

Experience with New York State Electricity Markets

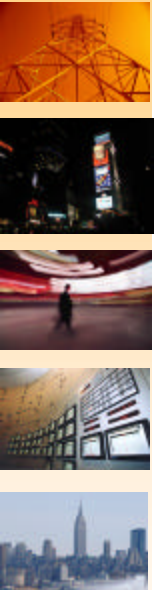


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Special Edition, Market Operations Report
NYISO BIC, Albany, NY
April 2, 2003

Outline of Today's Presentation

- I. Introduction
- II. NYISO Market Overview
- III. Experience with Long Term Investment Signals

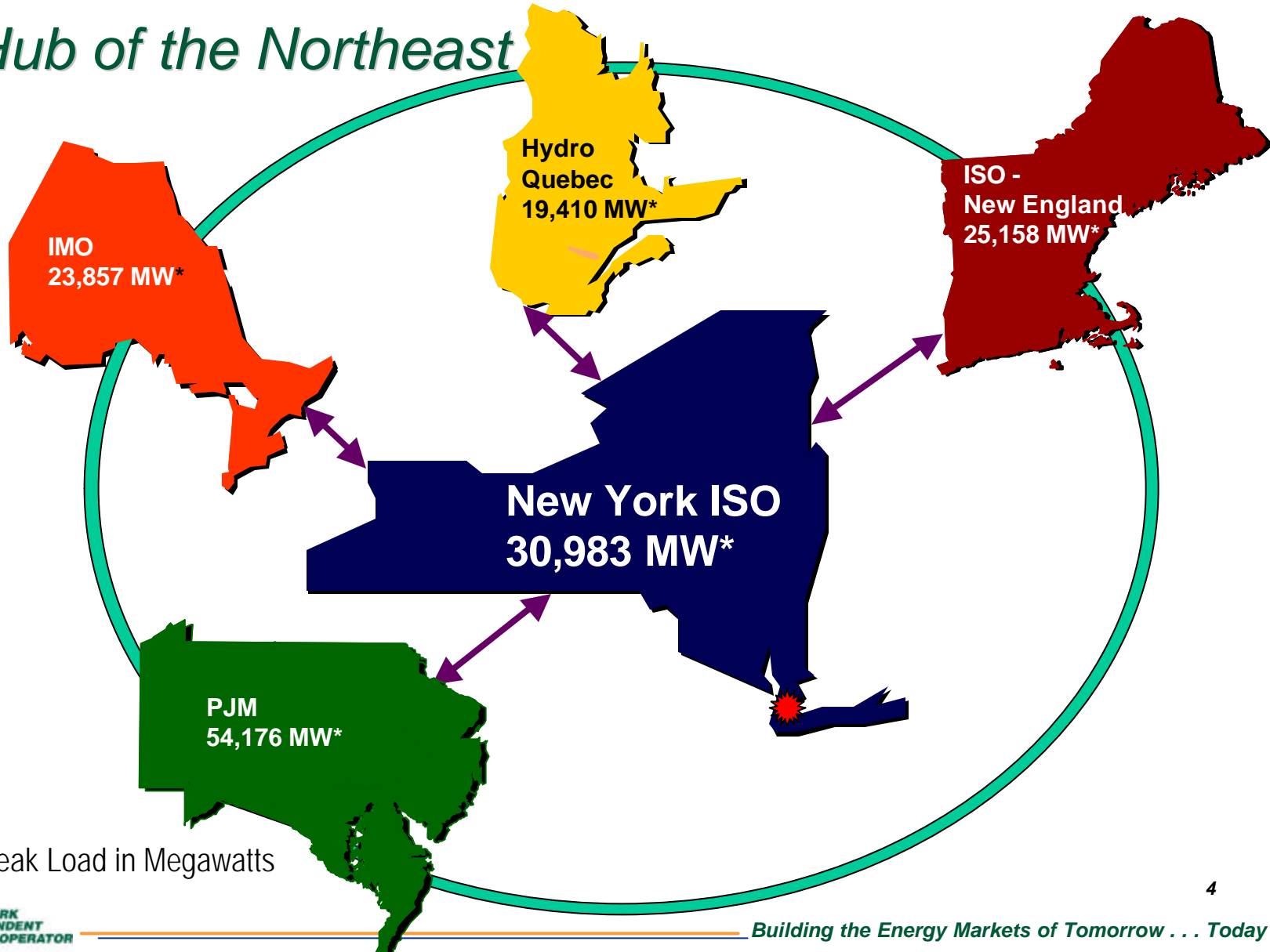


I. NYISO Introduction

- ✓ NYISO formed December 1, 1999.
- ✓ Highly divested and complex marketplace featuring co-optimized market clearing systems.
- ✓ 91% utility divestiture rate makes it most divested market in nation.
- ✓ NYISO market volume \$5.2 billion last year and \$16.2 billion since inception. Highest market volume in East.
- ✓ Unique challenge: New York City is world's biggest and most complex load pocket. World capitals of finance and communications located within.

I. NYISO Introduction

Hub of the Northeast

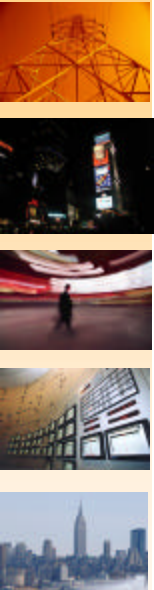


* = Peak Load in Megawatts

II. NYISO Market Overview

Goals of deregulation....

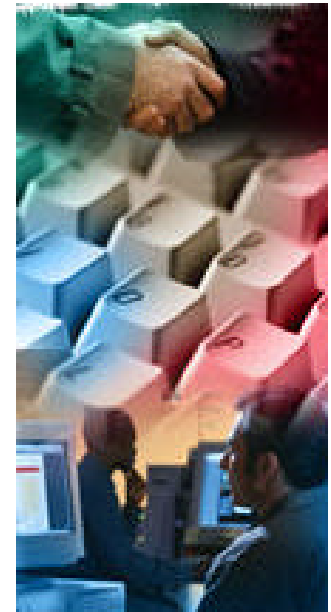
- ✓ Competition:
 - *Increased operational efficiencies through market driven incentives*
- ✓ Innovation:
 - *New products and services*
- ✓ Growth:
 - *Long term incentives to add supply and transfer capability*



II. NYISO Market Overview

Day-Ahead Market - Highlights

- ✓ Security Constrained Unit Commitment (SCUC) scheduling software simultaneously co-optimizes energy and ancillary services for least cost solution
- ✓ Hourly Locational Marginal Prices (LMP)
- ✓ Issues binding forward contracts to Suppliers and Loads
- ✓ Bilateral transaction scheduling accommodated concurrently with supply and load bids
- ✓ Deviations settled against Real-Time Market
- ✓ Installed capacity suppliers required to bid in



II. NYISO Market Overview

Day-Ahead Market - Experience

- ✓ 95-98% of the NYISO market is transacted in the Day-ahead market (DAM)
- ✓ DAM is activity split nearly 50-50 between bilateral and LMP transactions
- ✓ DAM prices provide reliable indices for secondary market trading
 - *Need for price corrections is rare*
 - *Prices posted daily by 11am*
 - *Improved convergence between Day-Ahead and In-day prices achieved through virtual trading and improved in-city modeling*

