NYISO Generation Characteristics and Operation at Peak Load Periods

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Prepared for:
Ozone Transport Commission
HEDD Options Workgroup
January 11, 2006
Newark, NJ

Topics to Cover

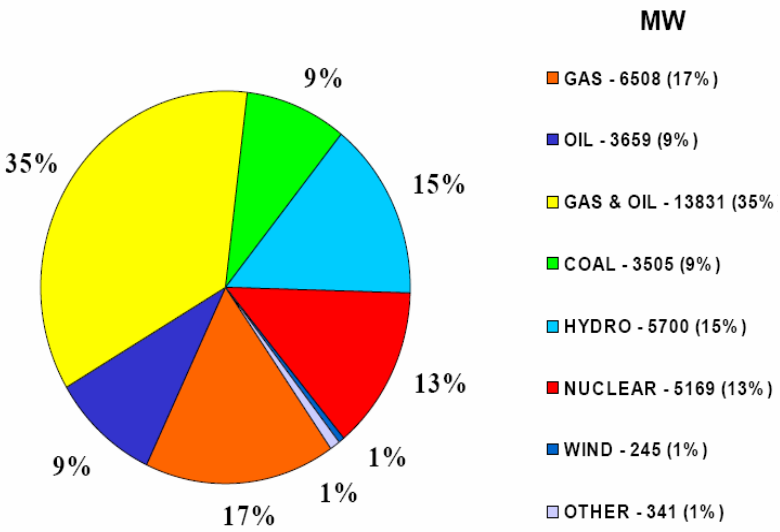
- Overview of the NYISO
- Characteristics of NY Generation
- NYISO Demand Response Programs
- NYISO Installed Capacity Market
- Performance During Aug. 2, 2006 Peak

Overview of the NYISO

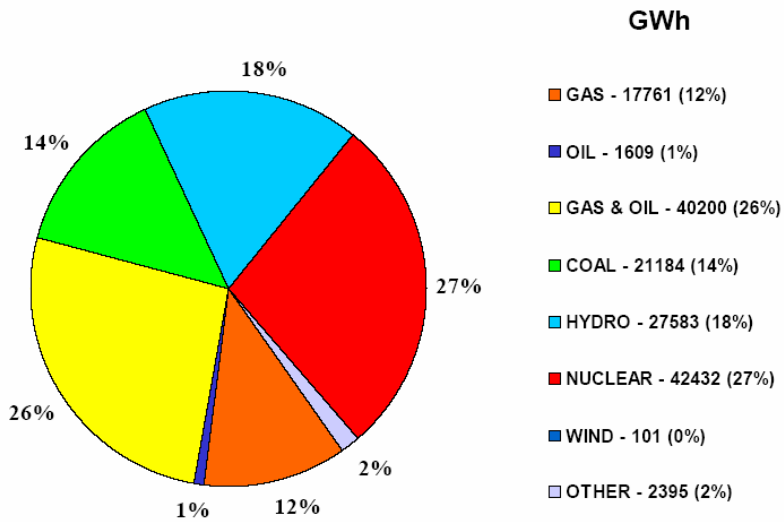
- NYISO formed December 1, 1999
- Independent board and management
- Highly divested and complex marketplace featuring co-optimization market clearing systems
- Most of the State's generation is independently owned
- NYISO market volume was $10.7 billion in 2005 and $41.1 billion since inception
- Unique challenge: New York City is world's biggest and most complex load pocket

