40/ kW-month
 - Deficiency Price \$0.00/ kW-month
- April Auctions (for May Delivery)
 - Supply Price \$0.15/ kW-month
 - Deficiency Price \$0.00/ kW-month

Congestion



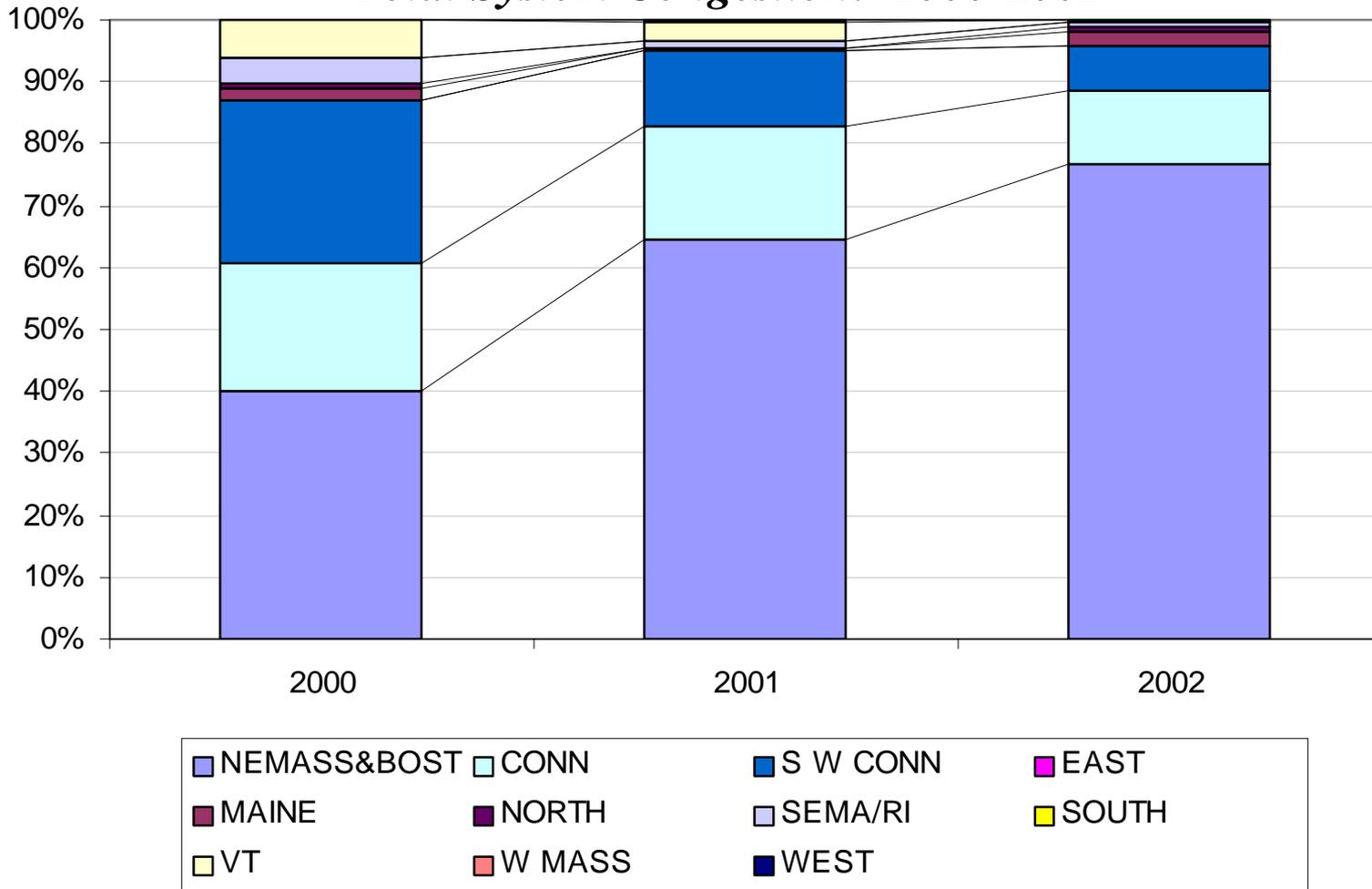
Uplift/NPC Payments by Month, January 2001-December 2002



Congestion



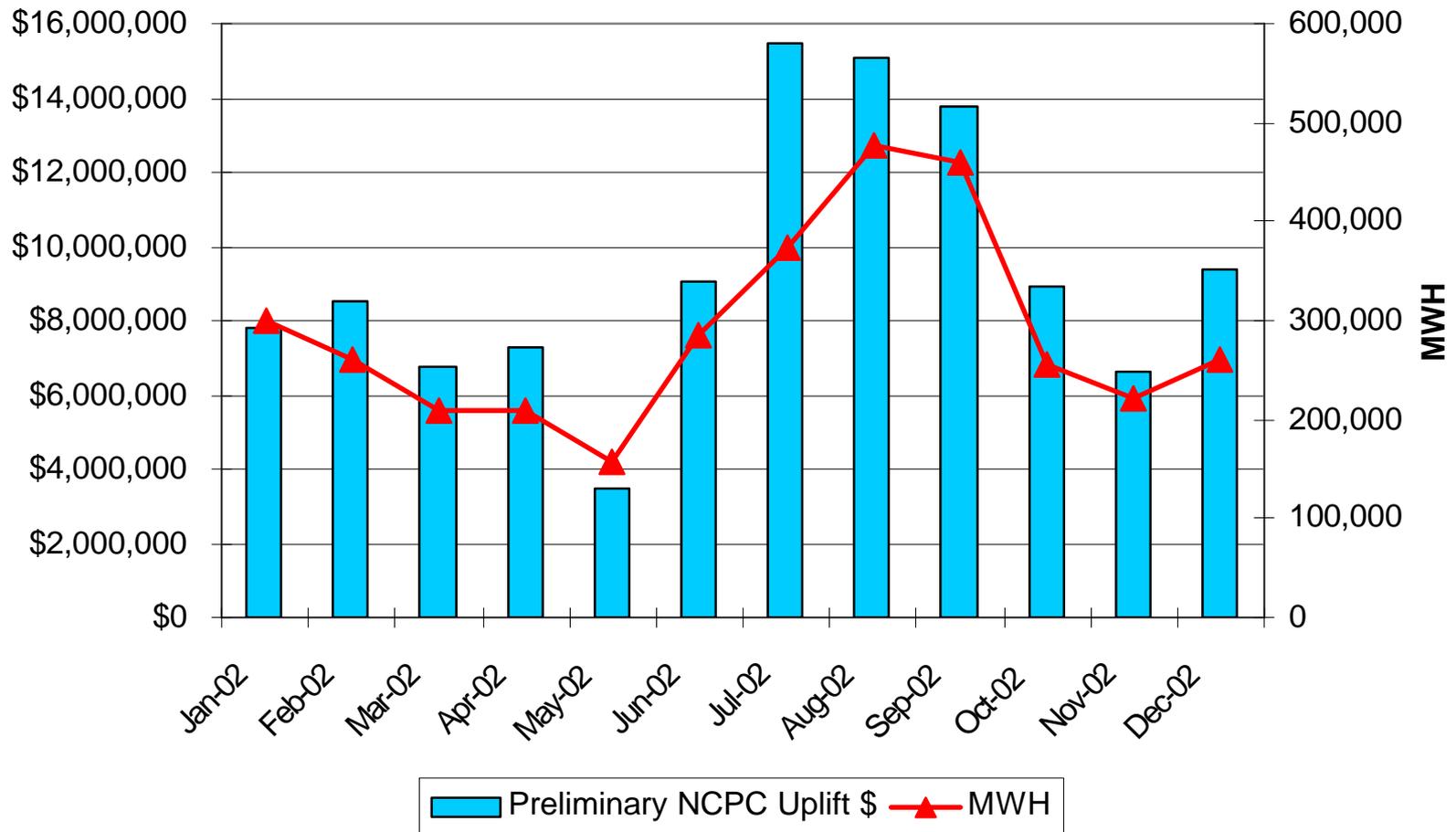
Transmission Congestion MWh -- Sub-Areas as Percentage of Total System Congestion: 2000-2002