II. NYISO Market Overview

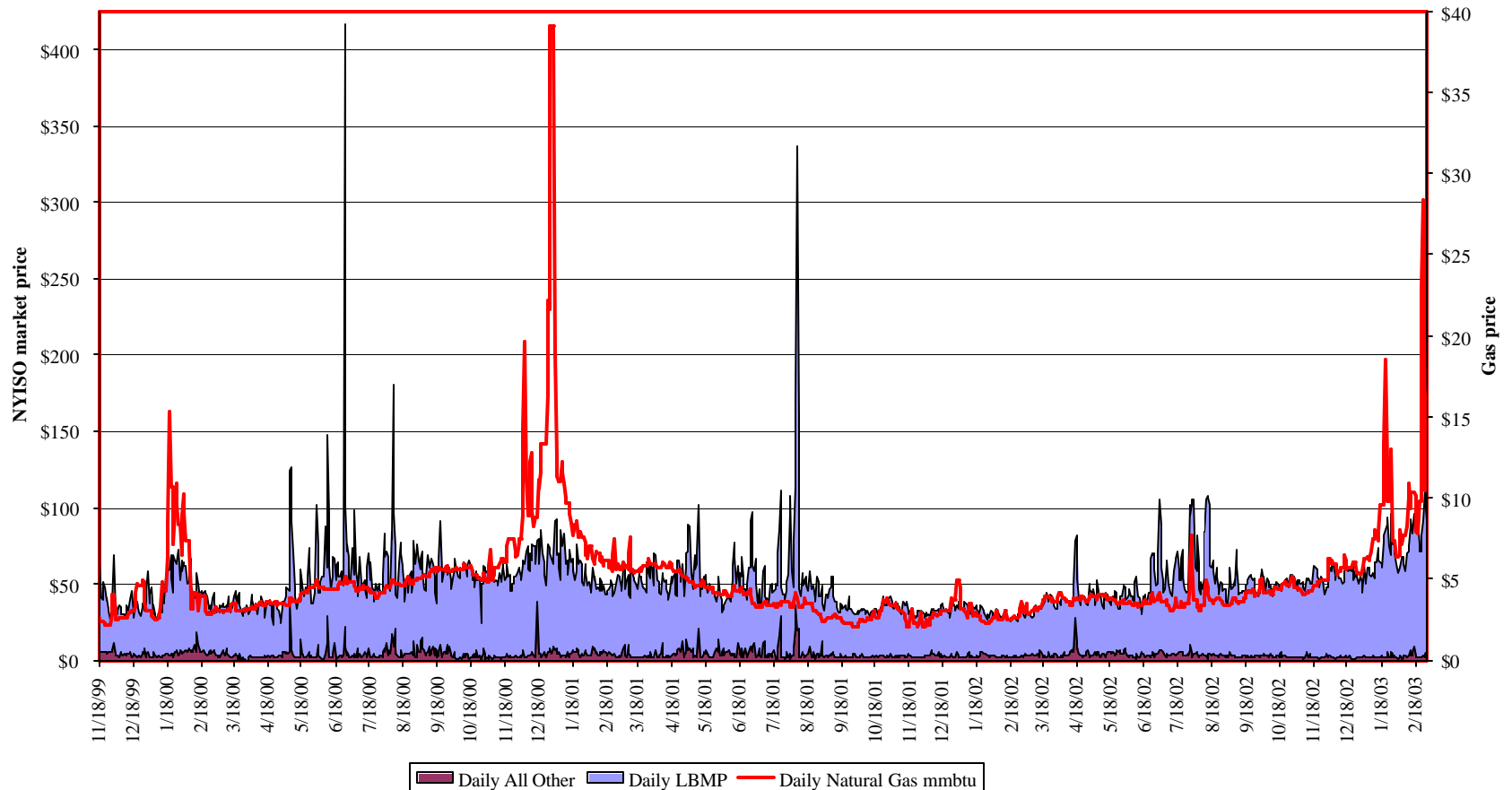
Day-Ahead Market - Experience

- ✓ NYISO Day-Ahead Market has consistently performed in a “workably competitive” fashion
- ✓ Day-ahead clearing prices have tracked changes in fuel prices
- ✓ Day-ahead prices exhibit a slight premium over real-time
 - *Loads prefer the lower volatility of the DAM*
 - *Generators bear a risk for performance*
 - *Uplift has been substantially reduced through market enhancements*

II. NYISO Market Overview

Price Trends

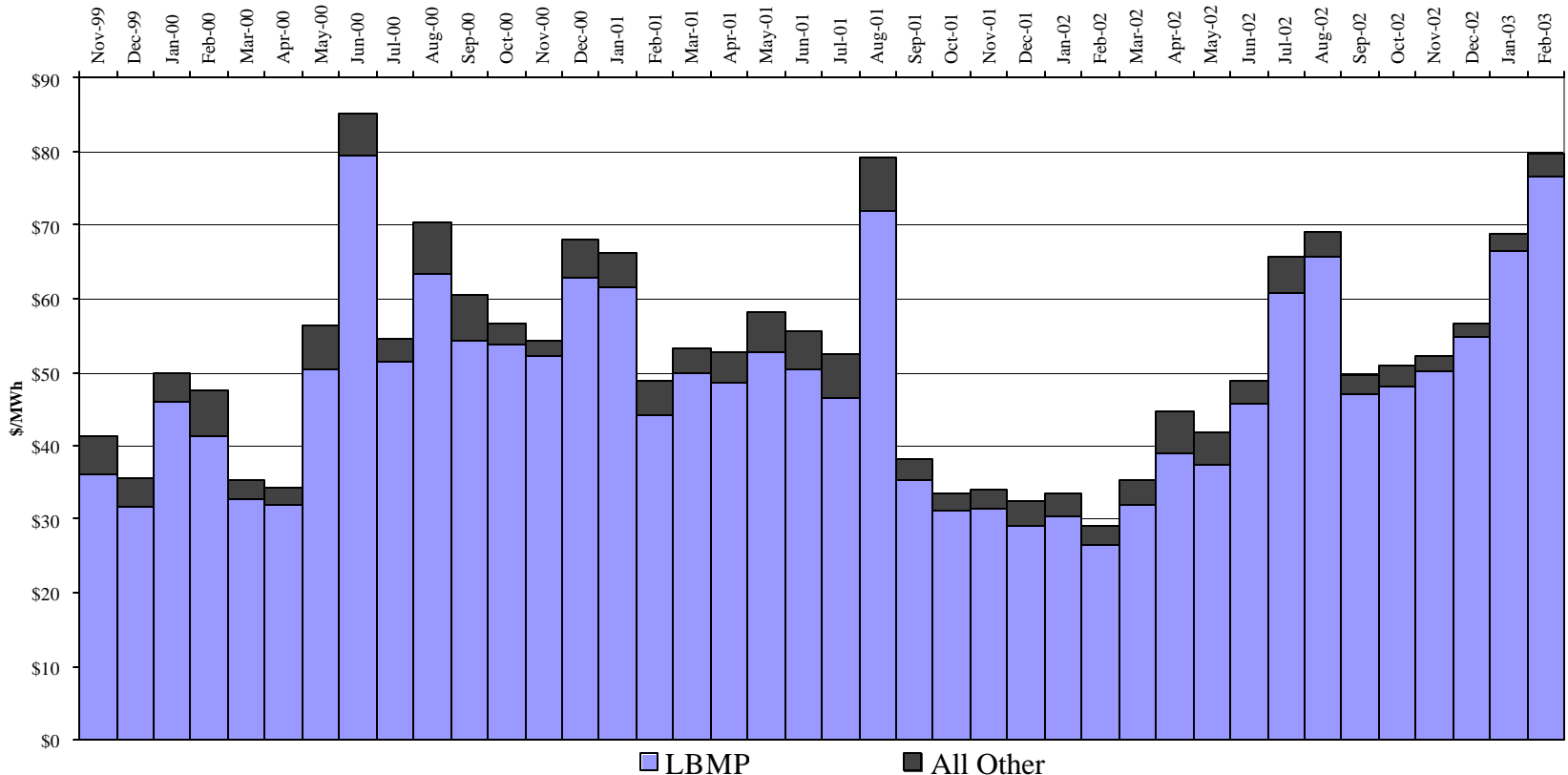
Average Daily NYISO Administered Total Price (Average Daily)
with Natural Gas Price \$/mmbtu (without taxes)



II. NYISO Market Overview

Price Trends

NYISO Administered Total Energy Price (Energy and Ancillary Services)
 from the LBMP Customer point of view
 Monthly - split by LBMP and 'All Other'



II. NYISO Market Overview

Real-Time Market - Highlights

- ✓ Transaction and generator bids may be adjusted hourly for consideration in the Balancing Market Evaluation (BME) to address in-day operating conditions
- ✓ Security Constrained Dispatch (SCD) software re-optimizes energy and ancillary services on system-wide basis every 5-minutes
- ✓ Provides for commitment of “quick start” resources
- ✓ Pricing (LMP) and 2nd settlement every five minutes



