



Energy Efficiency & Forecasting - Methods & Measures

**Presentation to Overview Forum
Energy Efficiency Portfolio Standard Proceeding
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NYISO Role in 15x15

- ◆ **Provide expertise** in forecasting, planning & evaluation.
- ◆ **Assess reliability impacts** of energy efficiency & demand response.
- ◆ **Facilitate market-based approaches** for delivery of energy efficiency & demand response products and services.

The 15x15 Roadmap

- ◆ **Data**

- *End-Use & Econometric, plus Conservation Databases*

- ◆ **Tools**

- *Econometric Models, End-Use Models, DSM Planning Models, Financial Models*

- ◆ **Planning**

- *Develop a feasible set of energy efficiency measures at least cost*

- ◆ **Measurement & Verification**

- *Traditional program evaluation and market-based*

Econometric Forecasts

- ◆ Wealth of data produced by US & state agencies;
 - *Updated quarterly by economic consulting companies;*
 - *Includes demographics, employment, output, prices, for cities, counties, states & the nation.*
- ◆ Forecast total energy or by business segment.
- ◆ Statistical measures to guide model fitness & significance. Model accuracy is generally very good.
- ◆ Difficult to directly account for effects of conservation in history and in forecasts.

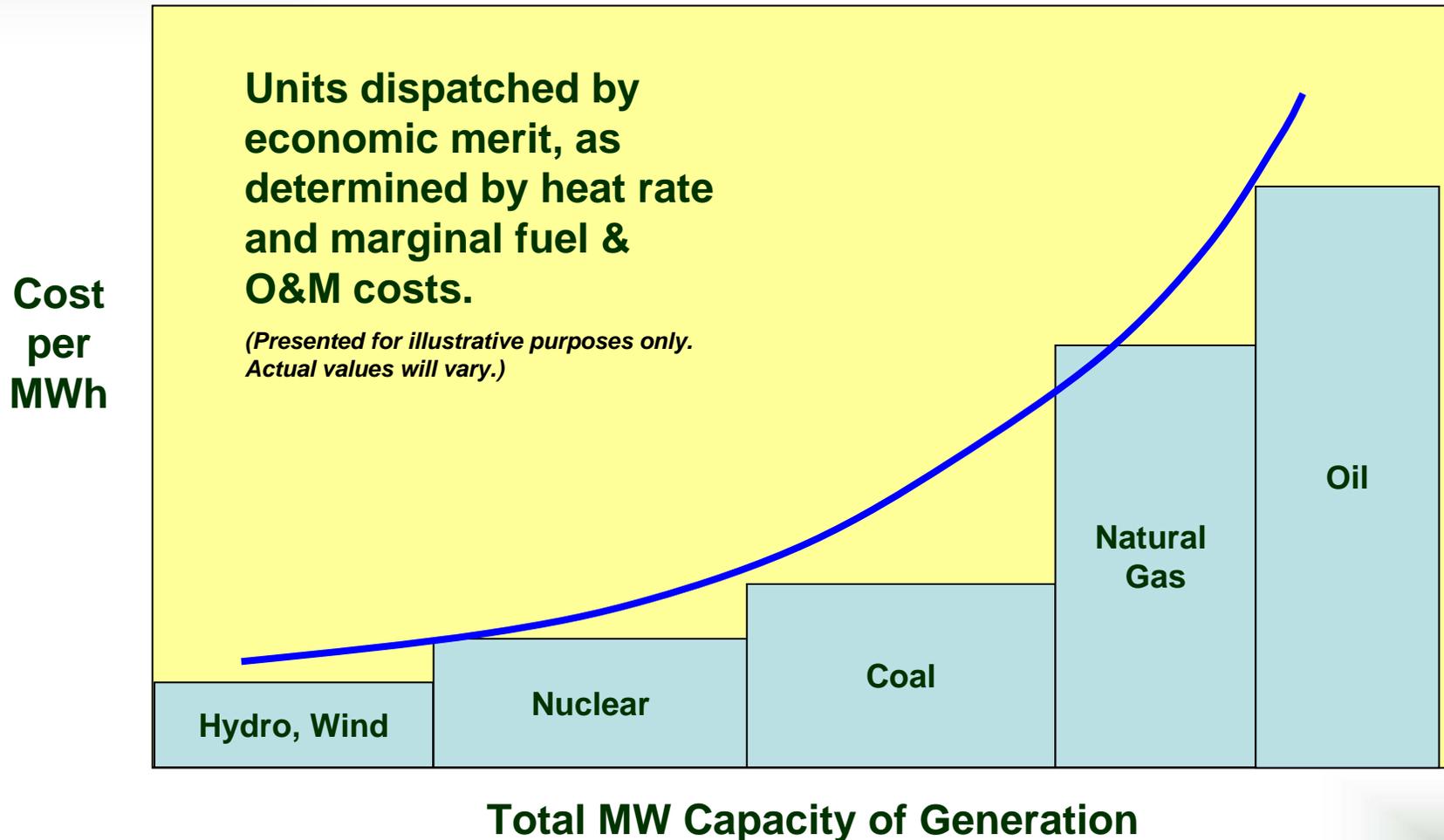
End Use Forecasts

- ◆ EIA releases new data only once every 4 years. Local data costly to obtain & update.
- ◆ Data includes appliance age, size, efficiency & market share.
- ◆ Not applicable for total usage -- must have usage for residential, commercial & industrial sectors.
- ◆ Emphasis on HVAC, refrigeration, lighting, commercial & industrial motors & processes.
- ◆ Statistical measures of fit difficult to obtain.
- ◆ Primary benefit -- Directly accounts for effects of conservation in history & in forecast.