Congestion



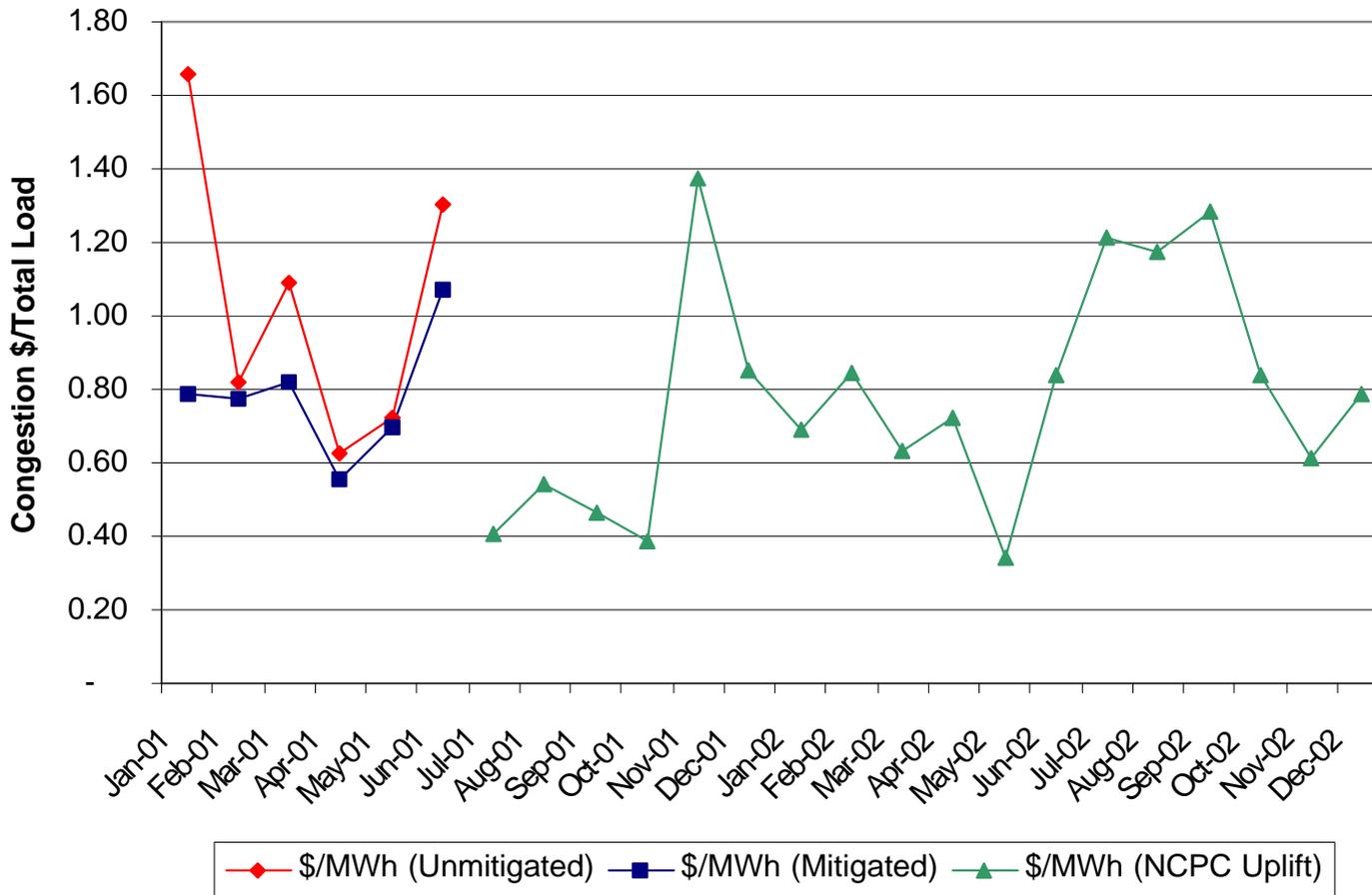
*NCPC Uplift Payments & MWh during Congestion Hours
January – December 2002*