NYISO Generation Mix

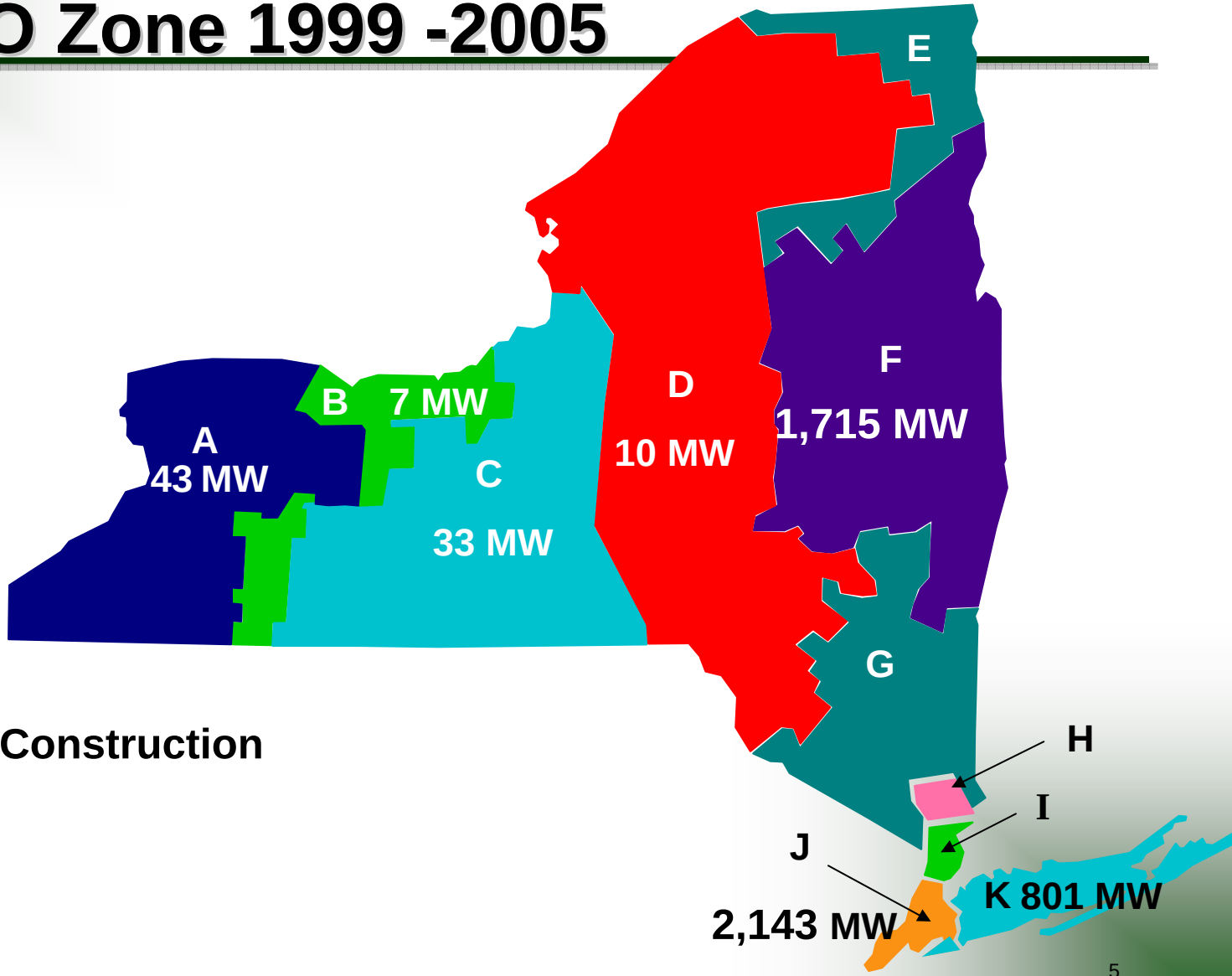
2006
NYCA CAPACITY BY FUEL TYPE



2005
NYCA GENERATION BY FUEL TYPE



Megawatts of New Generation* by NYISO Zone 1999 -2005



* Built or Under Construction

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NYISO Demand Response Programs

Demand Response Program Overview

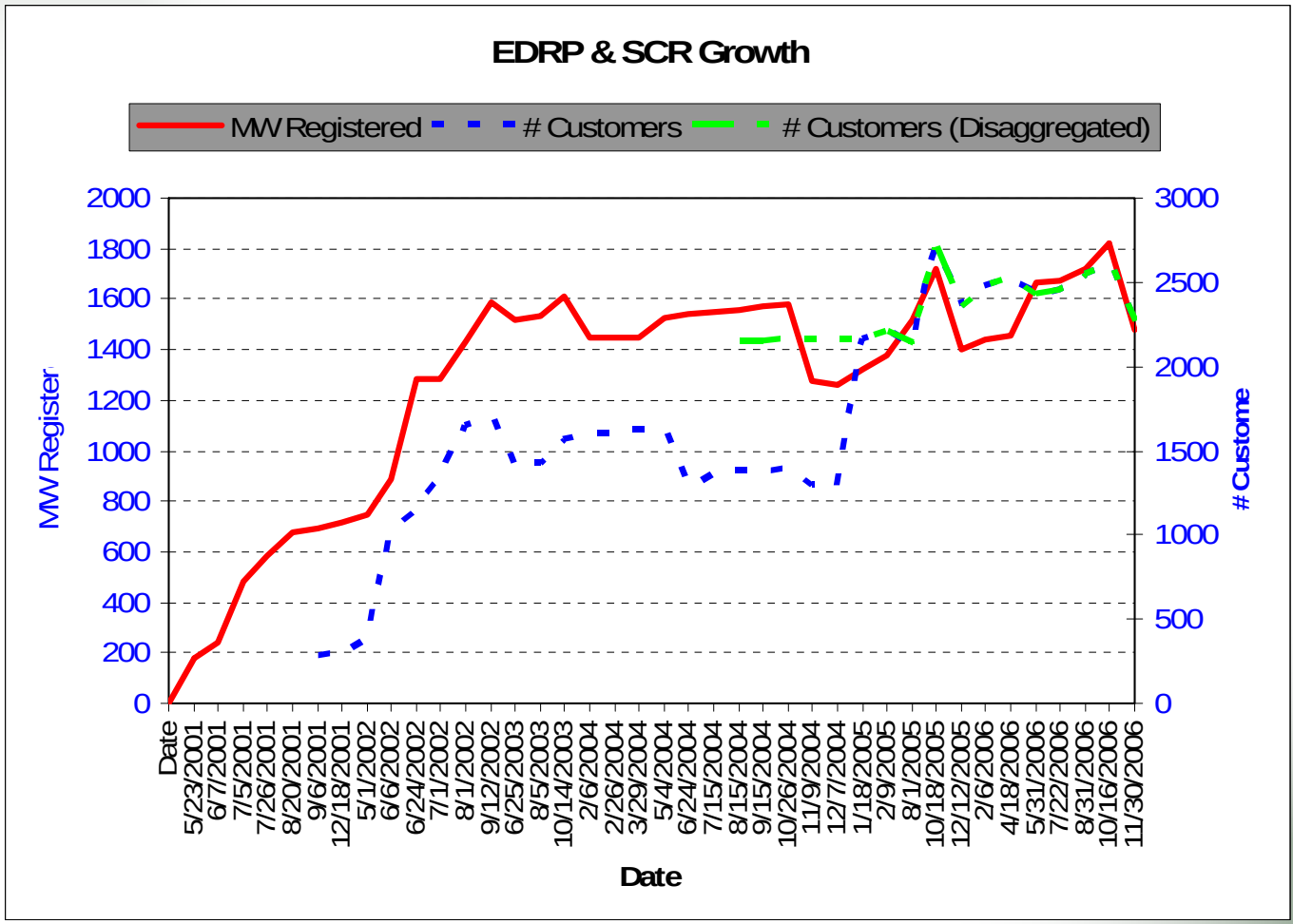
The NYISO operates two reliability-directed demand response programs:

- The Emergency Demand Response Program (EDRP):
  - *resources paid the greater of $500/MWh or the prevailing LBMP for curtailments*
  - *no consequences for enrolled participants that fail to curtail*
  - *minimum 100 kW requirement – can aggregate resources*

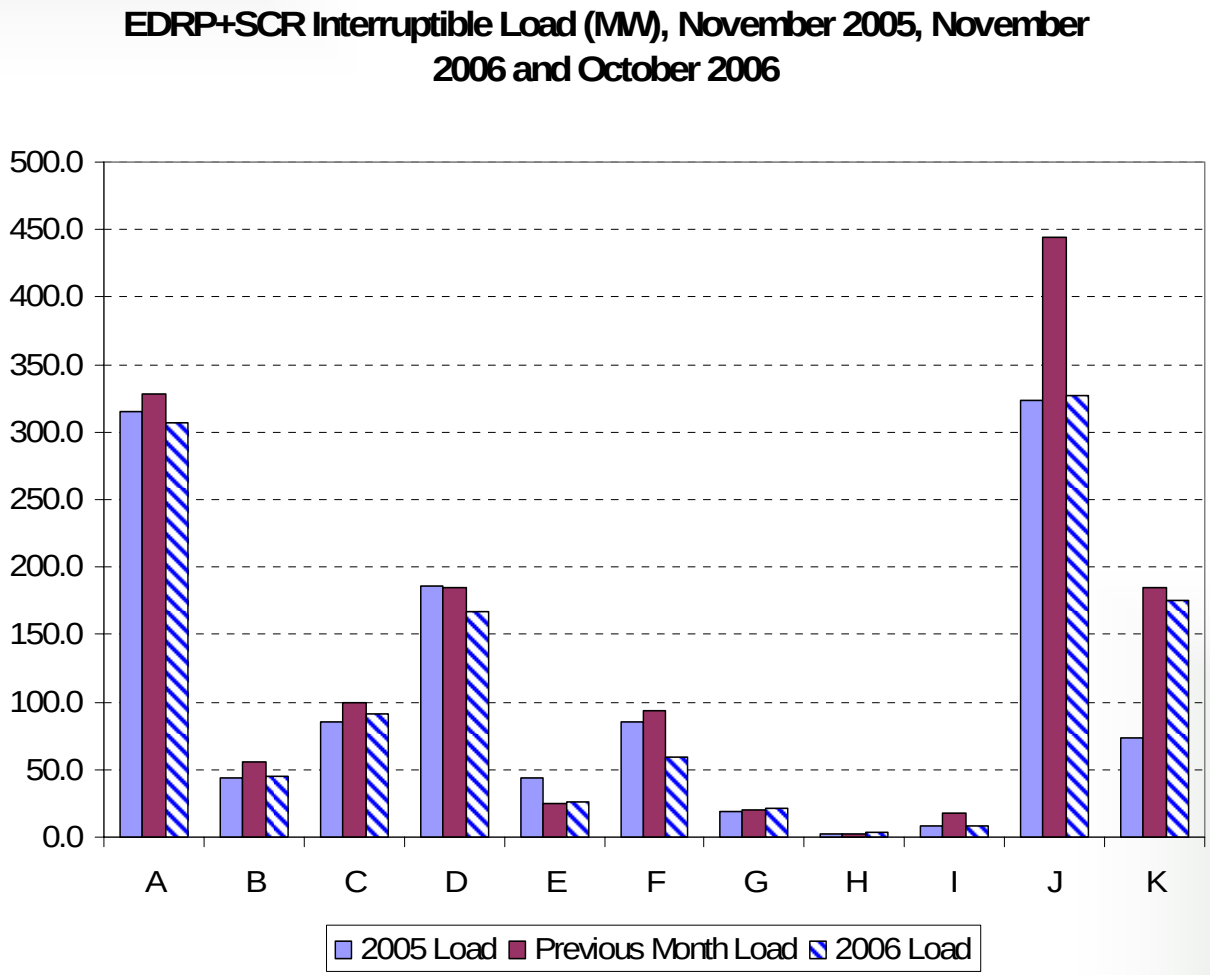
- The Installed Capacity Special Case Resources Program (SCR):
  - *certified resources can offer unforced capacity (UCAP) to Load Serving Entities (LSEs).*
  - *resources are obligated to curtail when called upon to do so with two or more hour's notice, provided that they were notified on the day prior*
  - *resources are subject to testing to verify that they can fulfill their curtailment requirement.*
  - *failure to curtail could result in penalties administered under the ICAP program.*

Participants register either for EDRP or ICAP/SCR but not both.

