

ICAP Demand Curve Review

**New York ISO
ICAP Working Group**

May 27, 2004

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Overview

- ❑ Overall Approach
- ❑ Assumptions
 - ❖ Review
 - ❖ Definition and performance clarification
 - ❖ Capital cost changes
- ❑ MarketSym Results
 - ❖ Annual MCPs
 - ❖ Peaker capacity factors
 - ❖ New energy and ancillary service revenues
- ❑ Financial Results
 - ❖ Assumptions
 - ❖ Levelized capacity revenue requirements
 - ❖ Debt coverage test
- ❑ ICAP Demand Curves

Overall Approach

- April 22nd- Peaker, fuel, and financing assumptions
- May 27th- MarketSym and financial results

$$\begin{aligned} & \text{Total Capital Cost} && (DMJM+Harris \& LAI) \\ & - \text{PV of Net Energy Revenues} && (LAI-MarketSym) \\ & - \text{PV of Ancillary Service Revenues} && (LAI-MarketSym) \\ & \quad \underline{+ \text{PV of Fixed Operating Costs}} && (LAI) \\ & = \text{PV of Capacity Revenue Requirements} \end{aligned}$$

spread over economic life in nominal dollars (LAI)
= Levelized Net Capacity Revenue Requirement

Assumptions-Previously Reviewed

- ❑ Model Topology
 - ❖ No change to zonal representation
- ❑ Fuel Costs
 - ❖ No change to underlying costs
 - ❖ Balancing charges included
 - ❖ Intraday premium not included
- ❑ Demand Forecast
 - ❖ No change to 2004 Gold Book forecast
- ❑ Supply Mix
 - ❖ No change to near-term and long-term additions
 - ❖ No change to CSC in service

Assumptions-Clarification

❑ Peaker Performance

	<u>2 x LM6000</u>	<u>2 x 7FA</u>
Output		
ISO/net/new & clean	94.5 MW	336.5 MW
ISO/net/avg degr'n	94.5 MW	326.4 MW
As Modeled	88.4 MW	310.0 MW
Heat Rate		
ISO/net/new & clean	10,597 Btu/kWh	9,549 Btu/kWh
ISO/net/avg degr'n	10,809 Btu/kWh	9,640 Btu/kWh
As Modeled	11,000 Btu/kWh	9,700 Btu/kWh

- ❖ ISO/ net / new & clean values used for unit costs
- ❖ ISO/ net / average degradation used for ICAP calculations
- ❖ As Modeled values used for dispatch simulation modeling

Assumptions-Changes

❑ Peaker Definition

- ❖ 2 x LM6000 in Zones J & K (no change)
- ❖ 2 x LM6000 *and* 2 x 7FA in ROS

❑ Peaker Capital Costs Increased

- ❖ Off-site costs (interconnection & gas lateral)
 - Based on review of confidential project data

	<u>NYC</u>	<u>LI</u>	<u>ROS</u> (2 x LM 6000)	<u>ROS</u> (2 x 7FA)
Elec Upgrades	\$2.5 M	\$2.5 M	\$1.25 M	\$5.0 M
Gas lateral	\$4.0 M	\$3.4 M	\$ 3.4 M	\$6.5 M

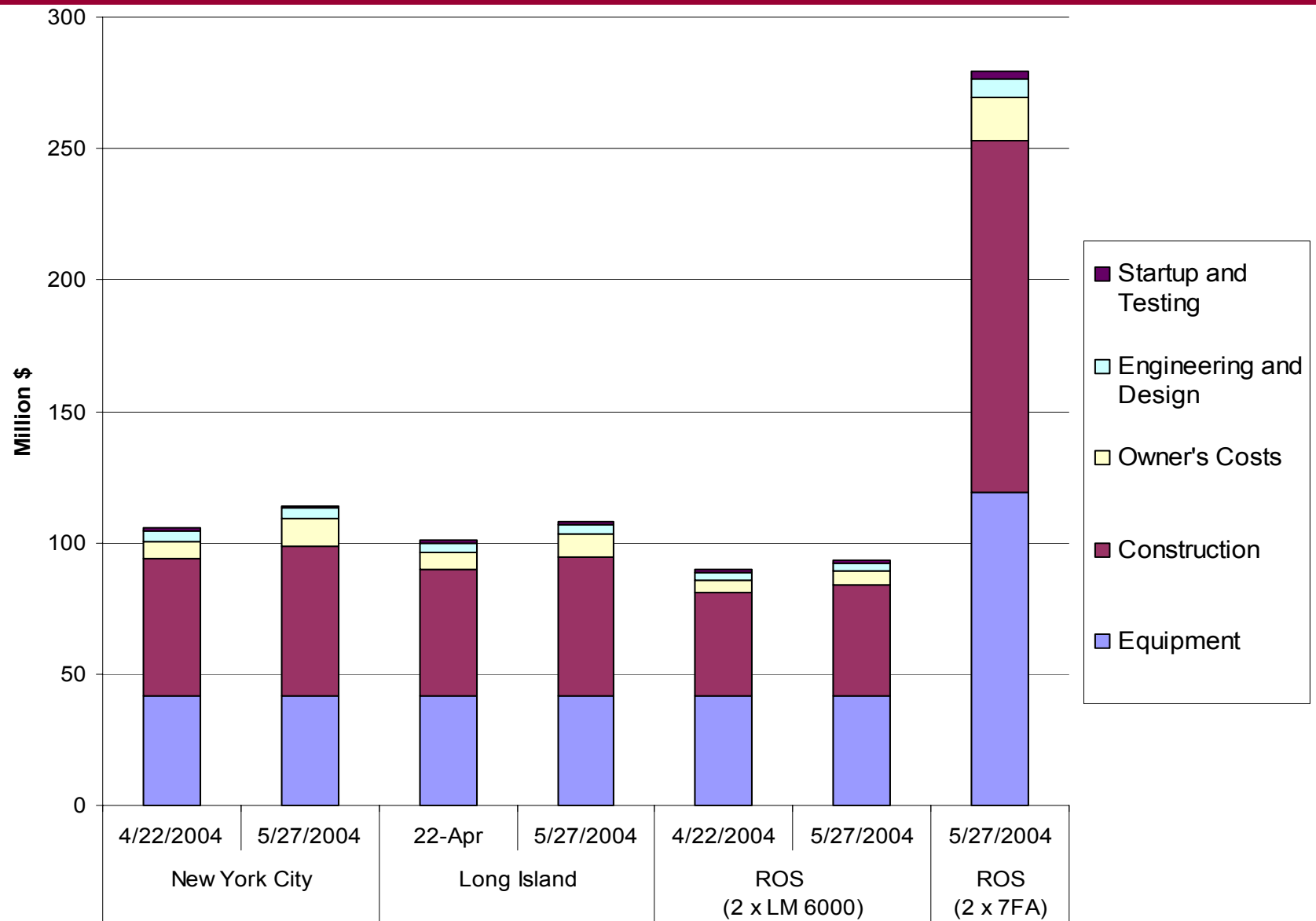
- ❖ Development (permits, ERCs, & social justice)
 - SCS Astoria \$5M community contribution

Peaker Definition

- ❑ Aeroderivative Plant
 - ❖ 2 x LM6000 Sprint in Zones J, K and ROS
 - ❖ Virtually all NYPA and LIPA units have Sprint
- ❑ Industrial Frame Plant
 - ❖ 2 x 7FA possible in ROS
- ❑ Longer Schedule
 - ❖ Based on SCS Astoria experience