Congestion



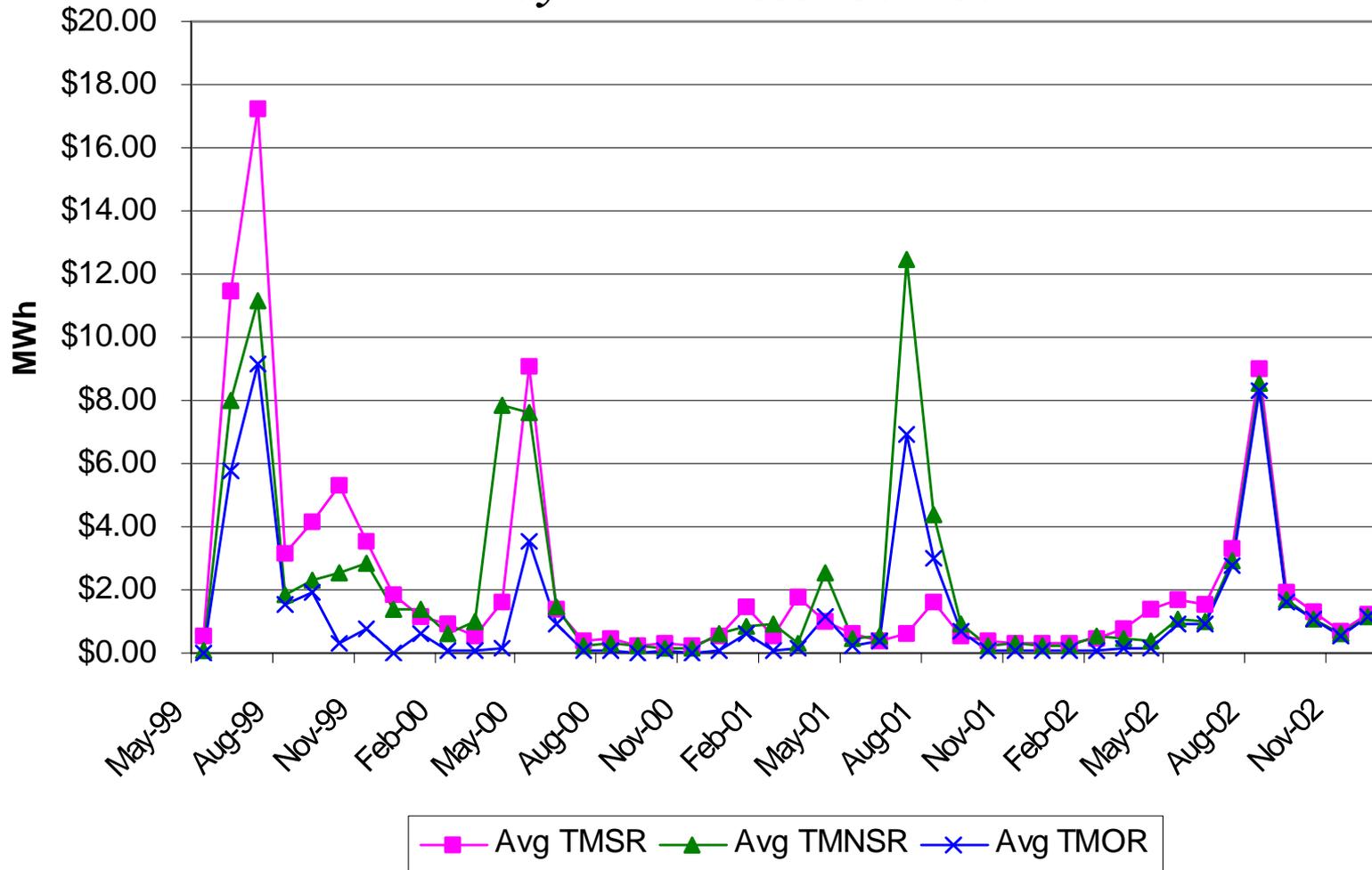
*Unmitigated & Mitigated Congestion Uplift, and NCPC Uplift
Cost Per MW of System Load
January 2001 - December 2002*



Ancillary Service Markets



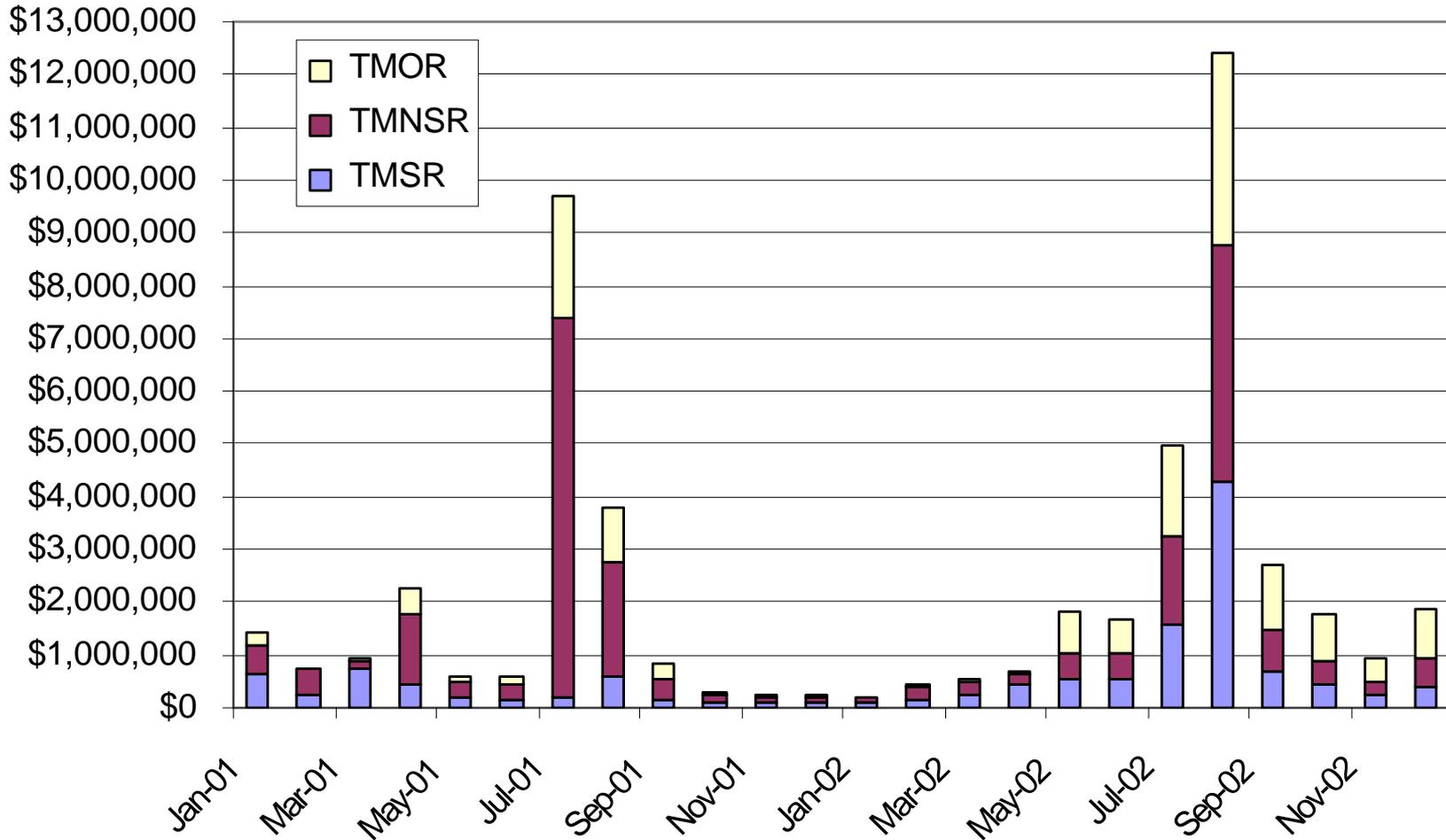
*Monthly Average Reserve Market Clearing Prices
May 1999 – December 2002*