Historical Participation in EDRP & SCR Programs

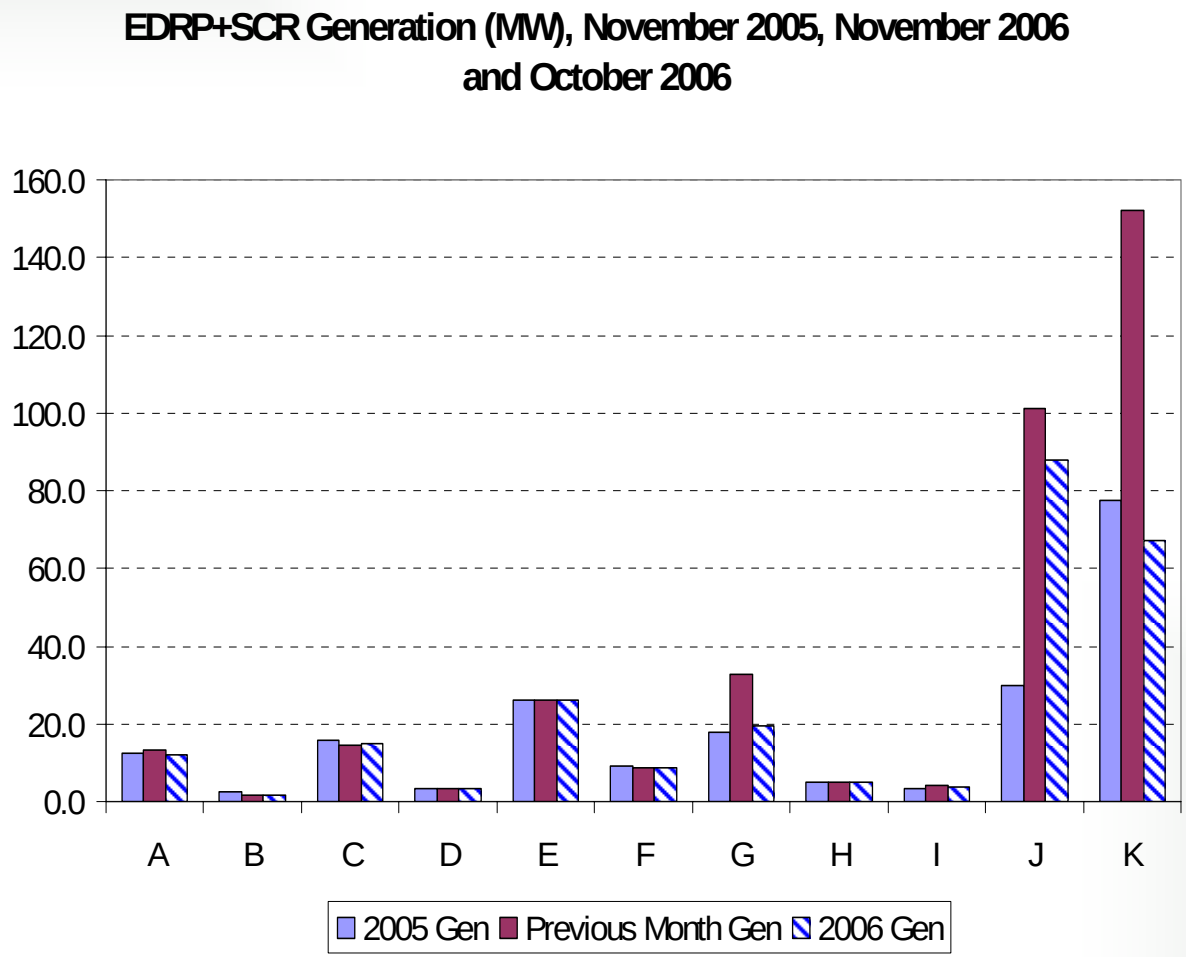


Interruptible Load Comparison



1230 MW of interruptible load registered as of November 2006

Generator Comparison



250 MW of distributed generation registered as of November 2006

Distributed Generator Rules Proposed by the NY DEC

- The NYS Dept. of Environmental Conservation (DEC) has drafted rules (Part 222.1) that address environmental restrictions on the use of emergency generators in demand response programs.
- Draft rules impose limits on MW registration in the NY metropolitan area (roughly Zones H-K) and elsewhere:

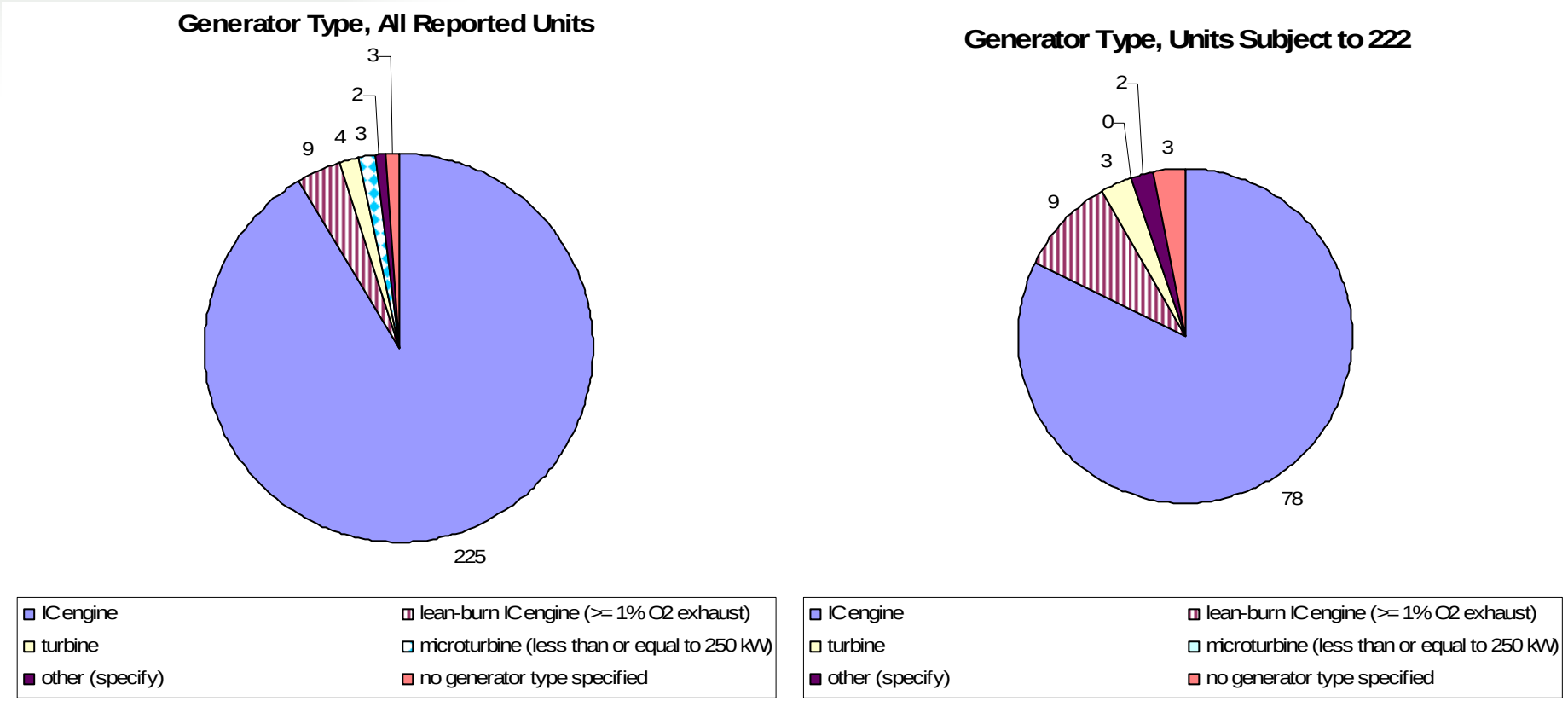
	NYCMA	Upstate
January 1, 2007:	*271.9 MW*	*111.4 MW*
January 1, 2011:	*150.0 MW*	*100.0 MW*
January 1, 2014:	*50.0 MW*	*50.0 MW*

- 30-hour annual limit on use within sponsor demand response programs (including NYISO, NYPA, LIPA and Con Ed)

Characteristics of DG in NY Demand Response Programs

- To better understand emergency generator participation in EDRP/SCR, the NYISO surveyed CSPs/RIPs in summer 2006
- 11 sponsoring organizations responded to survey (out of 36 registered)
- 246 sources reported
  - *96 sources surveyed are known to be generators in NYISO records (39%) – 57.8 MW of ICAP*
  - *150 sources surveyed are not listed as generators in NYISO records (61%) – 26.8 MW of ICAP*