II. NYISO Market Overview

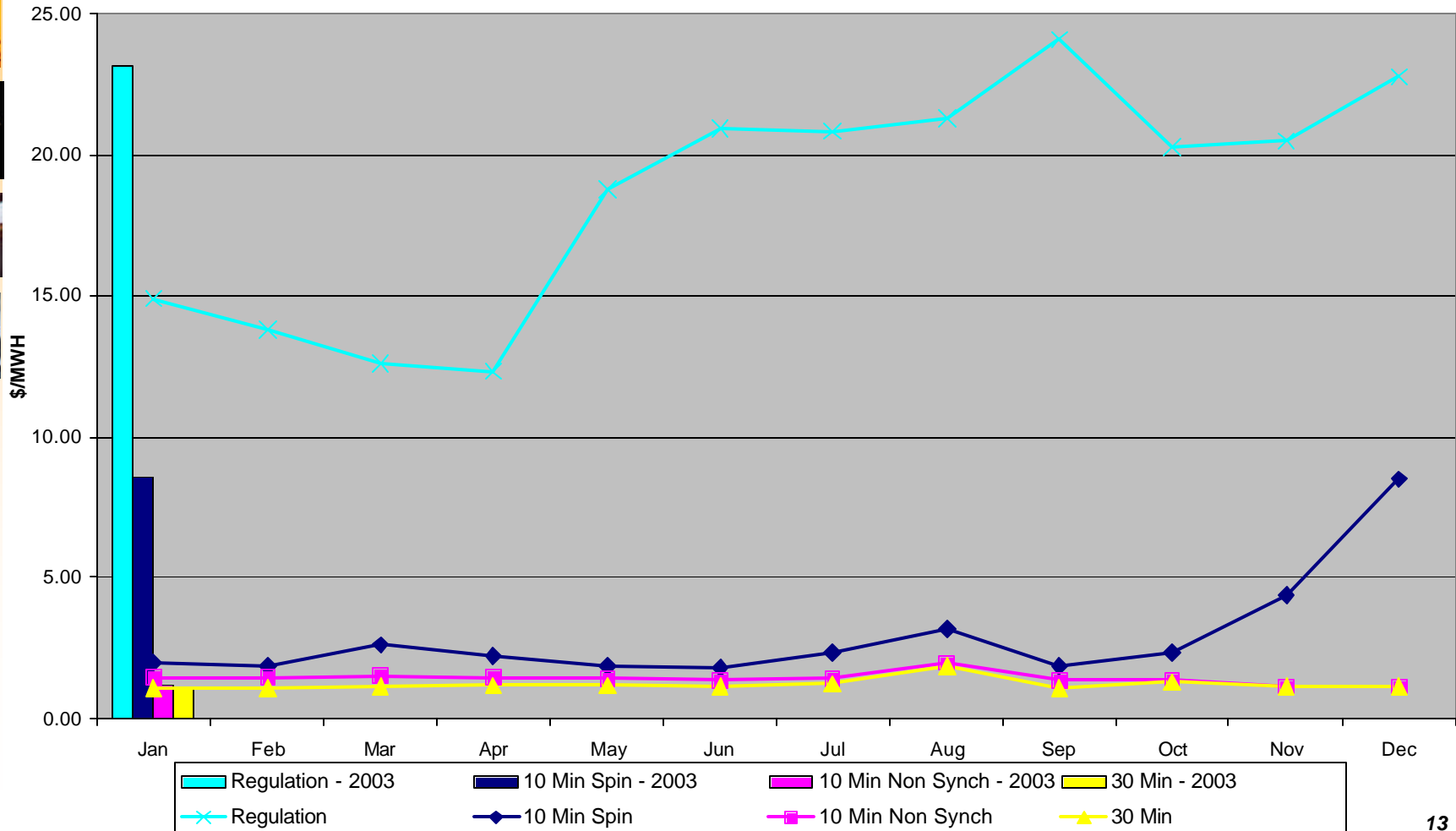
Real-Time Market - Experience

- ✓ Hourly and real-time markets have consistently produced “workably competitive” market outcomes
- ✓ Regional reliability has been enhanced following the introduction of the NYISO markets
 - *Marked improvement in area control performance*
 - *Ability to maintain exports to assist neighboring areas during peak system conditions*
- ✓ Significant progress has been achieved to alleviate seams issues and improve in-day price convergence

II. NYISO Market Overview

Price Trends

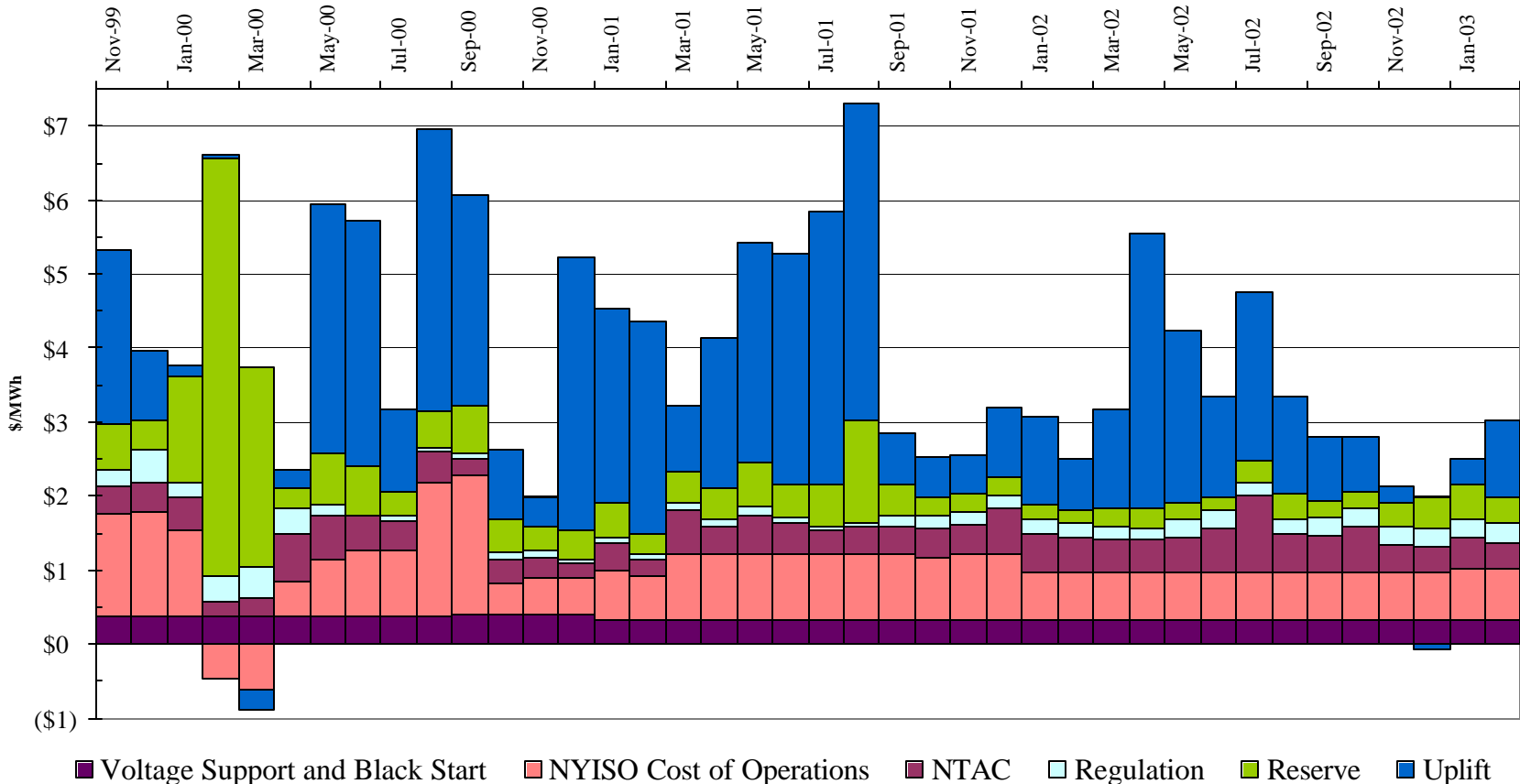
Monthly Average Ancillary Service Prices - Day Ahead Market 2002-2003