<u>Schedule(months)</u>	<u>Permitting</u>	<u>Construction</u>
• NYC & LI LM6000	27	+8
• ROS LM6000	21	+6
• ROS 7FA	21	+12

Peaker Capital Costs



Peaker Capital Costs

New York City (\$ millions 2004)		
	<u>4/22/04</u>	<u>5/27/04</u>
Owner's Costs	\$ 6.7	\$ 10.3
Equipment	\$ 41.5	\$ 41.5
Engineering & Design	\$ 4.0	\$ 4.0
Construction	\$ 52.4	\$ 57.2
<u>Startup & Testing</u>	<u>\$ 1.0</u>	<u>\$ 1.0</u>
Total Cost	\$ 105.6	\$ 114.0
Unit Cost (\$/kW)	\$ 1,118	\$ 1,207

- ❖ Consistent with NYPA GT experience with adjustments for capacity, inflation, and accelerated construction

Peaker Capital Costs

Long Island (\$ millions 2004)		
	<u>4/22/04</u>	<u>5/27/04</u>
Owner's Costs	\$ 6.4	\$ 9.1
Equipment	\$ 41.5	\$ 41.5
Engineering & Design	\$ 3.5	\$ 3.5
Construction	\$ 48.5	\$ 52.9
<u>Startup & Testing</u>	<u>\$ 1.0</u>	<u>\$ 1.0</u>
Total Cost	\$ 100.9	\$ 108.0
Unit Cost (\$/kW)	\$ 1,068	\$ 1,144

- ❖ Consistent with NYPA GT experience with adjustments for capacity, inflation, and accelerated construction

Peaker Capital Costs

Rest of State 2 x LM6000 (\$ millions 2004)		
	<u>4/22/04</u>	<u>5/27/04</u>
Owner's Costs	\$ 4.8	\$ 5.0
Equipment	\$ 41.5	\$ 41.5
Engineering & Design	\$ 3.0	\$ 3.0
Construction	\$ 39.5	\$ 42.6
<u>Startup & Testing</u>	<u>\$ 1.0</u>	<u>\$ 1.0</u>
Total Cost	\$ 89.8	\$ 93.2
Unit Cost (\$/kW)	\$ 951	\$ 987

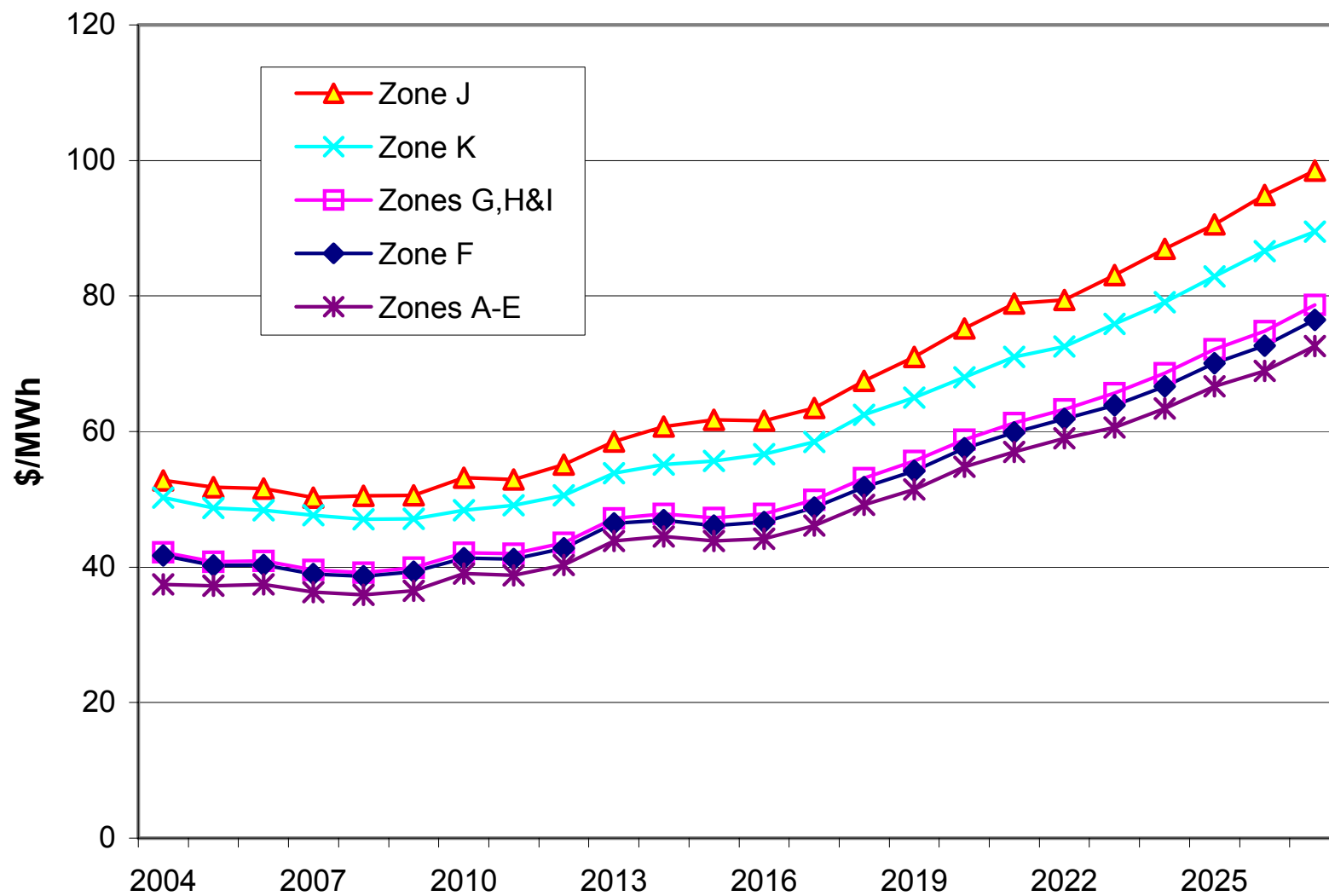
- ❖ 2 x LM6000 unit is 16% less expensive in ROS than in Zones J/K