Ancillary Service Markets



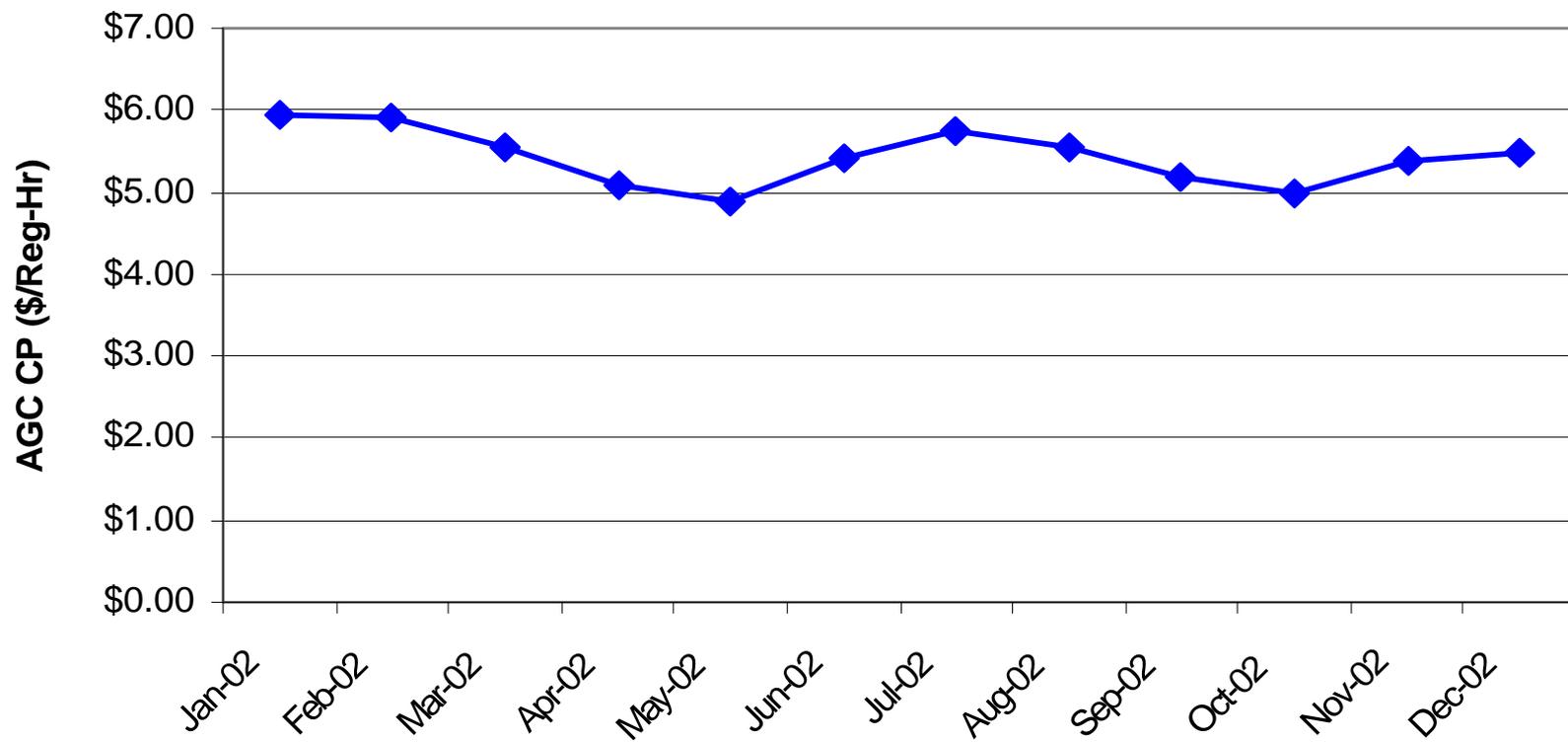
*Total Reserve Costs
January 2001 – December 2002*



Ancillary Service Markets



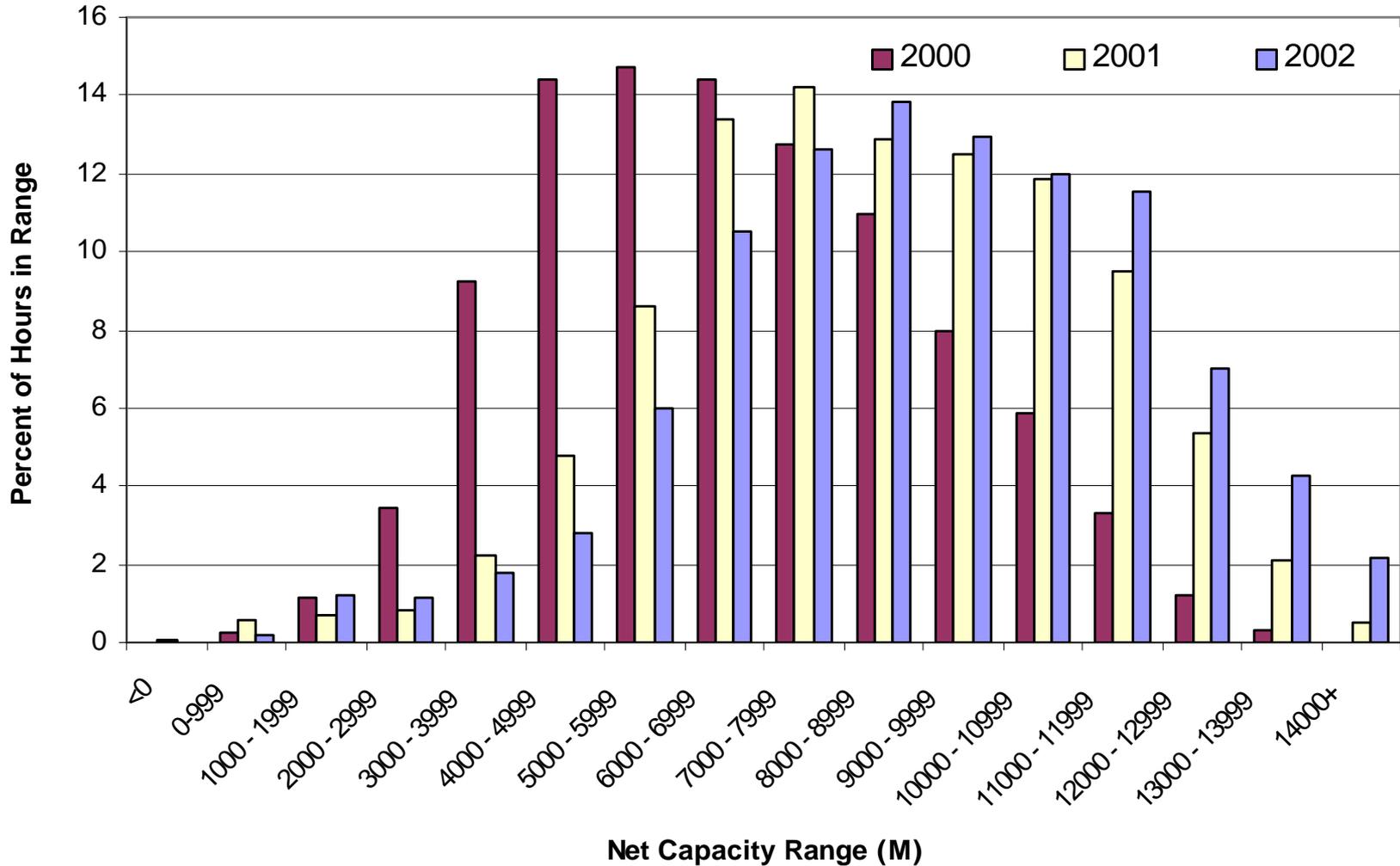
**New England AGC Clearing Prices
2002 Monthly Averages**