II. NYISO Market Overview

Price Trends

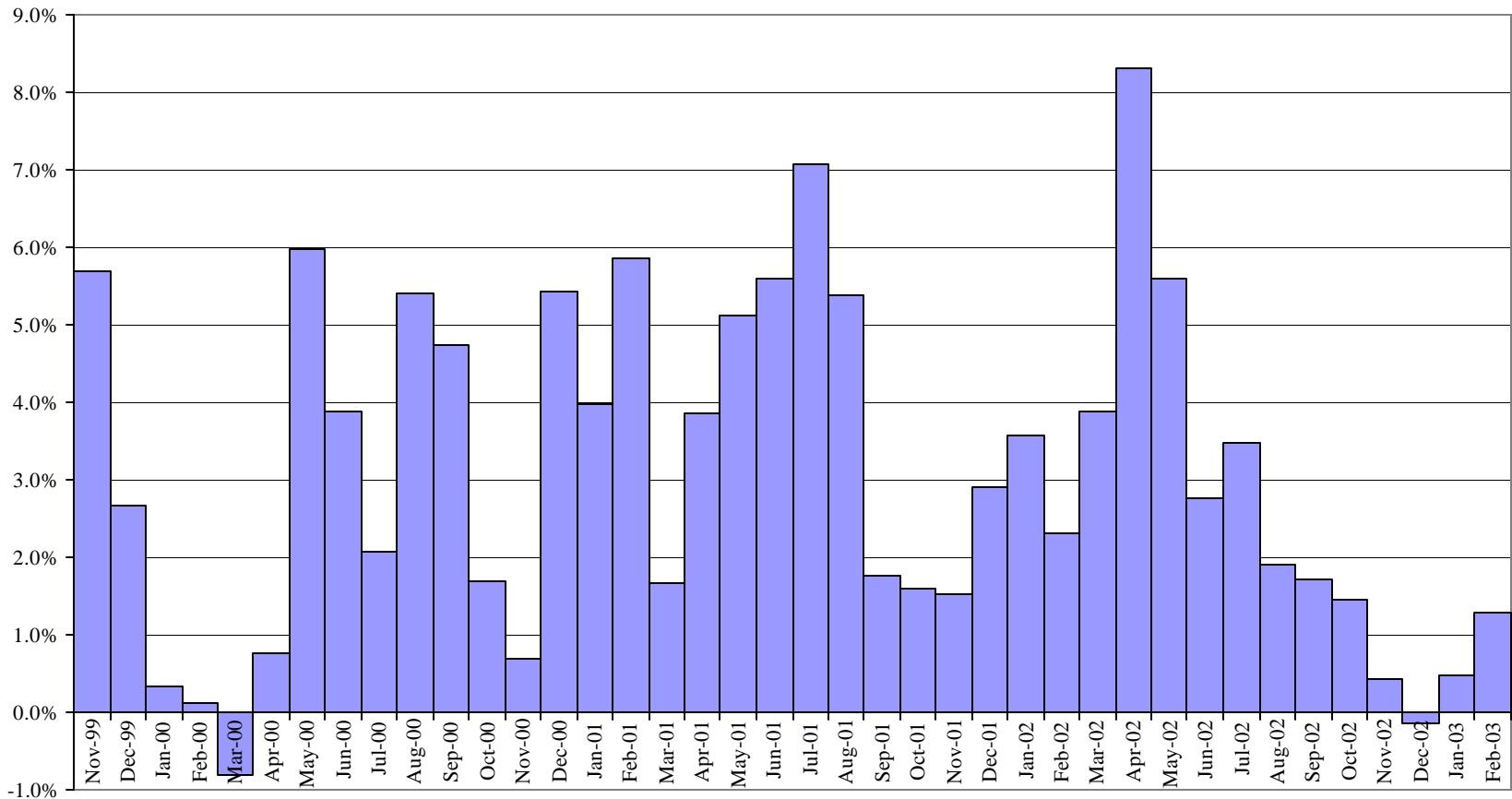
Average Monthly NYISO Administered Price by component
 (LBMP excluded for a detailed view of smaller categories)
 This chart illustrates the 'All Other' category.



II. NYISO Market Overview

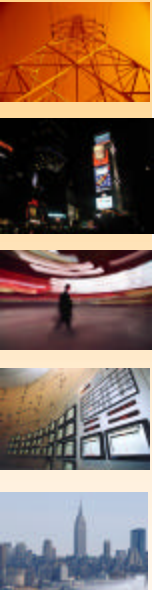
Price Trends

NYISO Administered Price
Uplift category as a percent of Monthly Average Price



III. Experience with Long Term Investment Signals

- ✓ Investors will respond to locational price signals
- ✓ A mix of short term (spot energy) and long term (bilateral transaction and/or ICAP) revenue streams needed to provide incentives to build
- ✓ The old central planning paradigm has been replaced with a “just enough, just in time” model

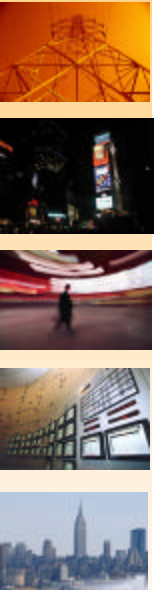
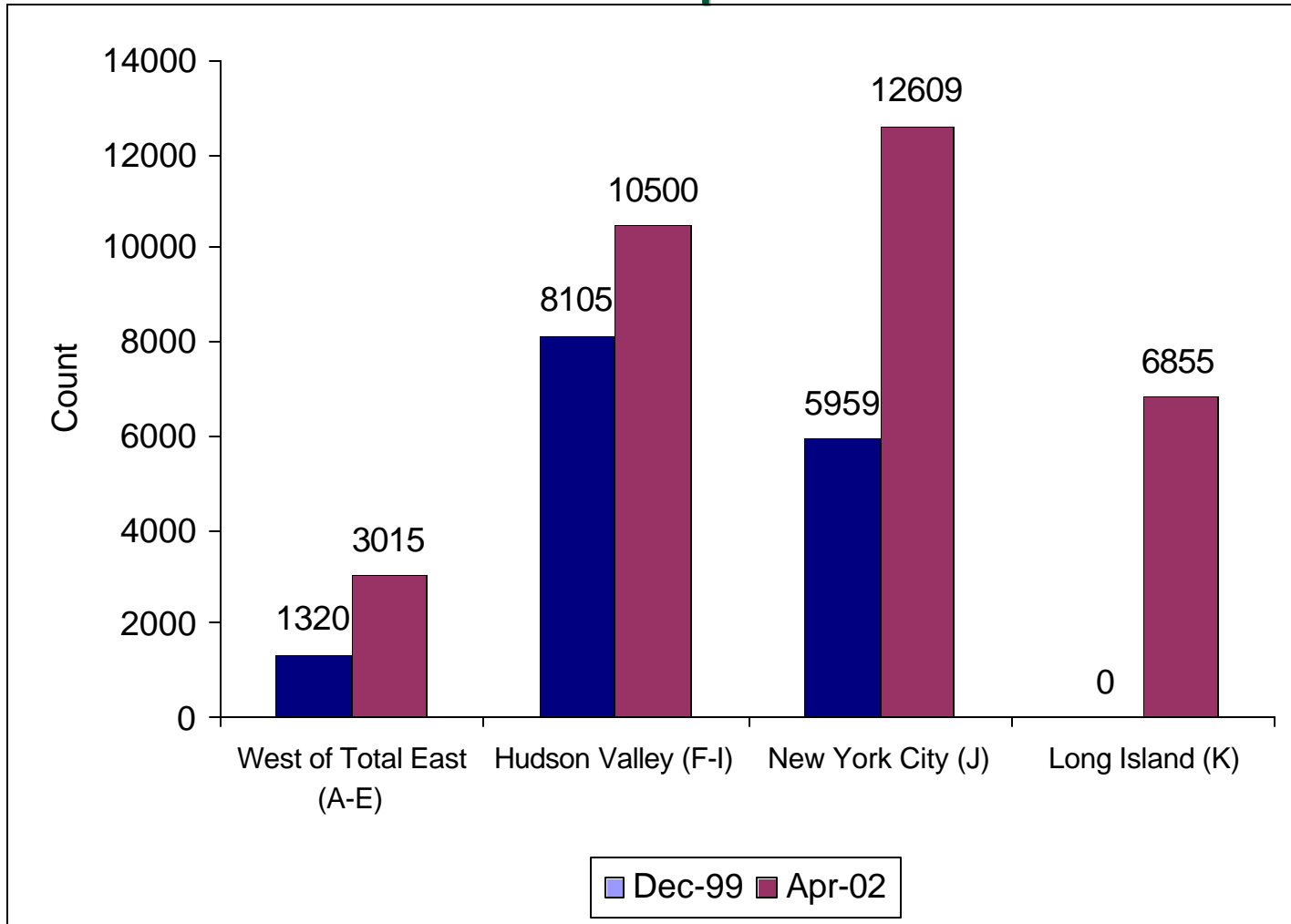