Peaker Capital Costs

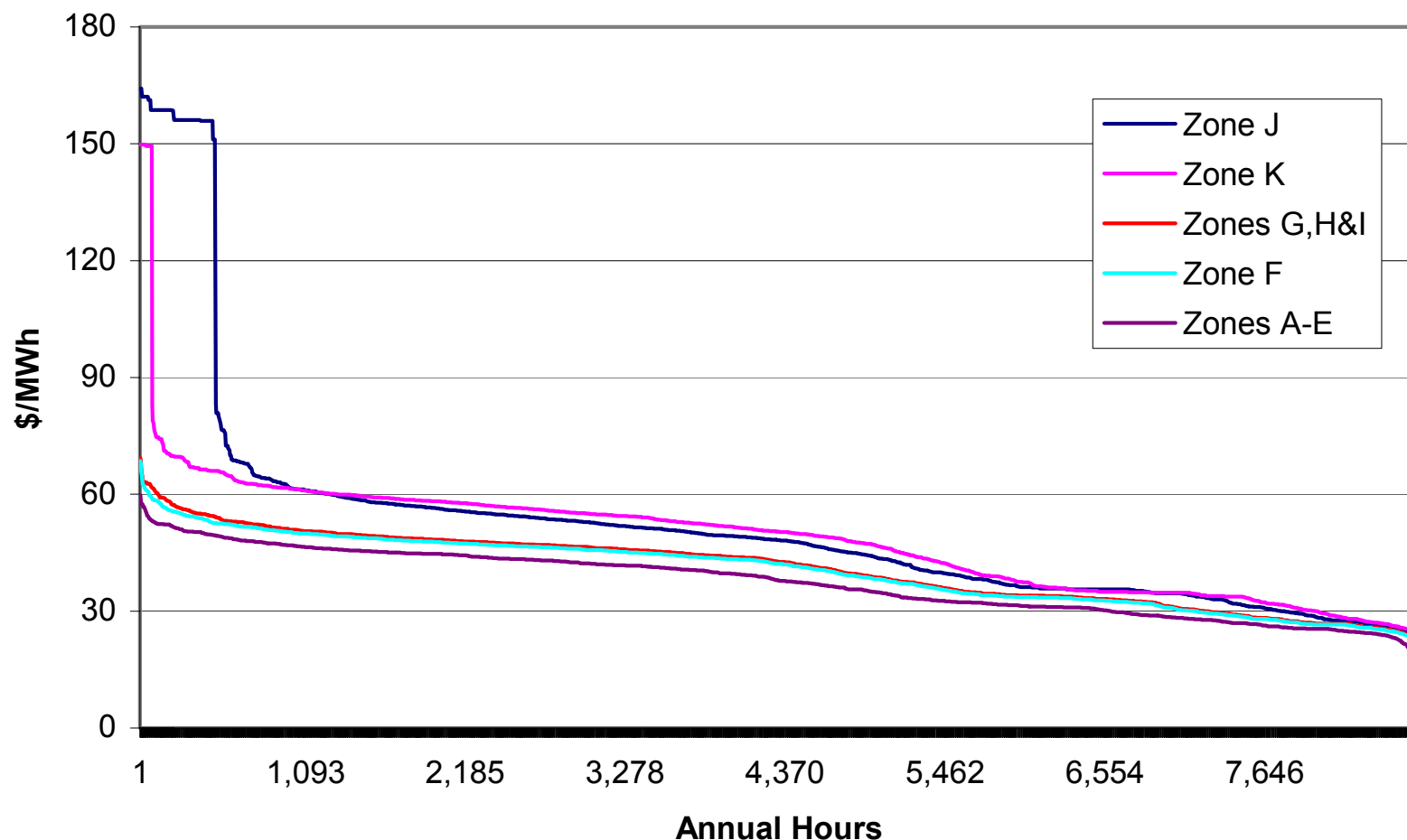
Rest of State 2 x 7FA (\$ millions 2004)	
	<u>5/27/04</u>
Owner's Costs	\$ 16.6
Equipment	\$ 119.3
Engineering & Design	\$ 7.1
Construction	\$ 133.7
<u>Startup & Testing</u>	<u>\$ 2.6</u>
Total Cost	\$ 279.4
Unit Cost (\$/kW)	\$ 830