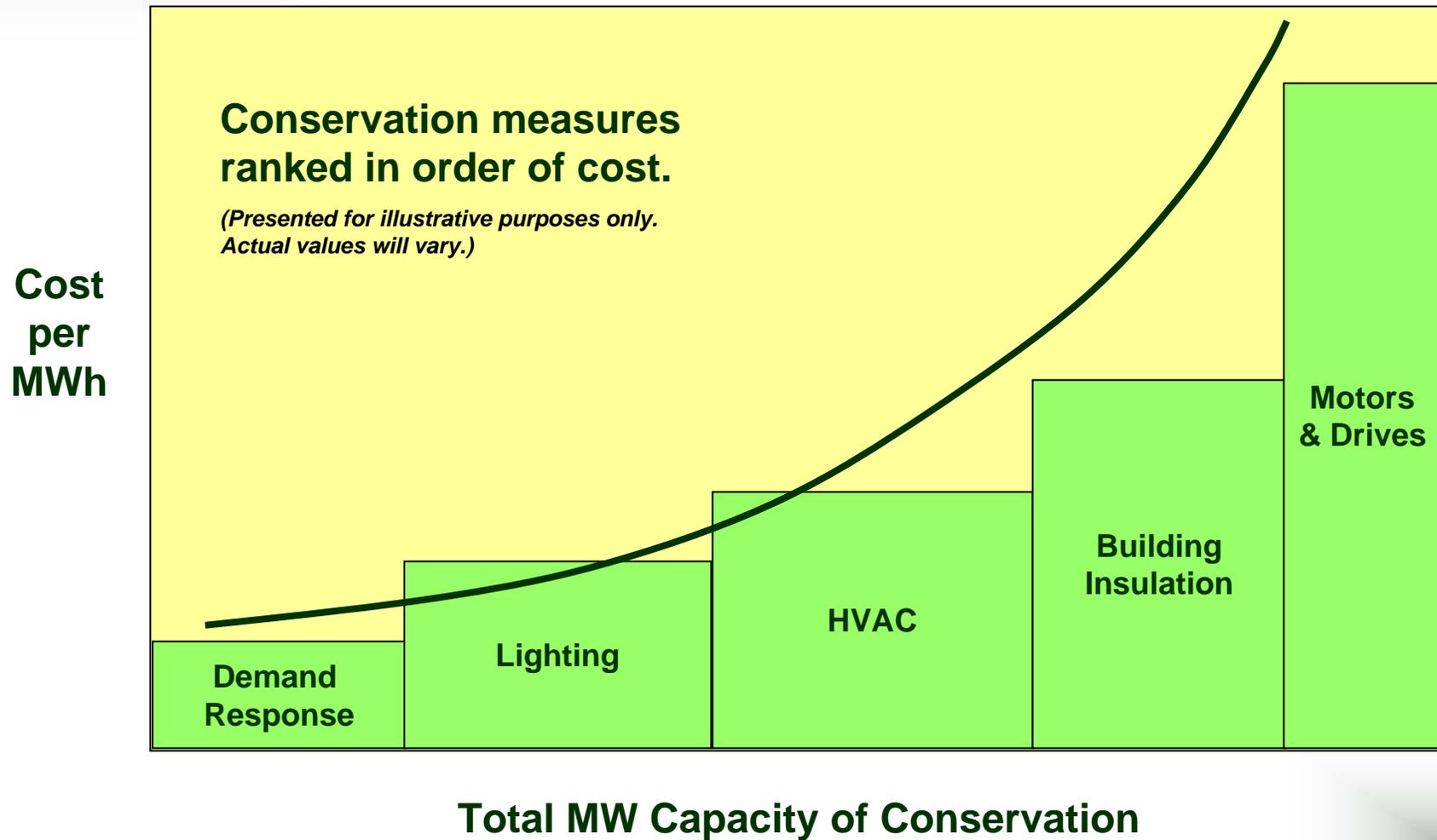
Both Approaches Needed

- ◆ Econometric models provide initial or baseline energy & demand forecasts.
- ◆ End-use model are calibrated to baseline econometric forecasts.
- ◆ Demand-side planning tools evaluate energy efficiency measures by sector & end-use.
- ◆ Cost-effective demand-side measures are netted against baseline forecasts.