III. Experience with Long Term Investment Signals

- ✓ A pronounced shift in siting new generation to congested areas has been observed since the NYISO markets were implemented in 1999.
- ✓ The capacity situation:
 - *18% reserve margin required for reliability*
 - *25%-35% reserve market recommended for robust competition*
- ✓ NYISO Markets achieving 18% with a small margin over the 2004-2007 timeframe.

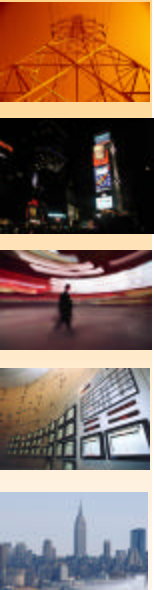
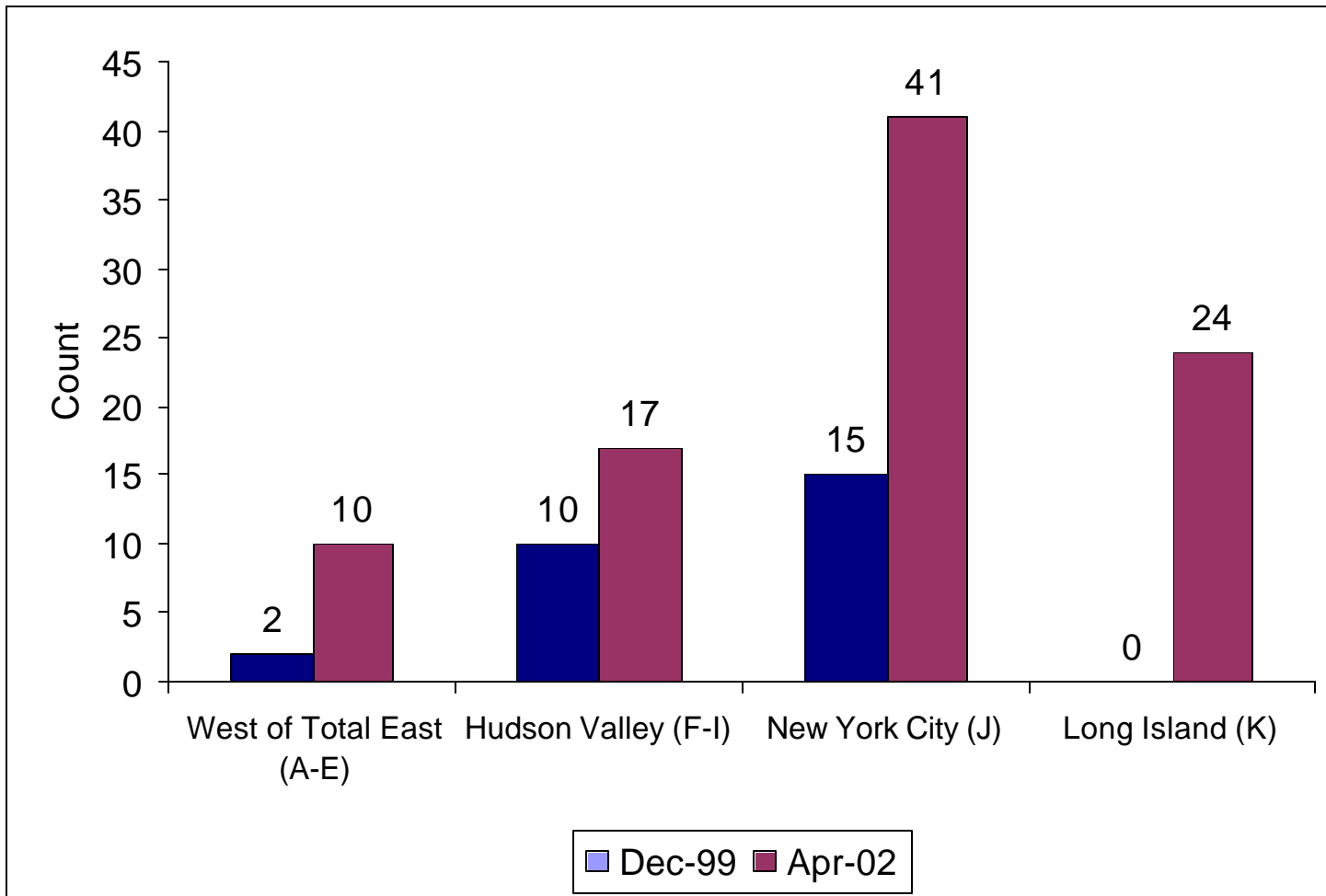
III. Experience with Long Term Investment Signals

New York Control Area Proposed Generation Locational Distribution of Proposed MWs



III. Experience with Long Term Investment Signals

New York Control Area Proposed Generation Locational Distribution of Proposed Projects



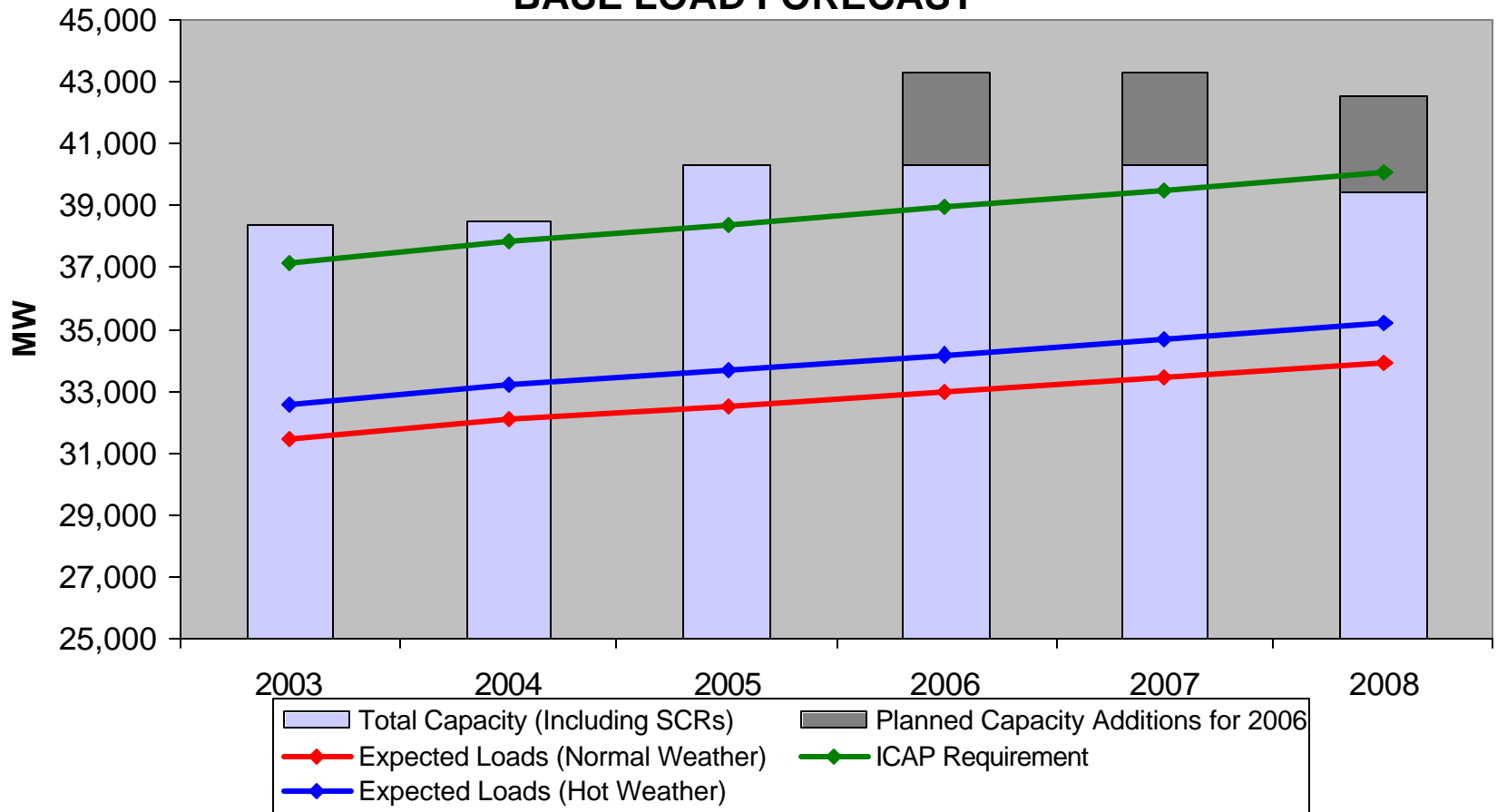
III. Experience with Long Term Investment Signals