Other Topics – Outages, Price Setters



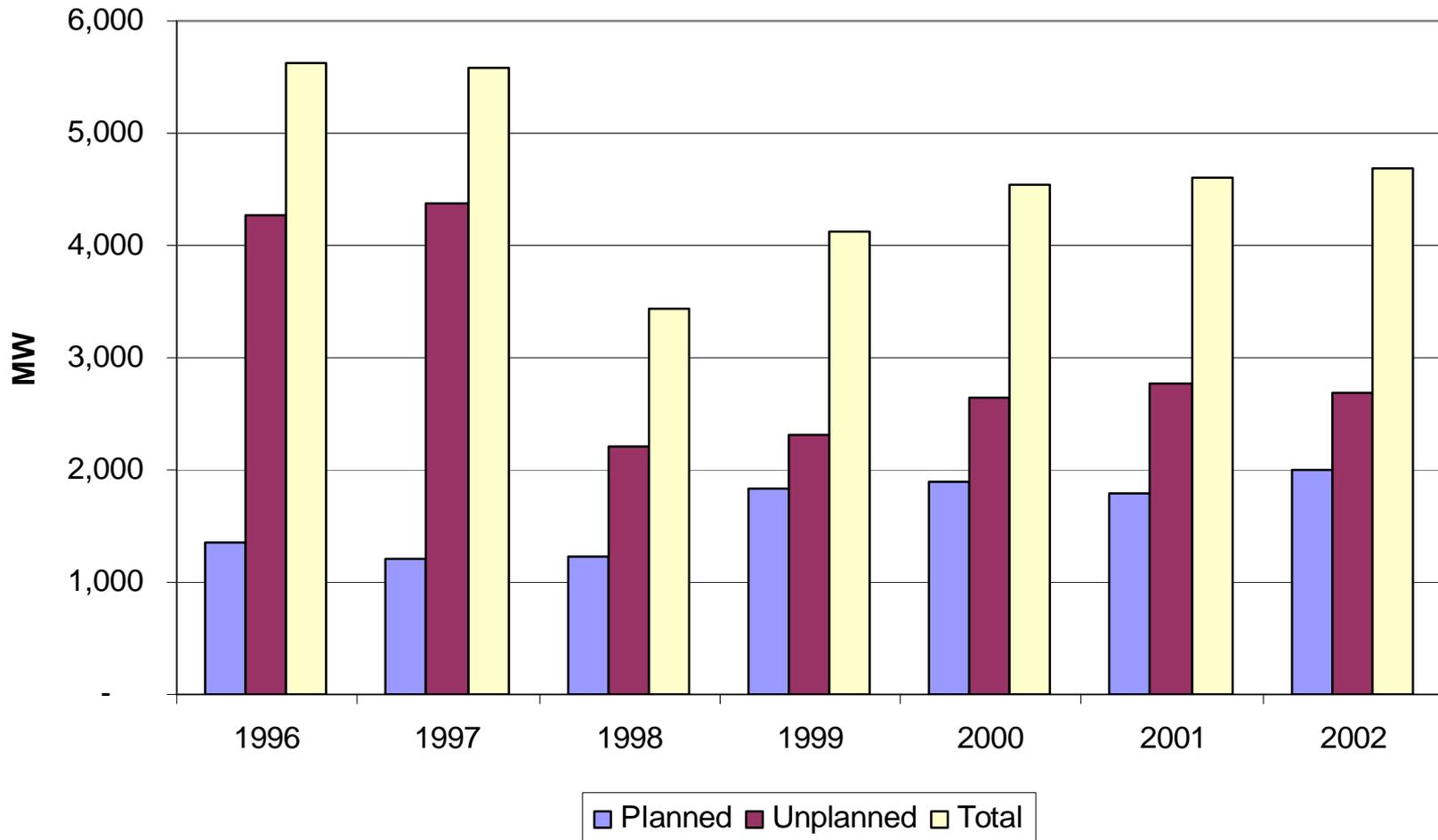
Net Capacity, 2000 – 2002



Other Topics – Outages, Price Setters



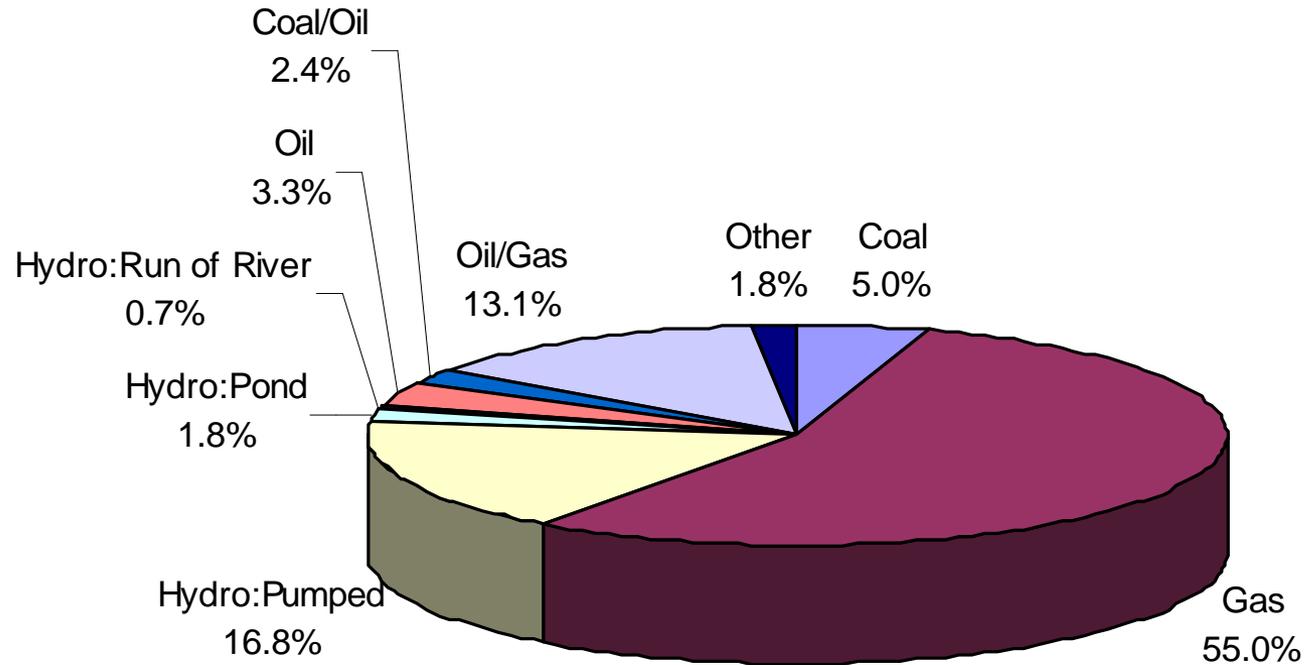
Average Megawatts of Outage Each Weekday



Other Topics – Outages, Price Setters



*RTMP Setters by Asset Type
January - December 2002*



2003 Market Developments and Look Ahead



- ISO New England implemented new Real-Time and Day-Ahead Markets and LMPs on March 1, 2003
 - Also implemented new ICAP and FTR markets
 - Virtual trading allowed in Day-Ahead Market
- Replaced real-time, single-price energy market
- Nearly complete rule and software replacement
 - New design based on PJM design and dispatch software
- Culmination of 20+ month implementation effort

2003 Market Developments and Look Ahead



- Standard Market Design (SMD) cut-over was virtually seamless.