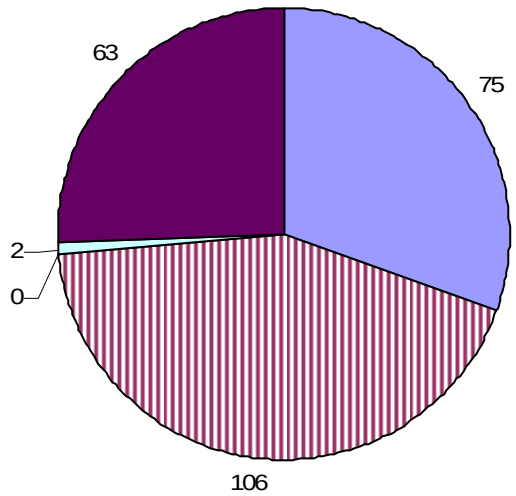
Generator Type

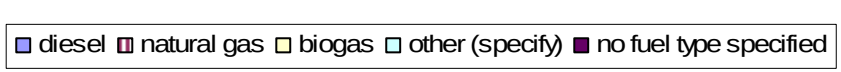


- Most smaller units are either IC engines or microturbines

Fuel Type

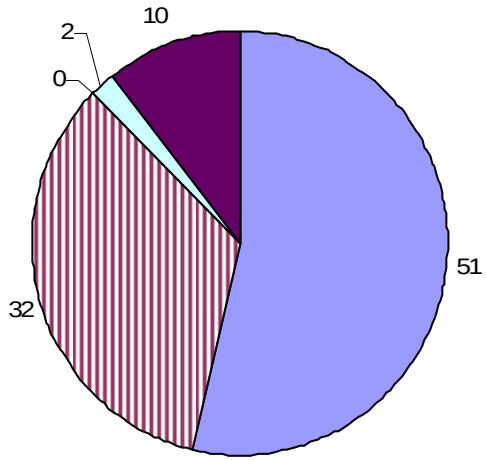
Fuel Type, All Reported Units

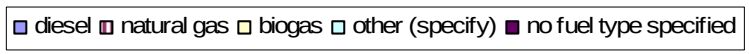




5 units regularly use low-sulfur fuel and are equipped with a particulate control device

Fuel Type, Units Subject to 222

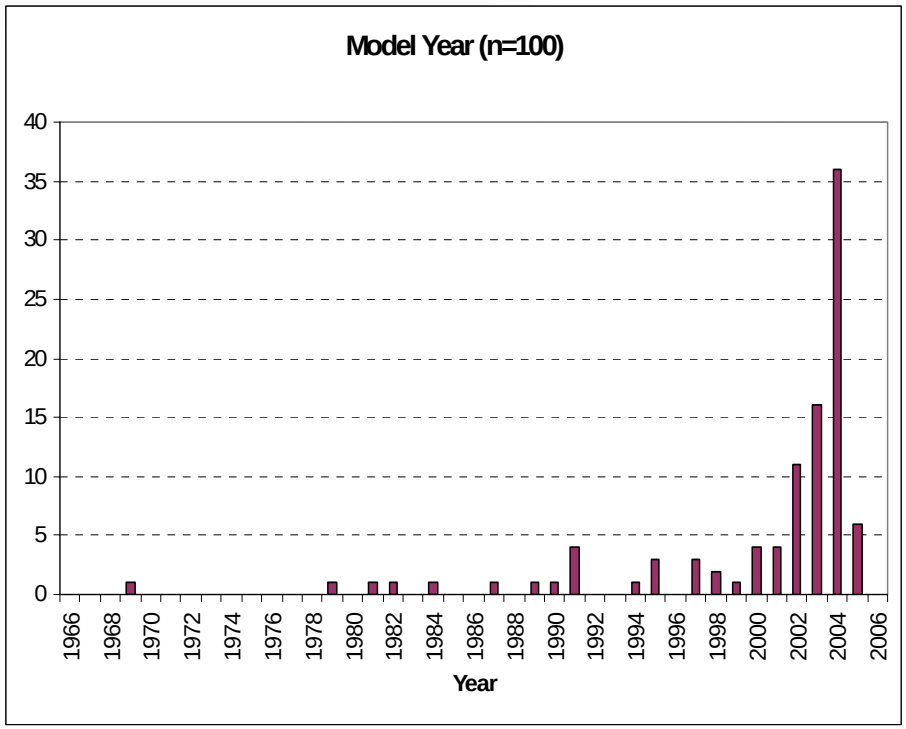


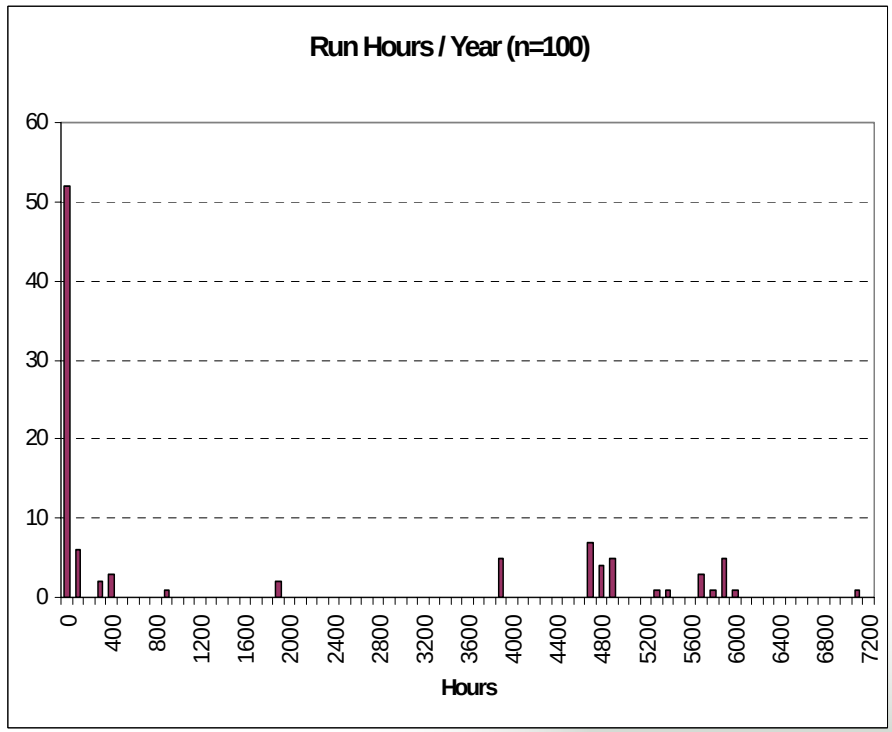


3 units regularly use low-sulfur fuel and are equipped with a particulate control device