Load and Capacity Situation: 2003-2008

Capacity and Expected Loads

New York Control Area

BASE LOAD FORECAST



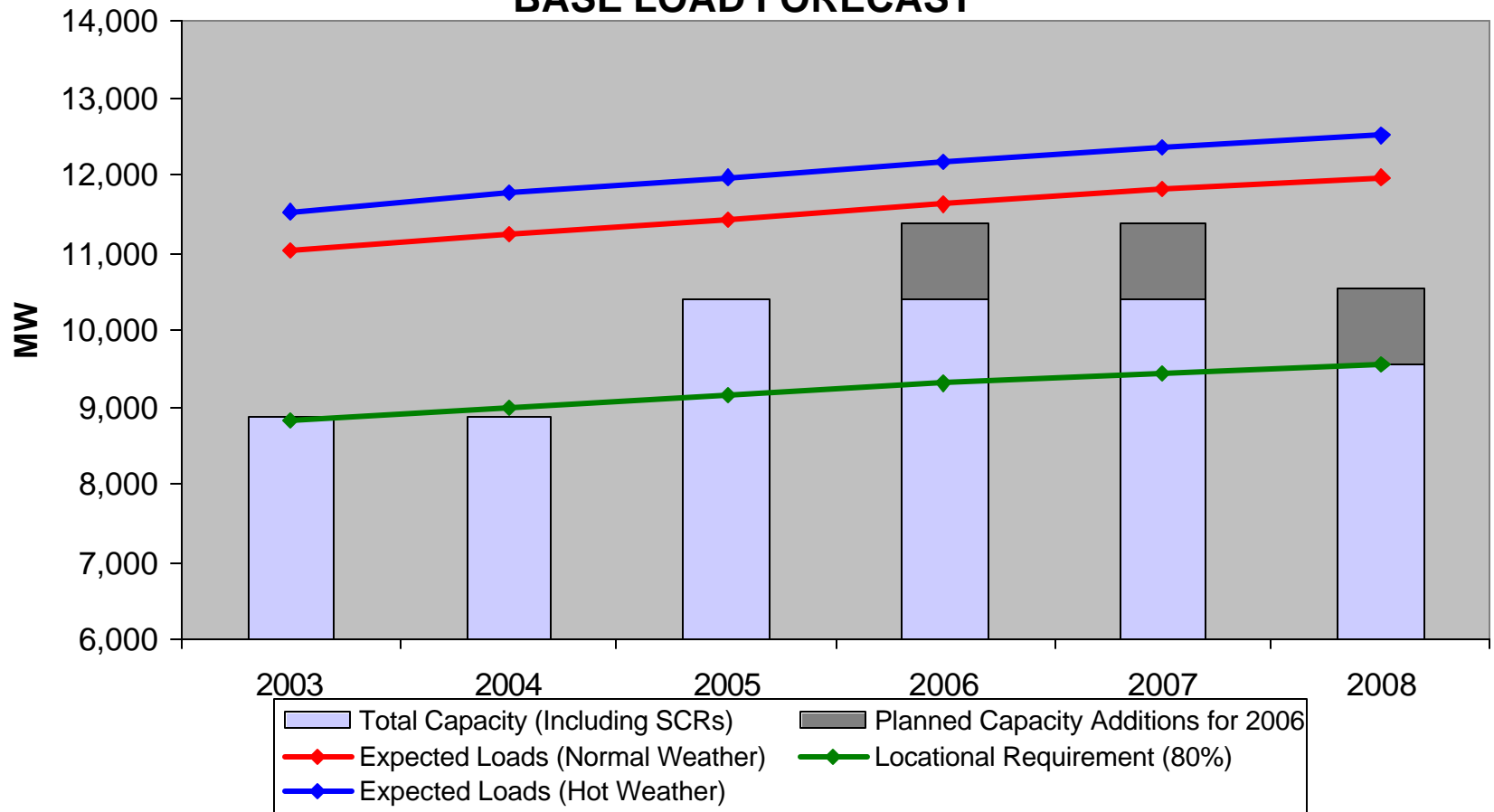
III. Experience with Long Term Investment Signals

Load and Capacity Situation: 2003-2008

Capacity and Expected Loads

New York City

BASE LOAD FORECAST



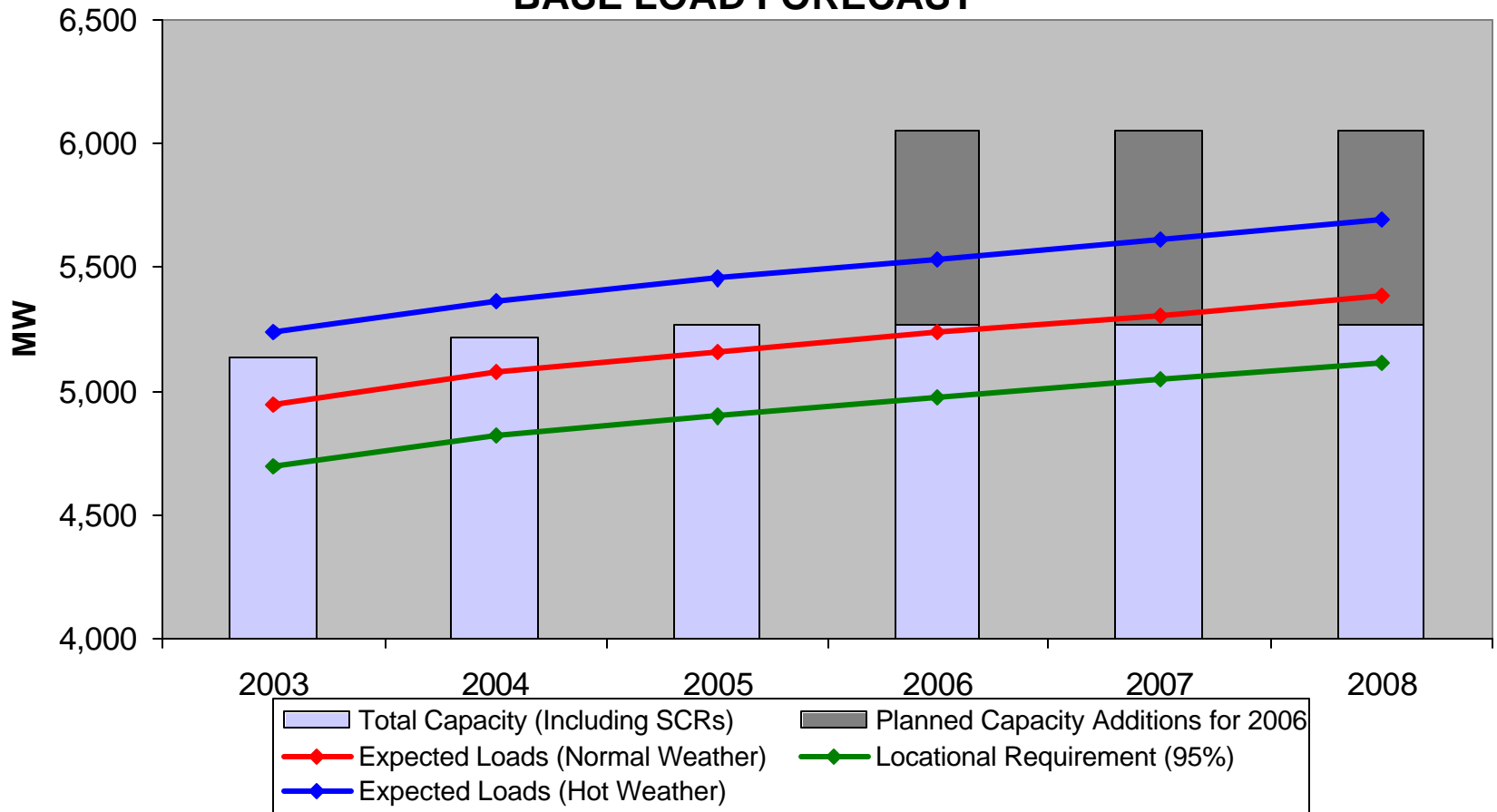
III. Experience with Long Term Investment Signals