❖ 2 x 7FA unit cost is 16% less expensive than 2 x LM6000

MarketSym Results – Annual Energy Prices

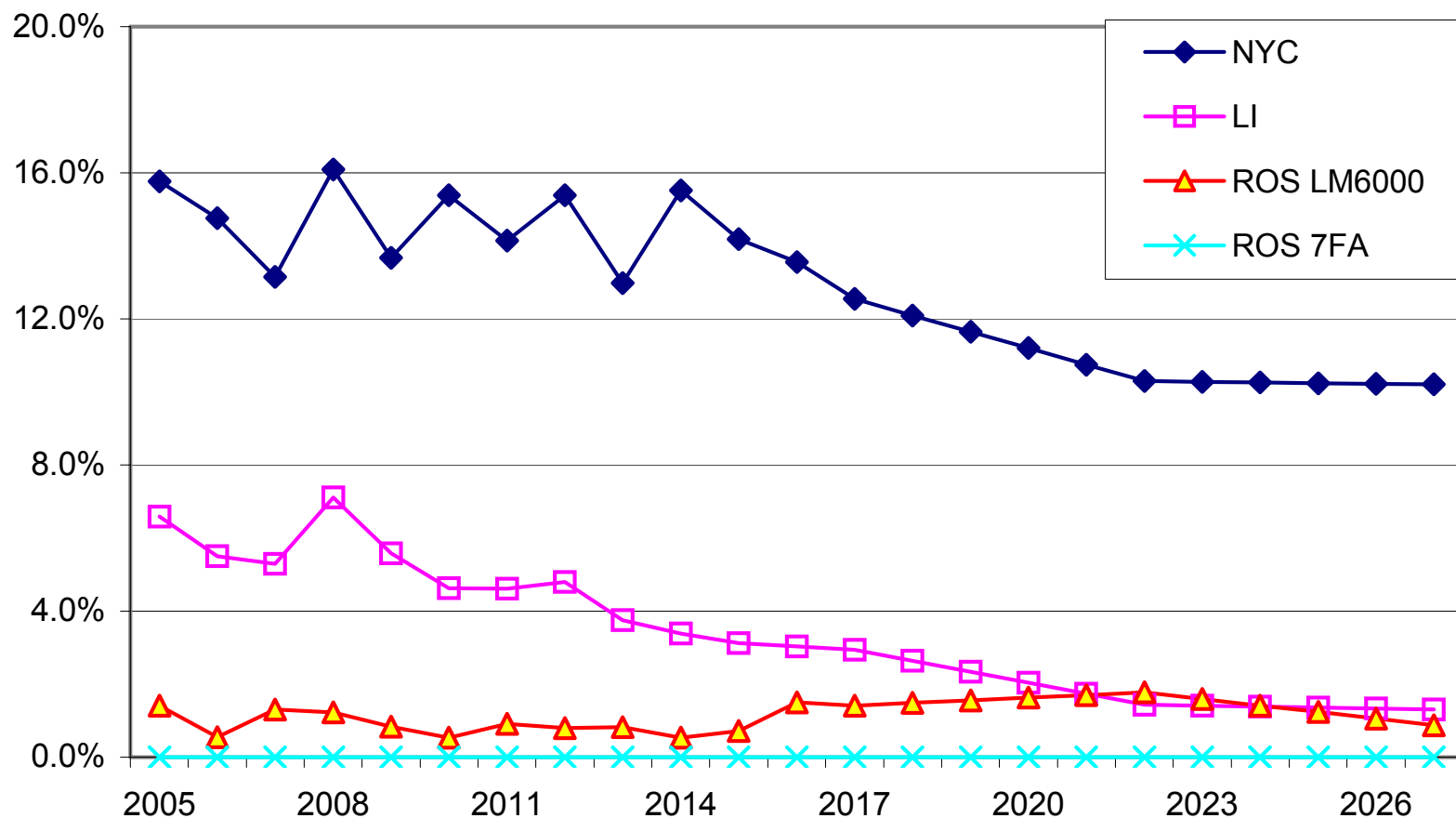


MarketSym Results-2005 Price Duration Curves



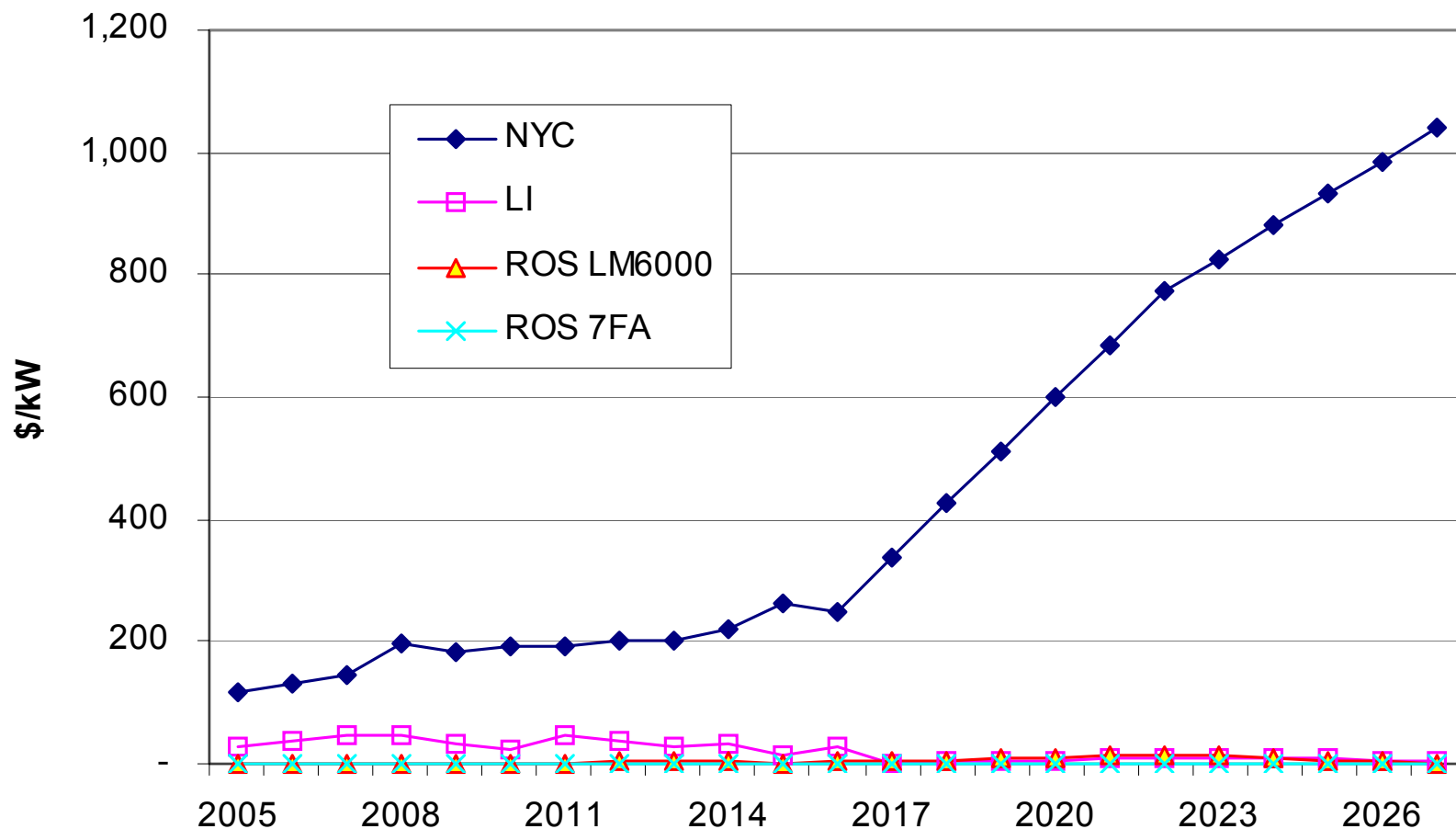
- ❖ *LI prices are underestimated due to inherent model structure*
- ❖ *LAI did not incorporate volatility that causes periodic price spikes*

MarketSym Results – Peaker Capacity Factors



- ❖ *Forecasted NYC and ROS GT capacity factors consistent with 2003 data*
- ❖ *Forecasted GT capacity factor on LI slightly below actual data with CSC*

MarketSym - Net Energy & Anc. Service Revs.



- ❖ *Net energy and ancillary service revenues for LI GTs are underestimated*
- ❖ *LAI recommends post-simulation GT bid adder to correct*

Financial Results - Ancillary Service Revs.

- ❑ 2003 NYISO market data
 - ❖ Energy revenues
 - ❖ TMSR, TMNSR, TMOR, and AGC payments
- ❑ TMNSR set as percentage of energy revenues
- ❑ TMNSR payment allocation
 - ❖ Hourly calculation based on MarketSym forecast
 - ❖ Peakers (GTs)
 - ❖ Internal combustion
 - ❖ Pumped storage

Financial – Assumptions

❑ Life of Unit

- ❖ 20 yrs

❑ Financing

- ❖ Parent company on-balance sheet
- ❖ Capital costs reflects merchant project risks

4/22/04

5/27/04

- ❖ Debt 60% @ 6.5%

50% @ 7.5%

- ❖ Equity 40% @ 25% (pre-tax)

50% @ 12.5% (after-tax)

❑ Levelization

- ❖ 12.5% discount rate
- ❖ First year (nominal dollars) = reference point
- ❖ Escalation @ 3% in future years