- Markets have worked well
 - Higher fuel costs in the first few weeks created higher energy prices
 - Recently, energy prices have decreased consistent with the downward trend of fuel prices.
 - Increasingly active virtual trading market, FTR market
 - “Seller’s Choice” contracts in Day-Ahead Market in Maine
- Software and business systems have generally worked well.
 - Limited number of software and business process issues

2003 Market Developments and Look Ahead

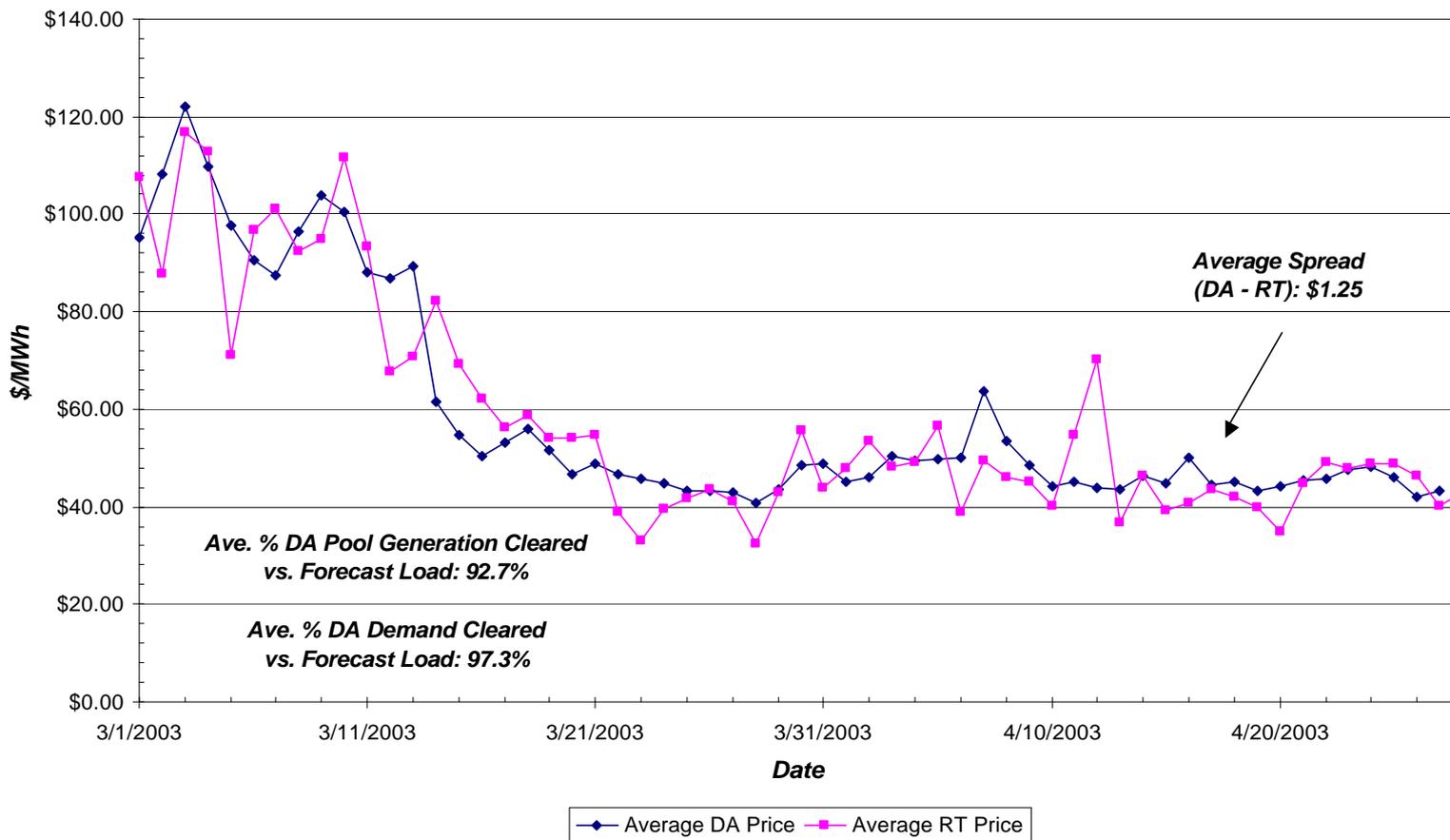


- No reliability issues since going live.
- NERC Control Performance within criteria.
- RAA and real-time software and business processes are functioning as designed.
- Conditions experienced in real-time so far:
 - Congestion
 - Minimum generation emergency
 - Major generation contingencies
 - Excess ramping curtailments
 - Emergency sales