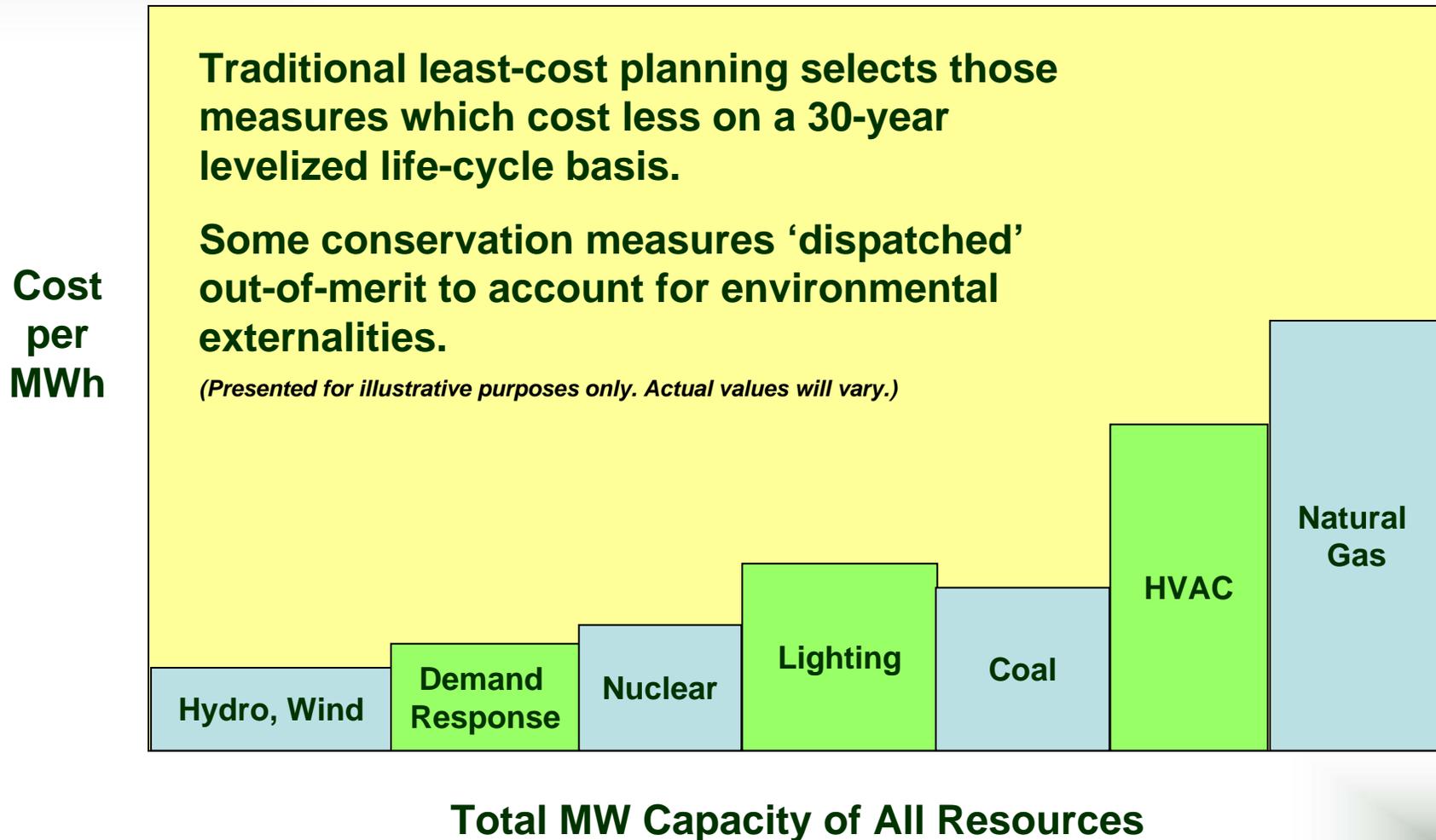
Conceptual Generation Cost Curve



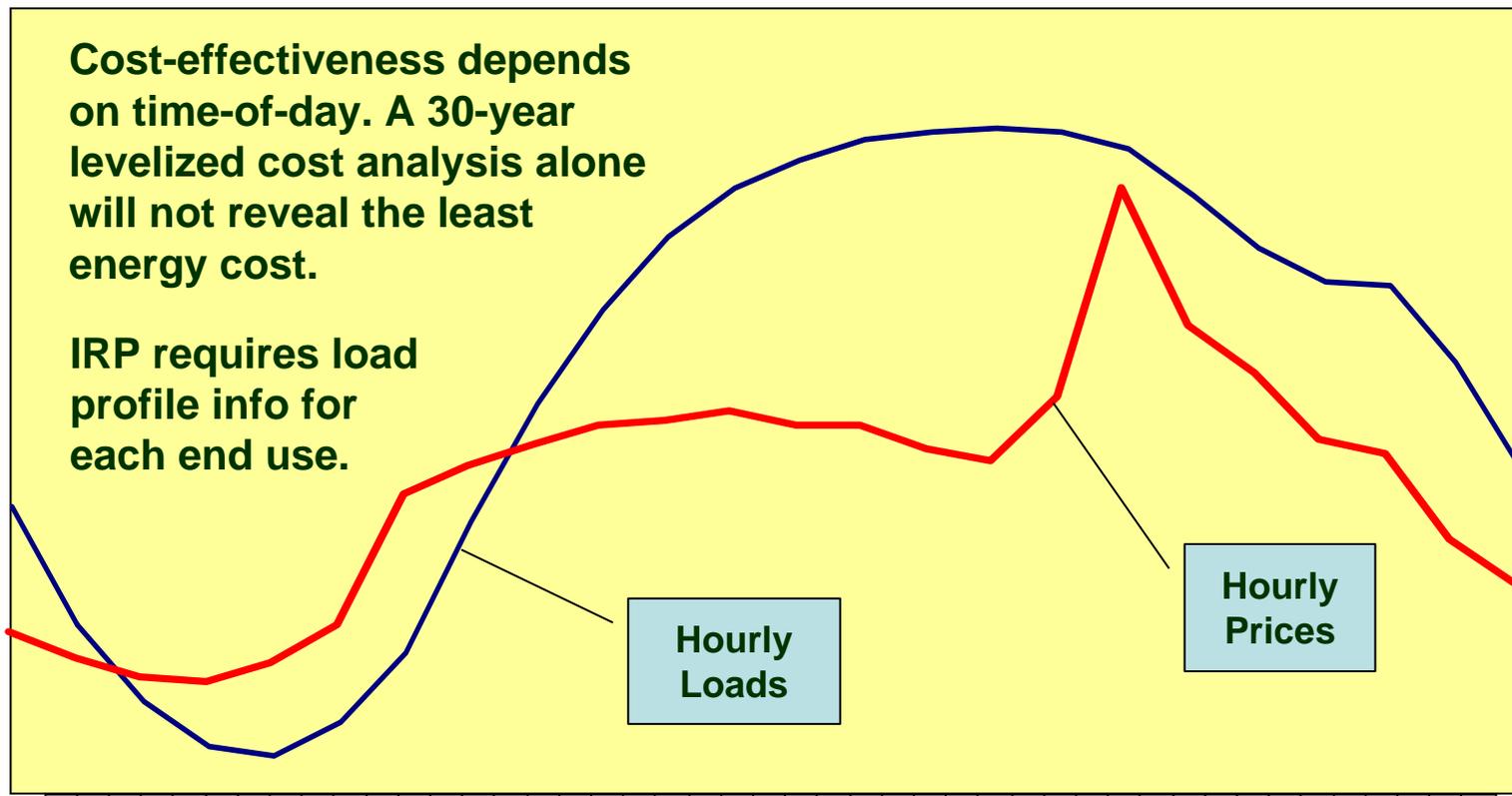
Conceptual Conservation Cost Curve



Integrated Resource Planning



Electricity Price & Load Variations Cannot be Overlooked



24 Hour Load Profile on a Typical Day

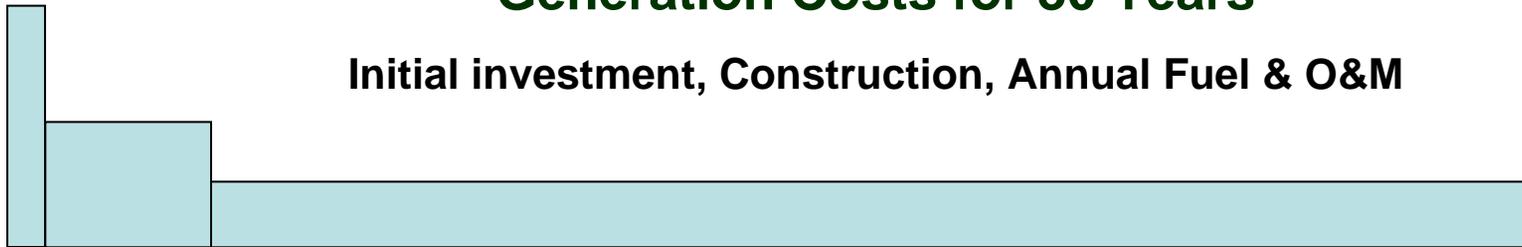
Conservation Risk Factors

- ◆ Risks of conservation resources should be evaluated just like generation resources.
- ◆ Projected engineering savings not achieved in practice or decay over time.
- ◆ Installed cost of measures higher than planned.
- ◆ Life of measure less than expected.
- ◆ Economic & market potential are less than technical potential.
- ◆ Savings dependent on consumer behavior.

Conservation and Generation Investment Streams