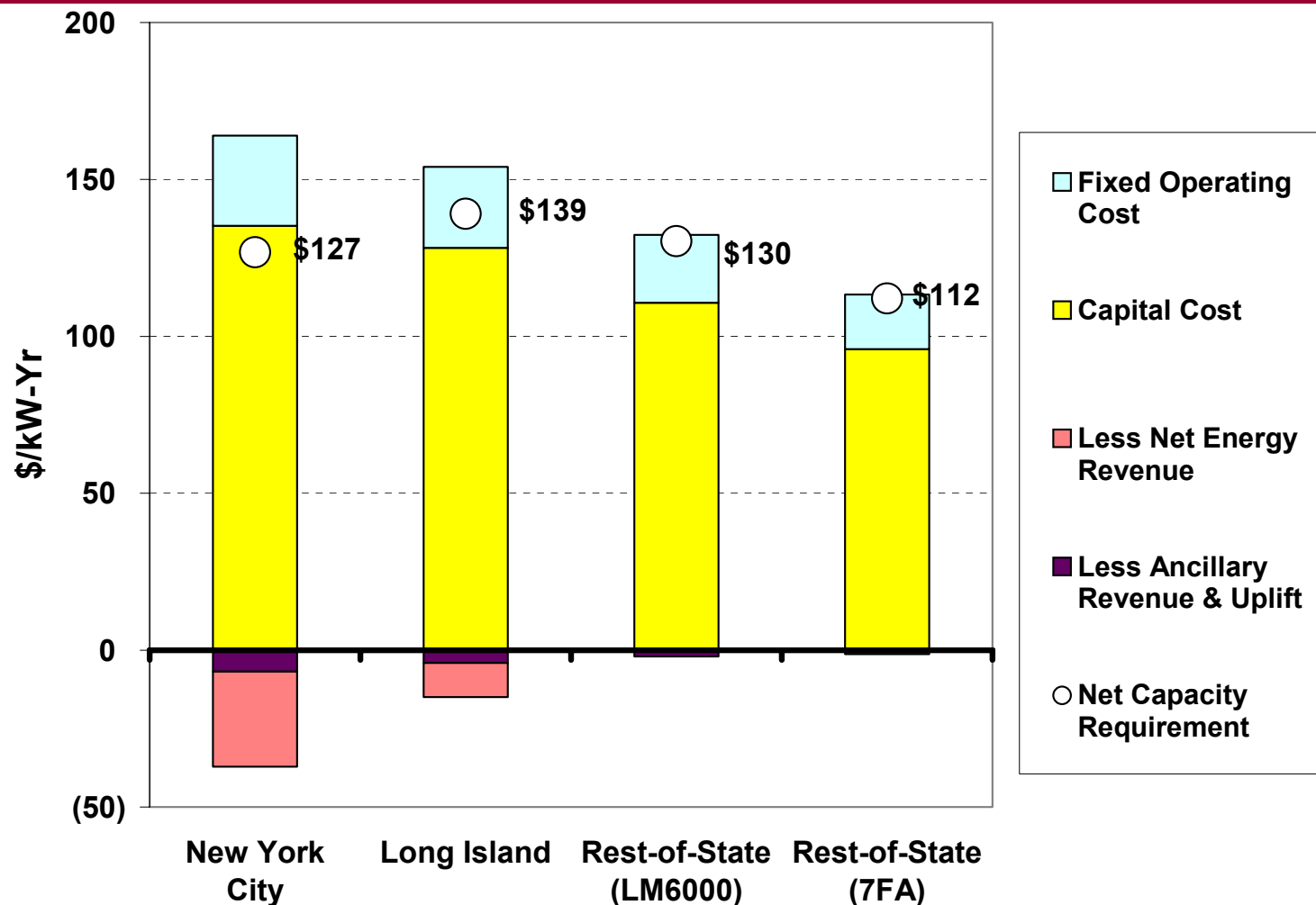
Financial

- ❑ Total capital costs ✓
- ❑ PV of net economic revenues ✓
- ❑ PV of ancillary service revenues ✓

- ❑ Fixed Operating Costs
 - ❖ Data indicates average property tax of 1.6 %
 - ❖ Other costs include staffing and contract

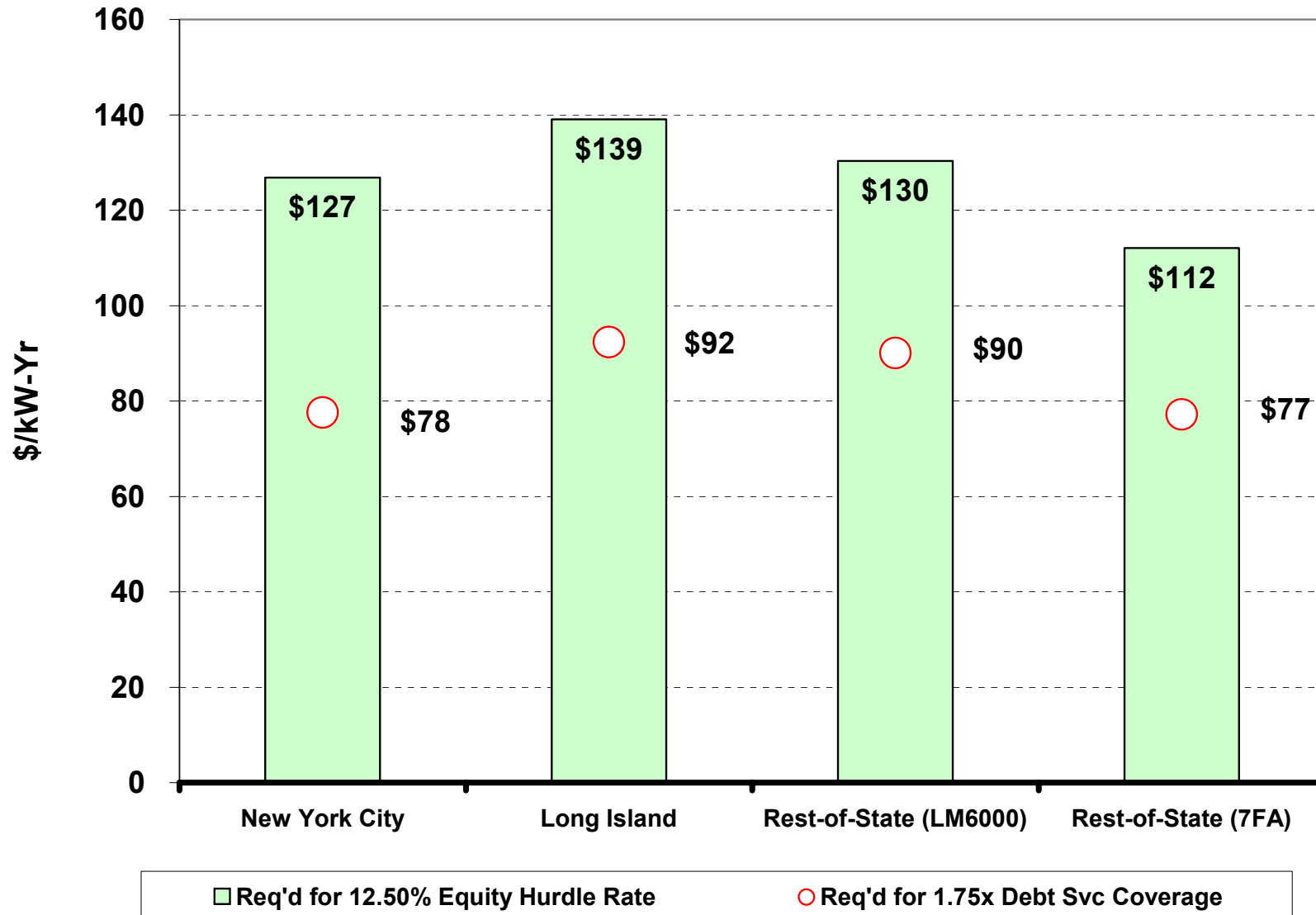
	<u>NYC</u>	<u>LI</u>	<u>ROS LM</u>	<u>ROS 7FA</u>
2005 \$/kW	\$28.72	\$ 25.80	\$ 21.65	\$ 17.44