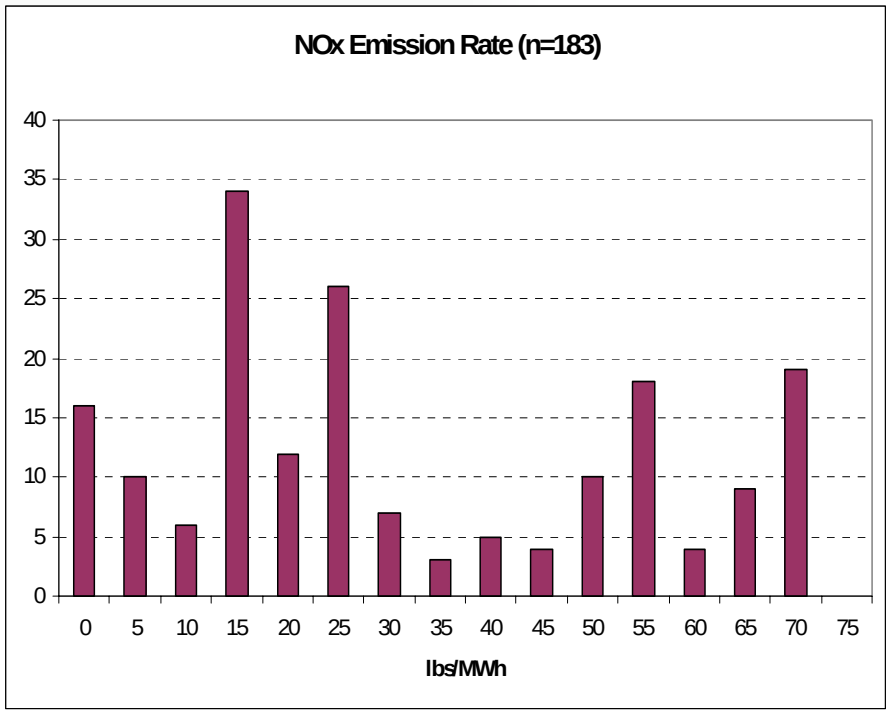
Predominant fuel for all reported units is natural gas; for units that would be subject to Part 222, predominant fuel is diesel