Generation Costs for 30 Years

Initial investment, Construction, Annual Fuel & O&M



Conservation Costs & Savings for 30 Years

Periodic Capital Investment (e.g. 10 years), Annual Fuel Savings



Conservation Program Evaluation

- ◆ Measurable
- ◆ Verifiable
- ◆ Persistent over entire measure life
- ◆ Billing analysis or metering is essential
 - *Pre & Post billing analysis*
 - *Participant & non-participant billing analysis*
 - *Whole house or Non-intrusive end-use metering*
- ◆ Samples with high confidence & precision
- ◆ California Protocols offer standard for M & V
- ◆ Market-based evaluation approaches.

Many Paths to Energy Efficiency

- ◆ Transmission Owners can design programs & recover costs in rate base.
- ◆ NYSERDA / SBC approach, scaled up to achieve the 15x15 goal.
- ◆ Efficiency Standards for appliances & buildings.
- ◆ Market-based ESCOs, price-responsive load aggregators & advanced metering.
- ◆ Renewable Portfolio Standard approach – offer incentives & let market deliver results.
- ◆ Market methods can *complement* traditional delivery & compensation mechanisms.



The New York Independent System Operator (NYISO) is a federally regulated, 501(c) 3 nonprofit corporation that began operations in 1999 to facilitate the restructuring of New York's electric industry. The NYISO operates the state's bulk electricity grid and administers the state's wholesale electricity markets. The NYISO's market volume was \$8.6 billion in 2006.

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