Financial Results – 2005 Lev'd Cap Rev Req'ts

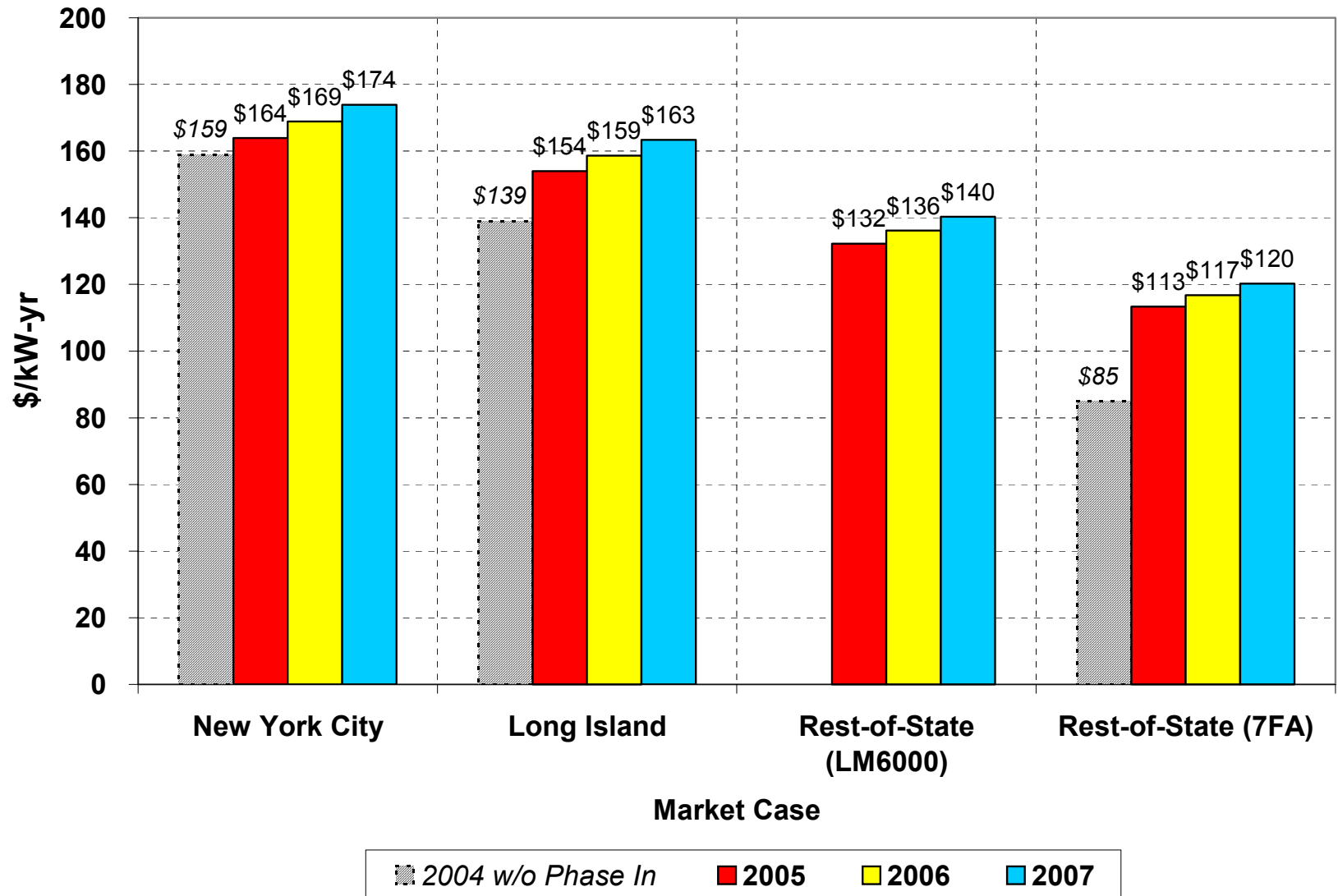


❖ *Net energy revenues on LI include post-simulation bid adders*

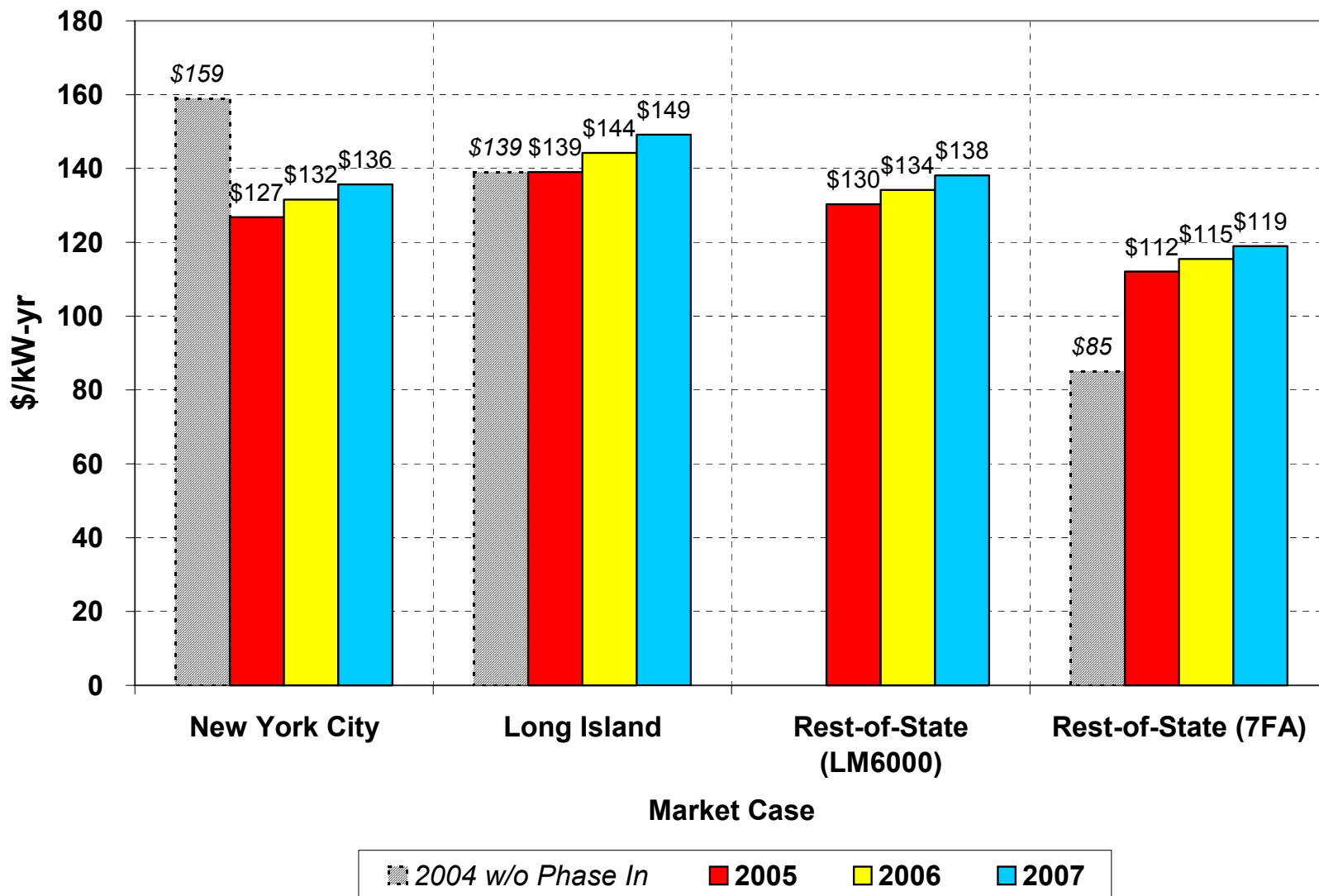
Financial Results – 2005 Debt Coverage Test