Load and Capacity Situation: 2003-2008

Capacity and Expected Loads

Long Island

BASE LOAD FORECAST



III. Experience with Long Term Investment Signals

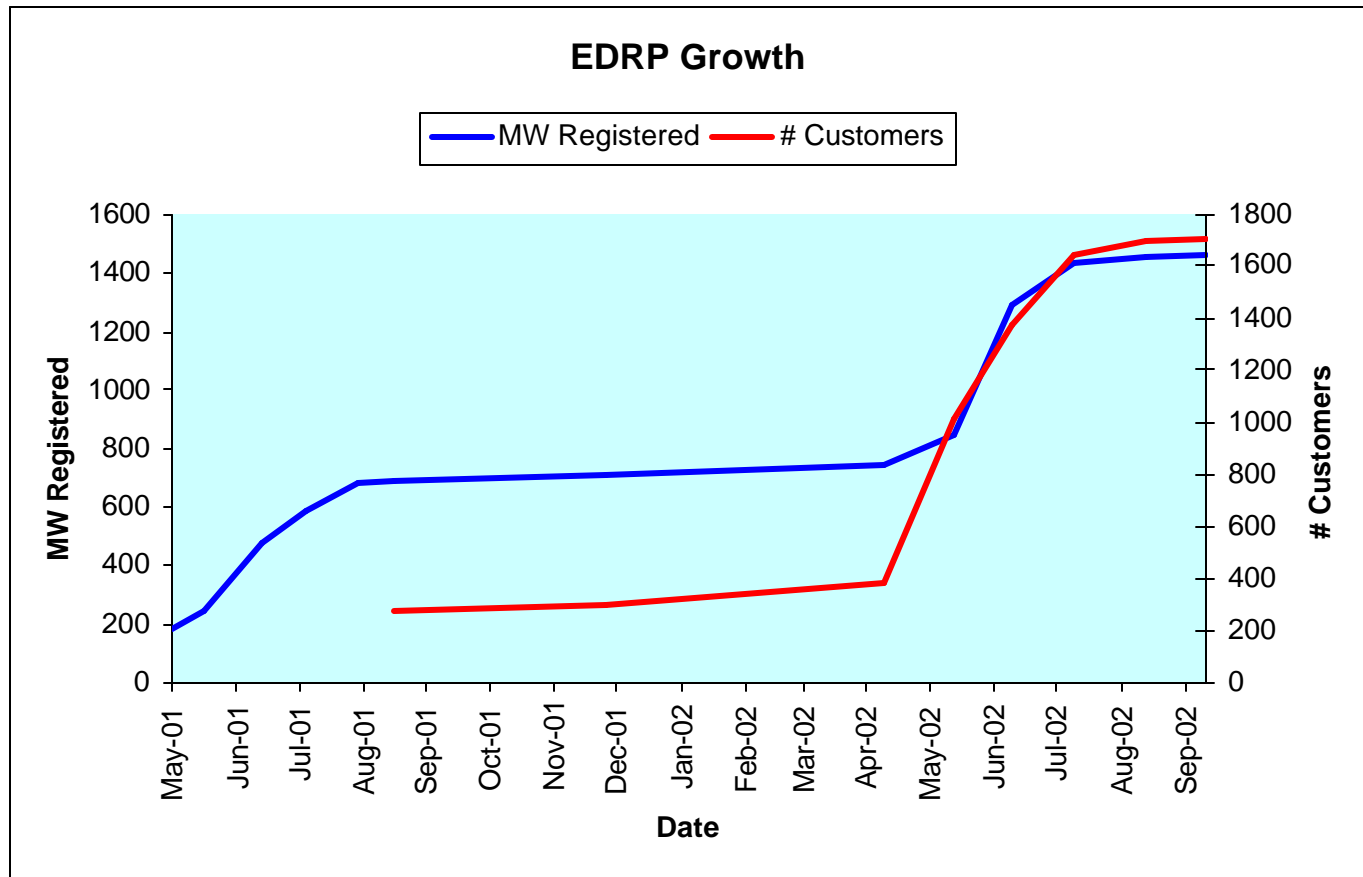
EDRP and SCR demand response programs....

- ✓ Introduce discipline and additional competition to the wholesale markets
- ✓ Enhance competitiveness of participating industries
- ✓ Support secondary investments to improve efficiency and expand wholesale market participation



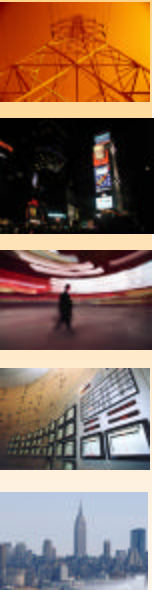
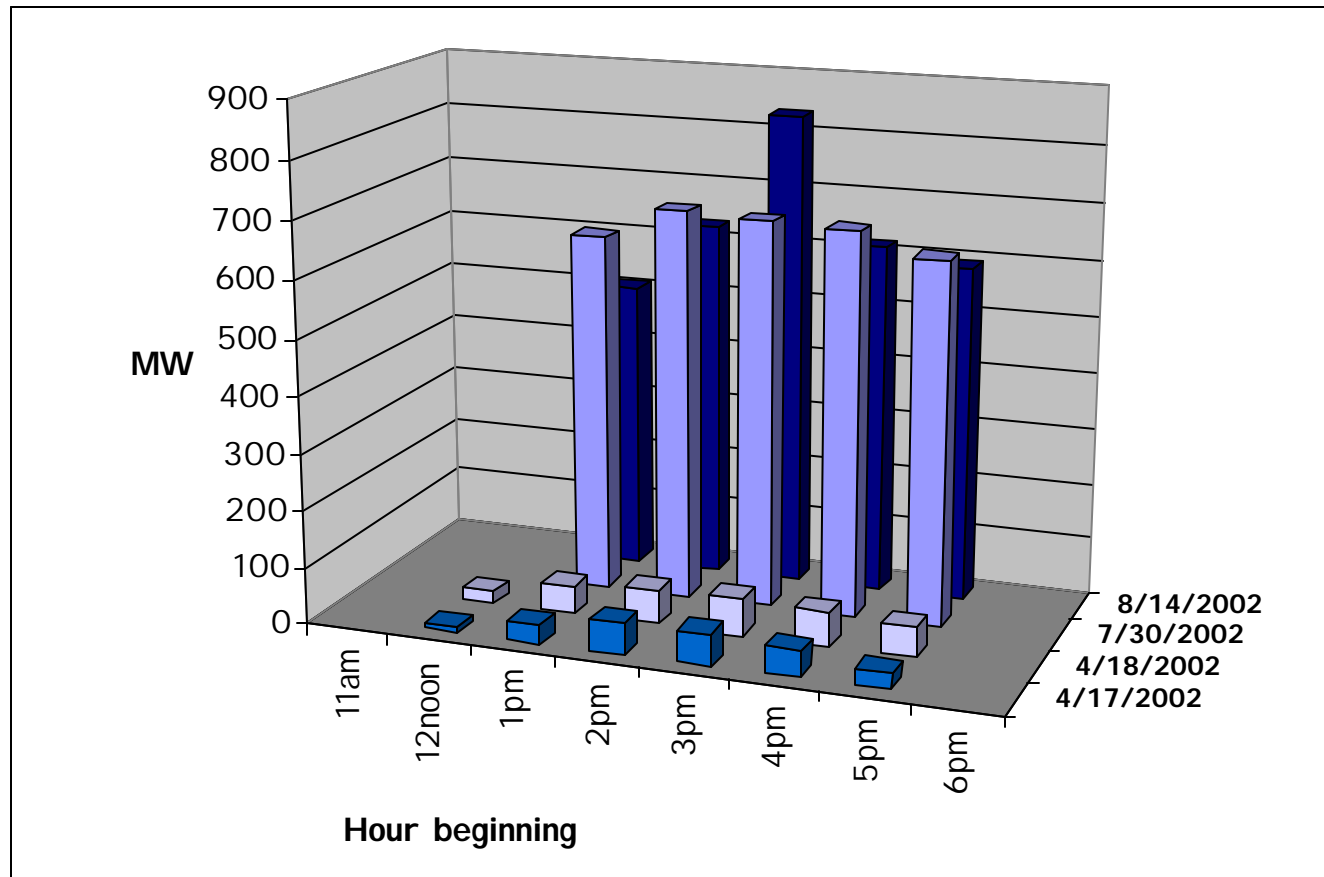
III. Experience with Long Term Investment Signals