2003 Market Developments and Look Ahead



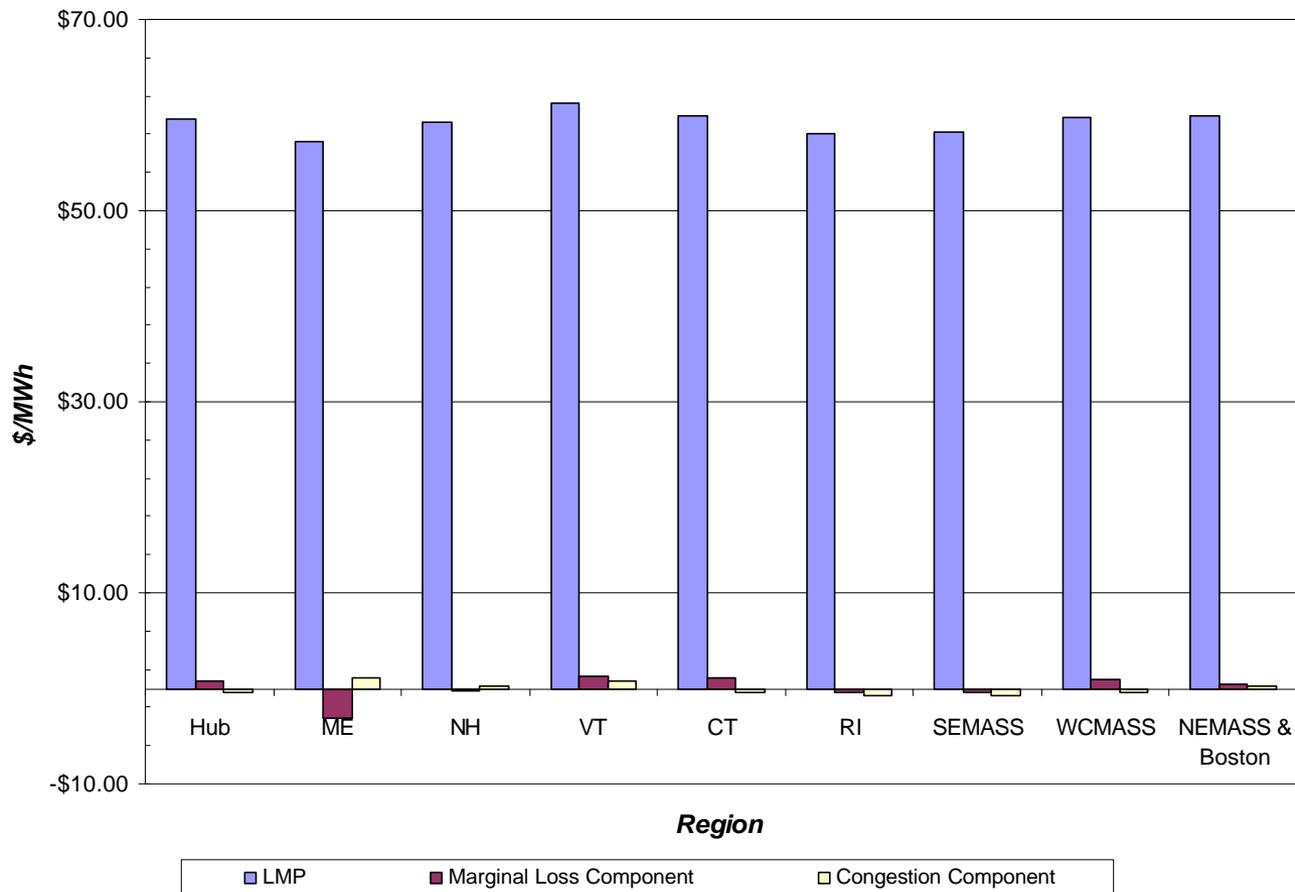
**Day-ahead & Real-Time Prices, ISO-NE Hub:
March 1, 2003 - April 27, 2003**



2003 Market Developments and Look Ahead



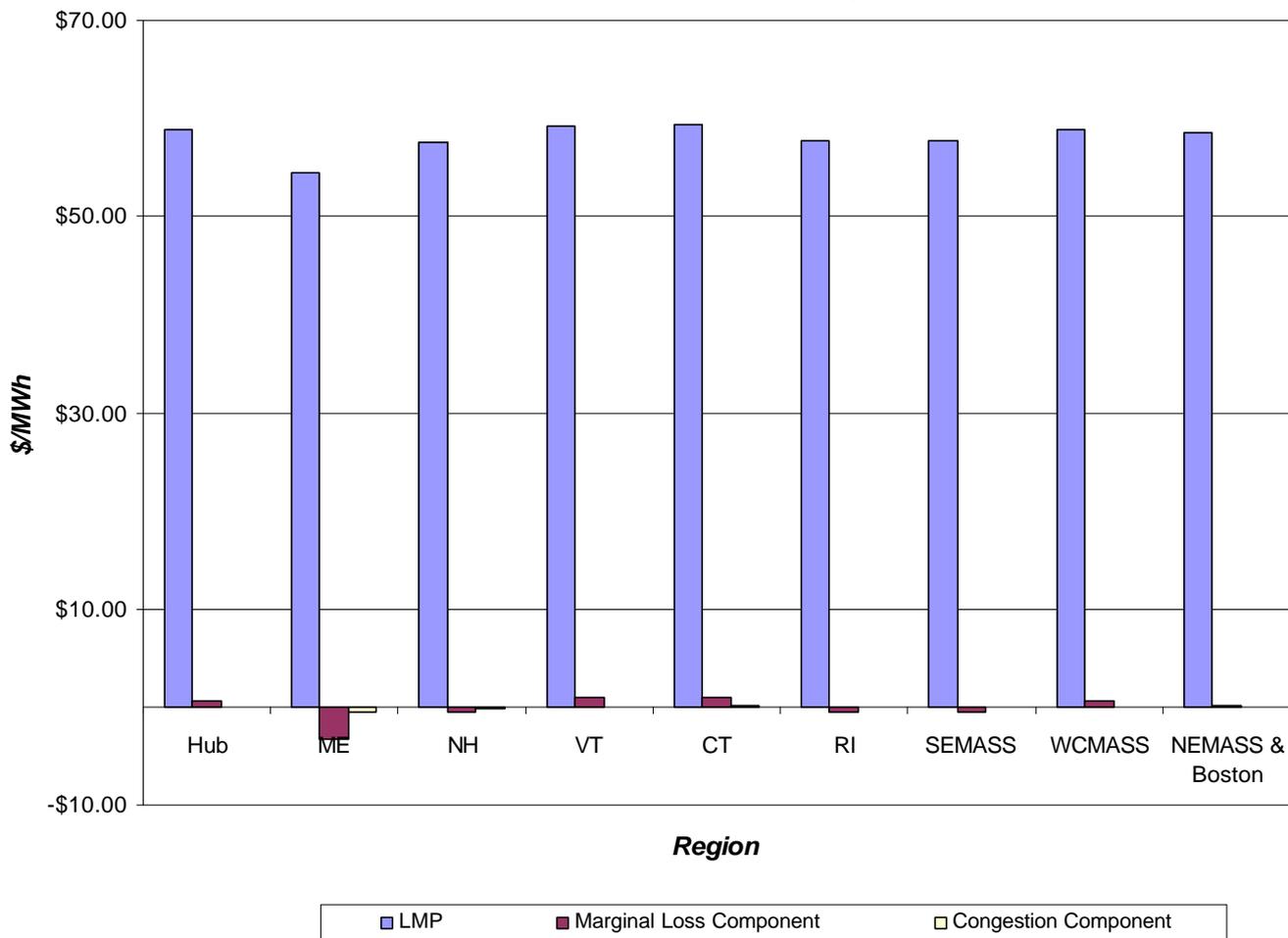
**Day Ahead - LMP Average by Zone & Hub:
March 1, 2003 - April 27, 2003**