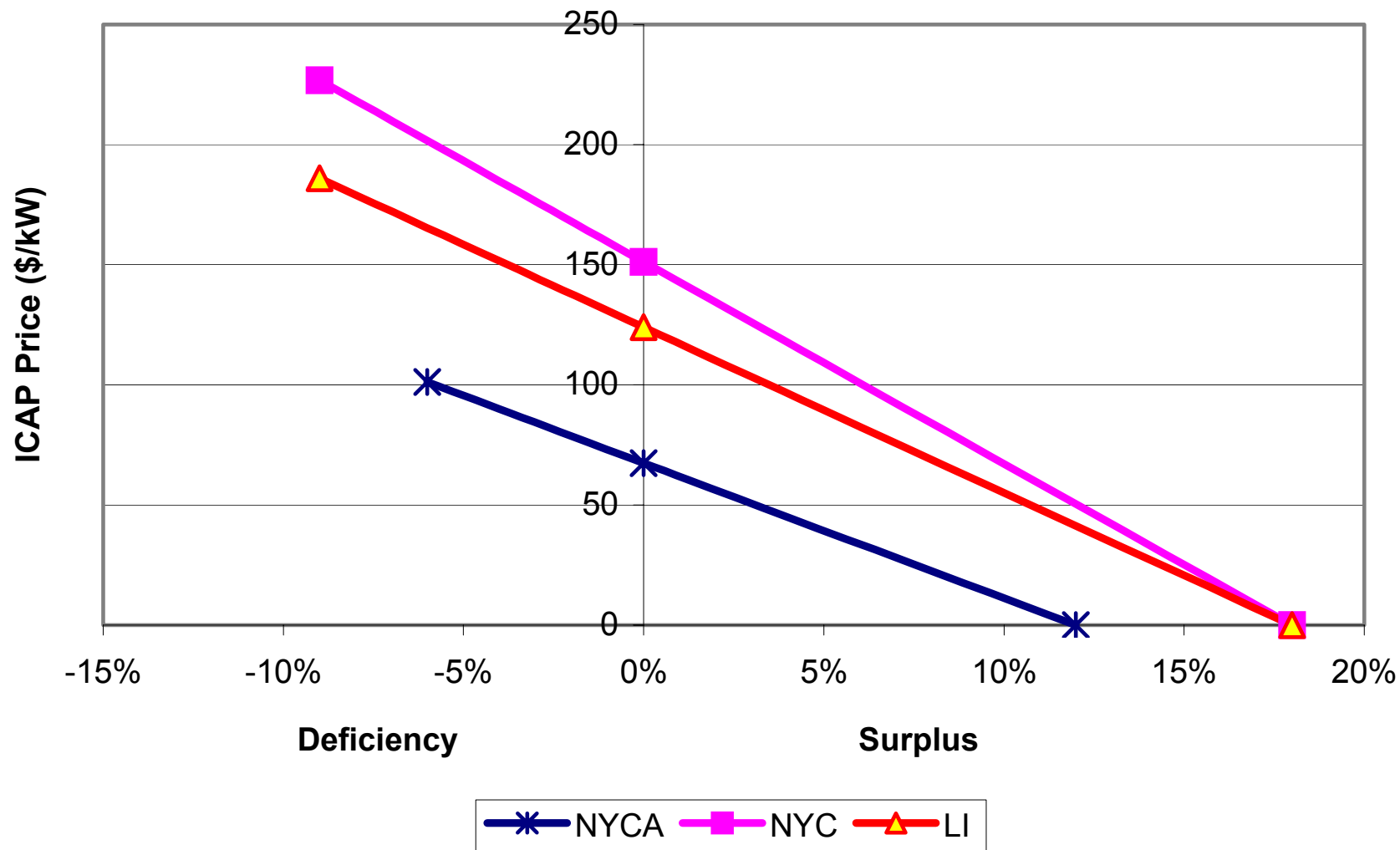
Financial Results-Capital + Fixed Operating Costs



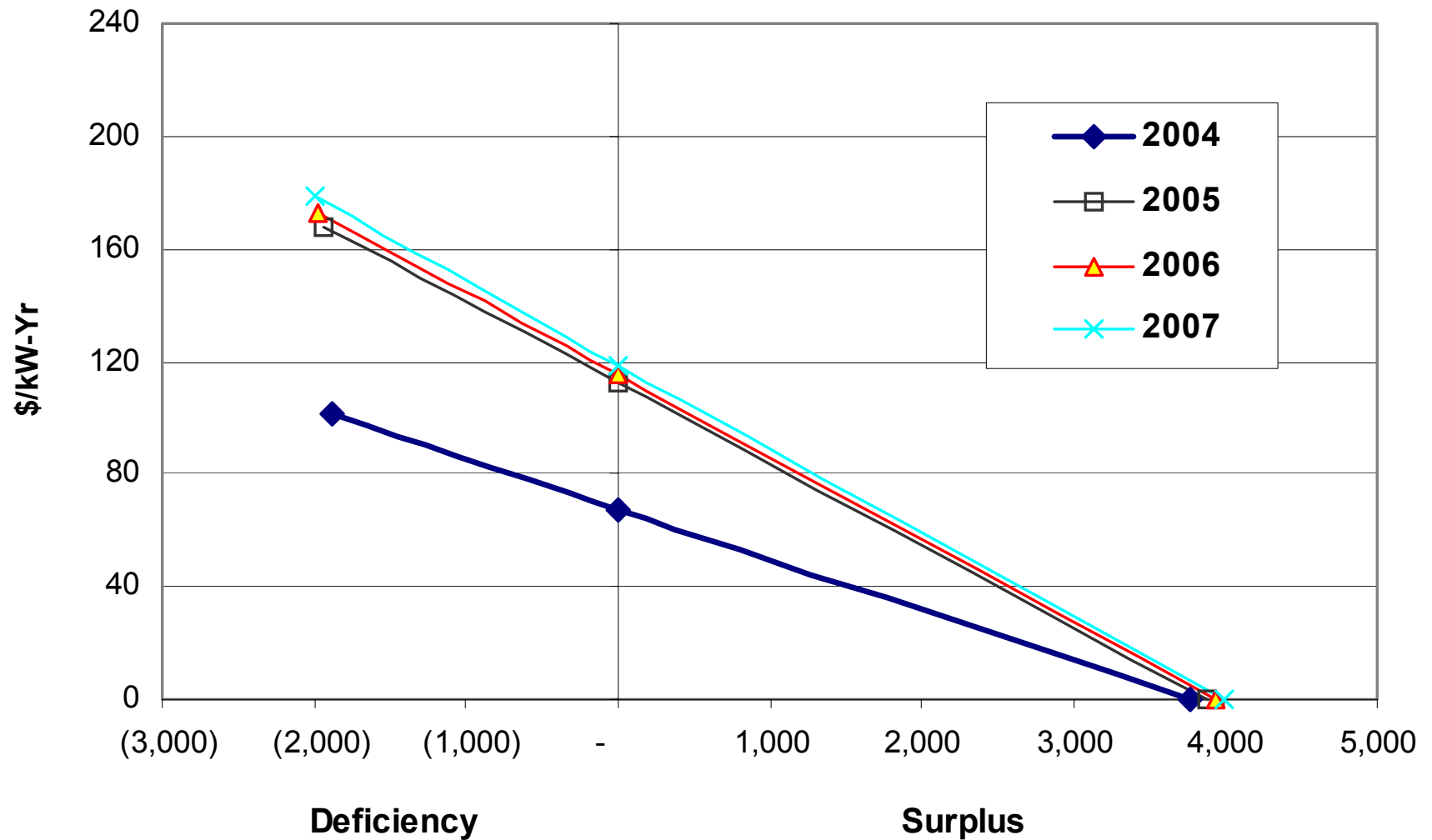
Financial Results - w/ Net Energy & Anc. Svc. Revs