Growth in EDRP, 2001-2003



III. Experience with Long Term Investment Signals

2002 EDRP Performance by Hour



III. Experience with Long Term Investment Signals

Distributed Generation in New York State

- ✓ Nearly 5000 mw of DG operating in NY
 - ✧ LSE Load modifiers
 - ✧ Special Case Resources (ICAP)
 - ✧ Emergency & Day-ahead Demand Response (EDRP)
 - ✧ 260 mw of DG registered in SCR & EDRP
- ✓ Capacity for 8000 MW of additional DG has been identified
- ✓ Lead time for new DG capacity is measured in weeks
- ✓ Installations range from 50 kW to 20 MW

III. Experience with Long Term Investment Signals

Distributed Generation – Combined Heat and Power MW Potential in NY

Size Range	NYC / LI	Upstate	Totals
50 – 500 kW	909	632	1,541
500 kW – 1 MW	1,050	728	1,778
1 MW – 5 MW	1,546	1,394	2,940
5 MW – 20 MW	935	793	1,728
Totals	4,440	3,547	7,987

Existing CHP in NY: ~5,000 MW

Source: *Combined Heat and Power Market Potential for New York State, NYSERDA Report No.02-12, October 2002.*

III. Experience with Long Term Investment Signals

Renewable Energy in New York State

- ✓ Issued in Jan. '03 – 25% of NY electricity to come from renewables by 2012
- ✓ Currently account for 17% (including hydro)



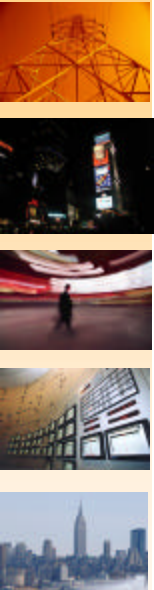
Madison Wind Project

- Possible technologies:
 - Wind (48+ MW currently installed)
 - Photovoltaic
 - Biomass
 - Hydro

III. Experience with Long Term Investment Signals

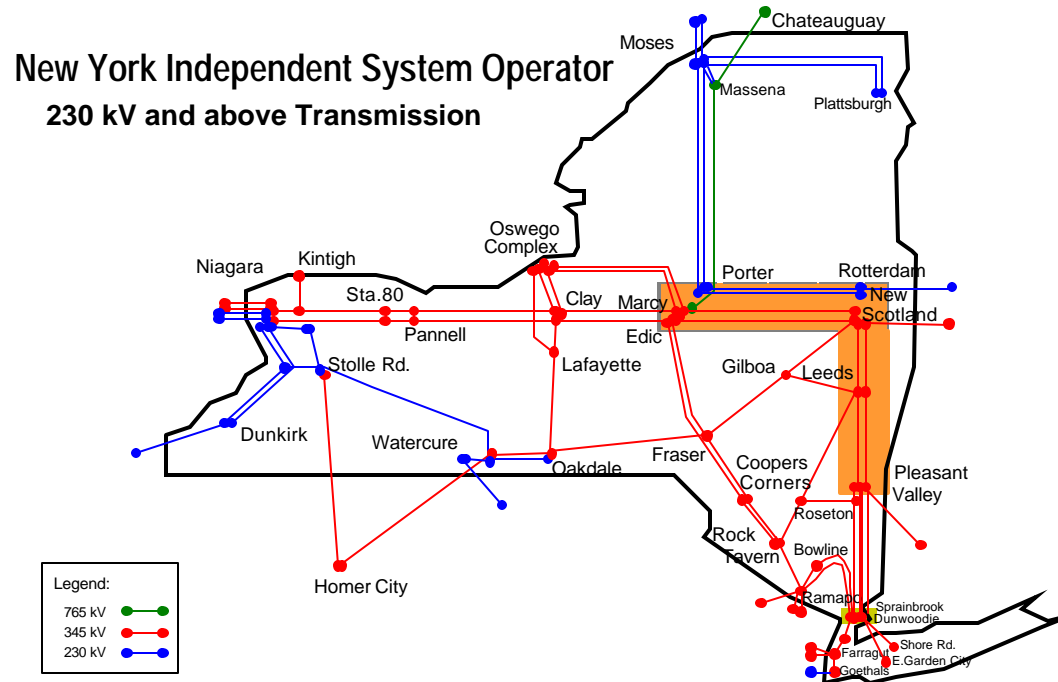
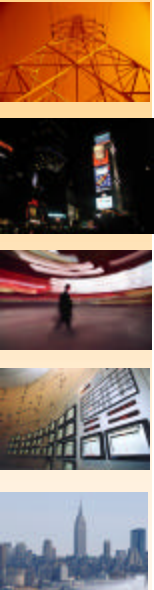
Responses to Transmission Congestion

- ✓ Reinforce the congested path
- ✓ Build alternative paths (AC/HVDC solutions)
- ✓ “Build out” of congestion through appropriate siting of new supply and demand response resources
- ✓ Develop incentives to shorten maintenance on facilities which aggravate congested paths



III. Experience with Long Term Investment Signals

Transmission Bottlenecks Revealed To All Stakeholders

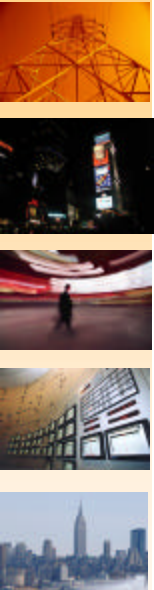


The NYISO Deregulation Experience...

- ✓ Increased operational efficiencies through market driven incentives
 - ✧ Dramatic improvement in NY control performance
 - ✧ Better use of transmission during stressed conditions
 - ✧ Competitive prices for capacity, energy, and ancillary services
- ✓ New products and services
 - ✧ Demand response products (energy & reserves)
 - ✧ Green Power
- ✓ Long term incentives to add supply and transfer capability
 - ✧ “Just enough, just in time” capacity additions
 - ✧ New AC and HVDC ties to neighboring markets
 - ✧ Transmission maintenance incentives

The NYISO Deregulation Experience

- ✓ Competition
- ✓ Innovation
- ✓ Growth



How to Contact the NYISO....

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 - cking@nyiso.com