2003 Market Developments and Look Ahead



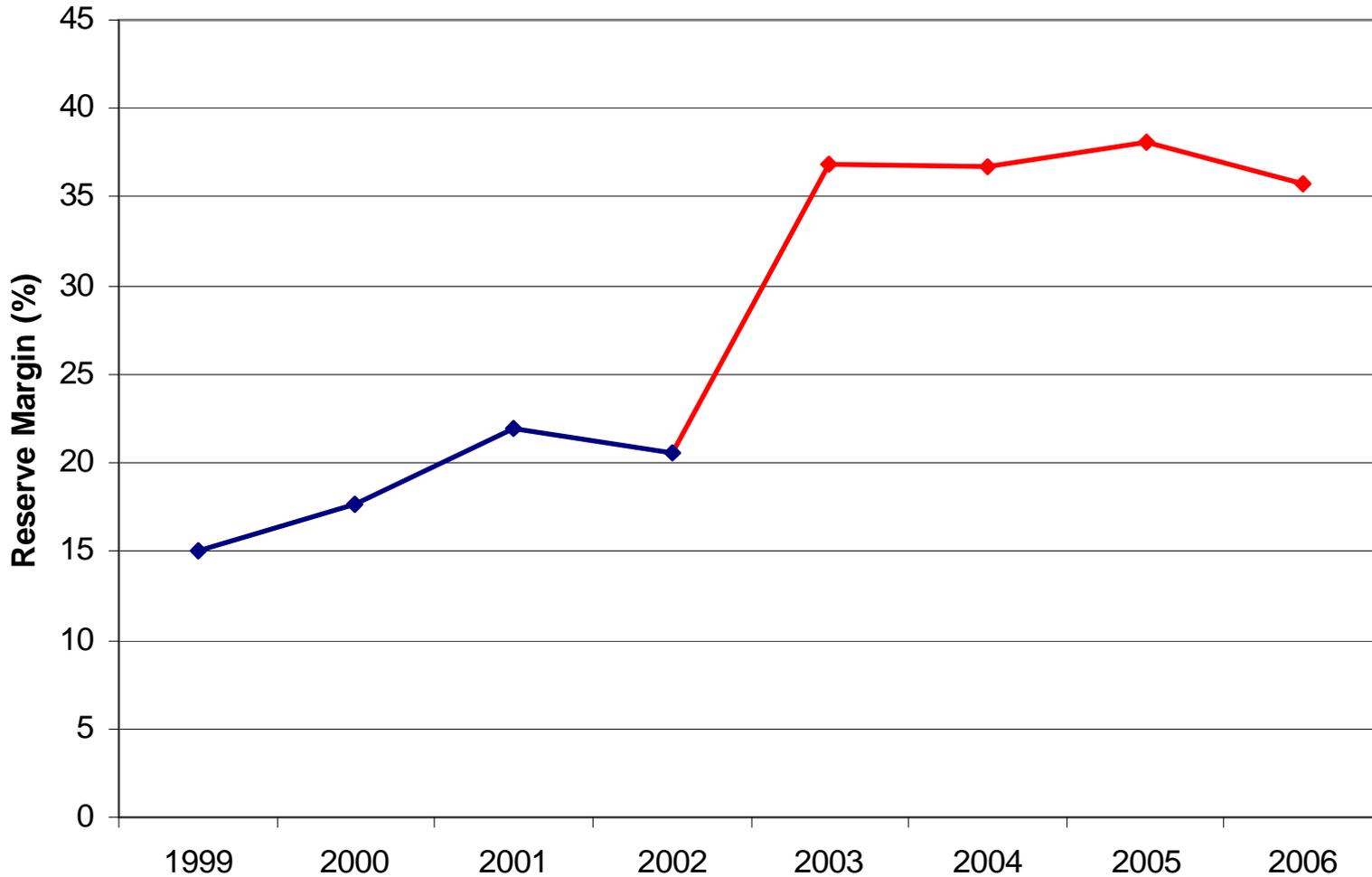
**Real Time - LMP Average by Zone & Hub:
March 1, 2003 - April 27, 2003**



2003 Market Developments and Look Ahead



1999-2002 Actual and 2003-2006 Forecasted Summer Reserve Margin



2003 Market Developments and Look Ahead



Demand Response

(as of April 21, 2003)

Active:	210 Assets		283.6 MW		Pending:	19 Assets		7.5 MW	
<u>Zone</u>	<u>Assets</u>	<u>RT Price</u>	<u>RT 30-Min</u>	<u>Profiled *</u>	<u>Assets</u>	<u>RT Price</u>	<u>RT 30-Min</u>	<u>Profiled *</u>	
CT	87	36.3	18.2	76.6	13	0.2	4.5		
ME	29	20.3		65.0					
NEMA	16	25.8	6.8	1.4	3		1.6		
NH	2	0.1	0.4						
RI	7	0.8							
SEMA	16	1.5	2.3		2	0.5	0.4		
VT	7	1.1	2.0	5.0					
WCMA	46	6.7	6.0	7.3	1		0.3		
Total	210	92.7	35.7	155.2	19	0.7	6.8		0.0

* Represents former Type 2 Interruptible Loads

2003 Market Developments and Look Ahead



- 2003 Areas of Interest
 - SMD Burn-In
 - Southwest Connecticut
 - Demand Response
 - Further Market Improvements
 - Locational ICAP, Reserve Markets, Seams Reductions, Scarcity Pricing