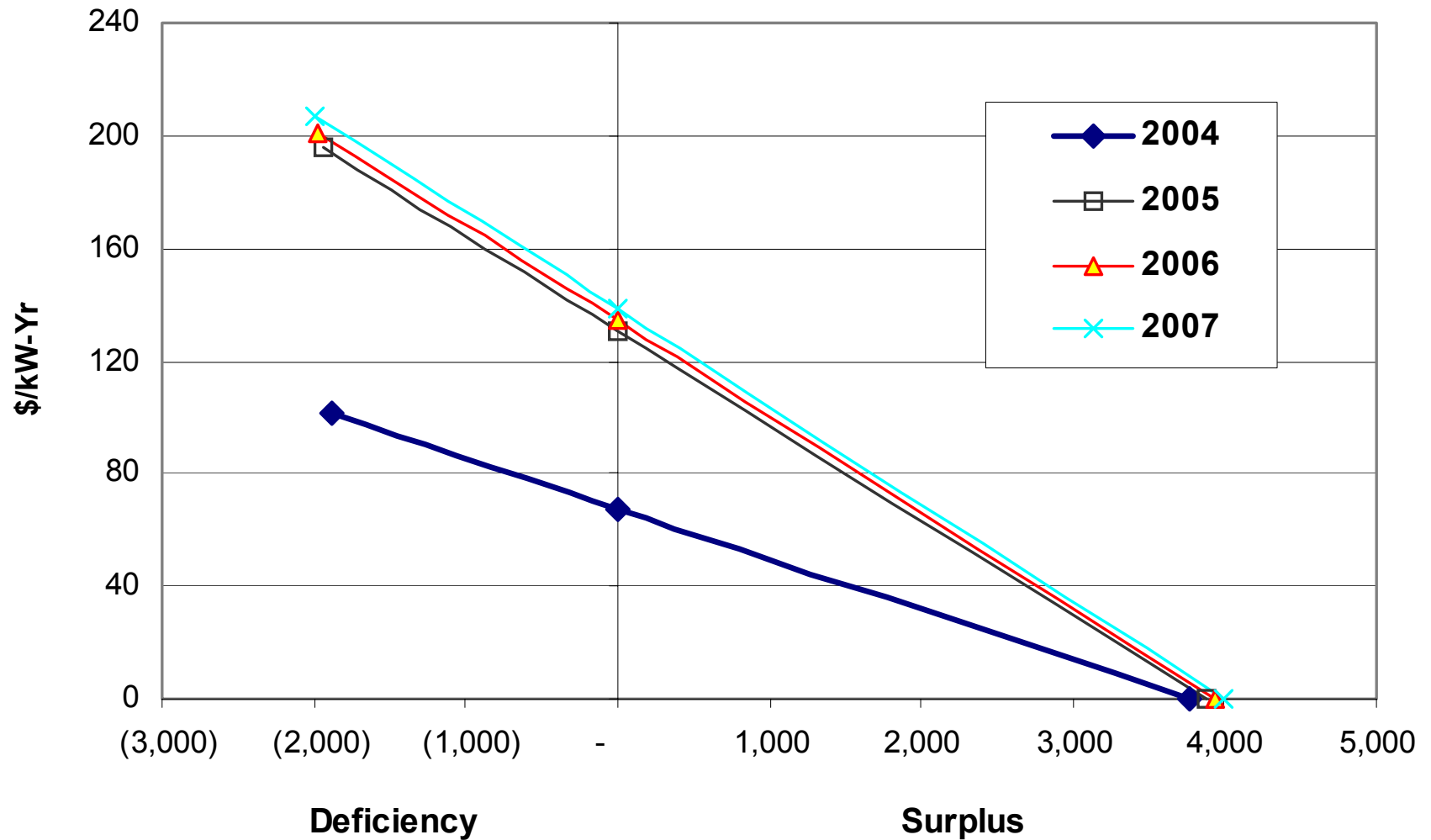
ICAP Demand Curves – 2004



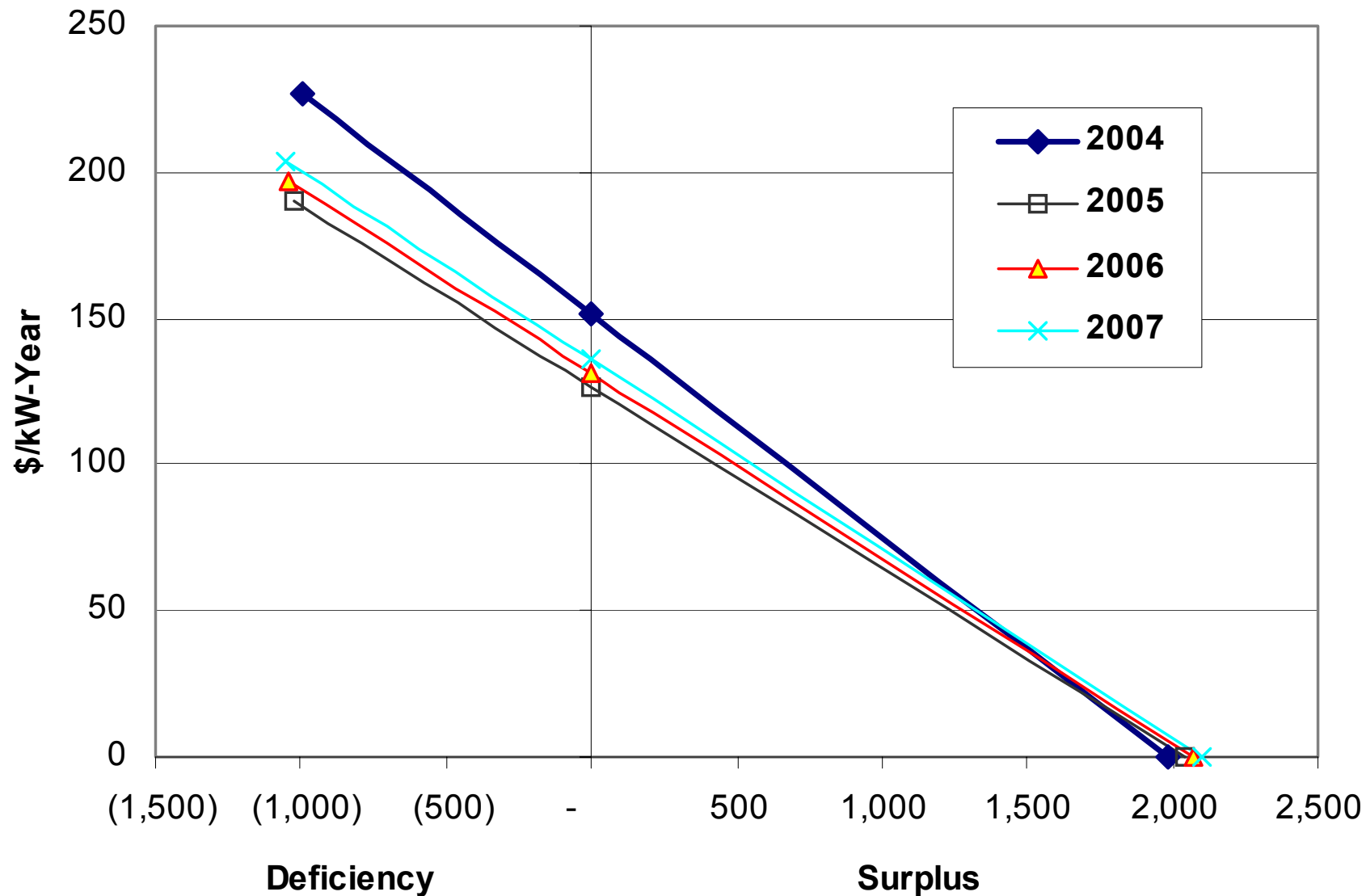
ICAP Demand Curves – NYCA 2 x 7FA



ICAP Demand Curves – NYCA 2 x LM6000



ICAP Demand Curves - Zone J



ICAP Demand Curves – Zone K