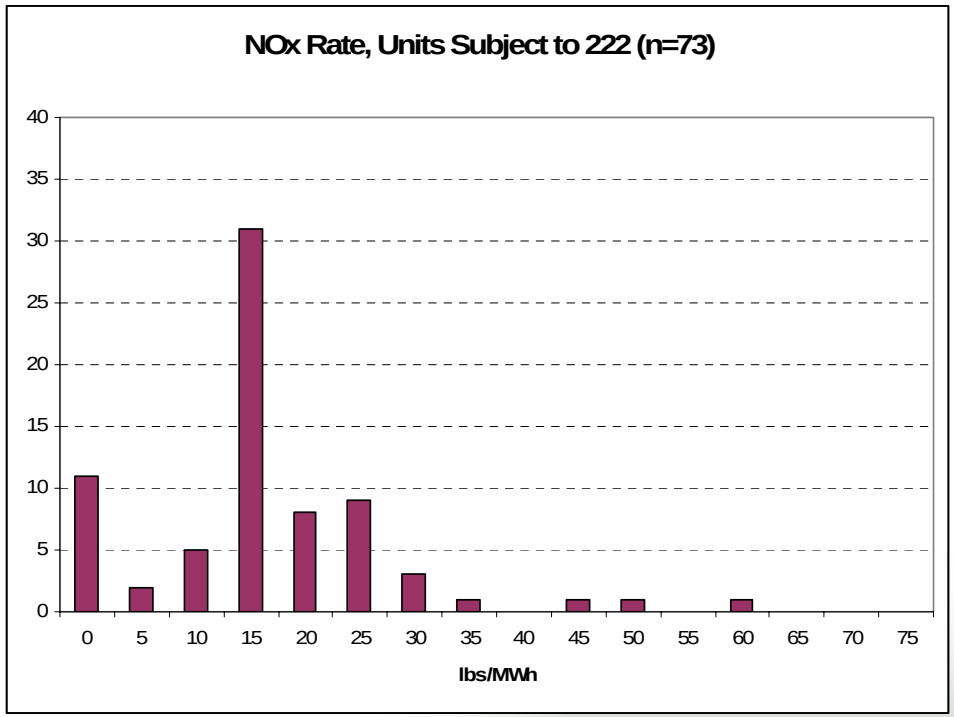
Model Year and Run Hours





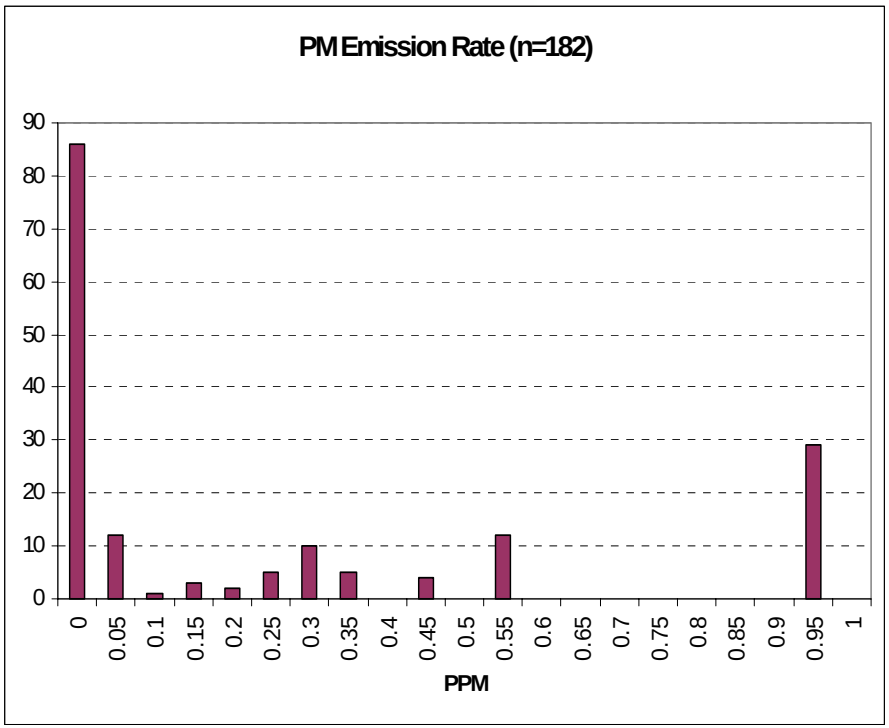
NOx Emissions Rate Survey Results

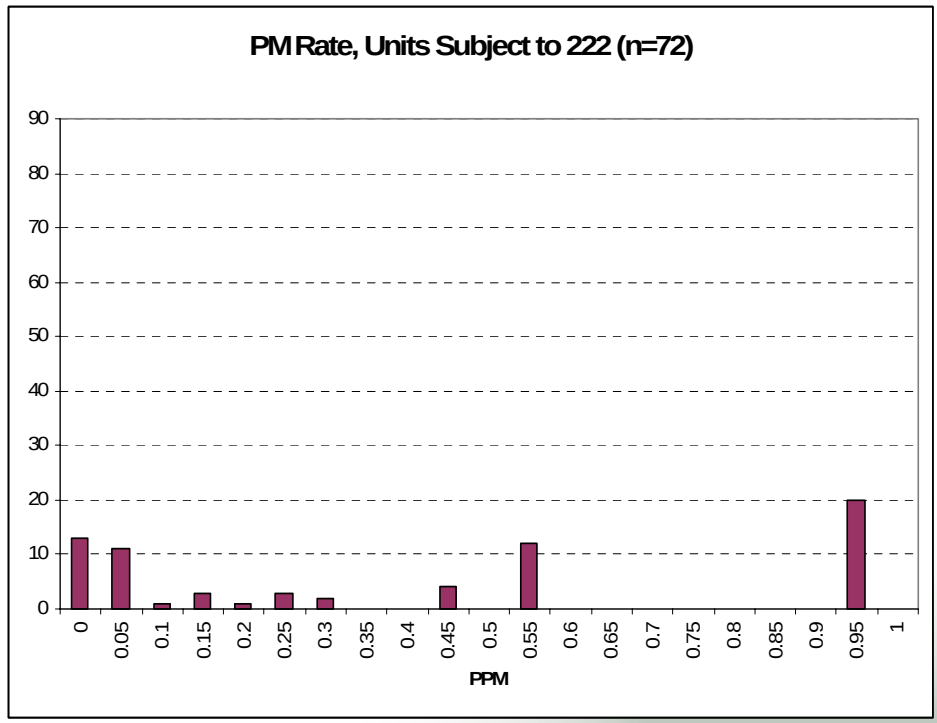




- Significant difference in mean values (34.7 lb/MWh for all units reported, 19.1 lb/MWh for units subject to Part 222)

PM Emissions Rate Survey Results





- Smaller, gas-fired units emit very little PM

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NYISO Installed Capacity Market

ICAP Markets in New York

- ICAP Requirements are set for the upcoming capability year
- Load serving entities can meet their ICAP requirements by:
  - *Self-Supply*
  - *Bilateral Transactions with Suppliers*
  - *Forward Auctions*
  - *Deficiency/Spot Market Auctions*
  - *After-the-fact penalty procurement*

Locational ICAP

- Due to transmission constraints into certain localities, areas or zones, some LSE's must procure at least some of their ICAP requirements from resources electrically located within that locality
  - *New York (NY) has had locational requirements since inception. There are two such transmission constrained zones:*
    - New York City and
    - Long Island

Demand Curve - NYISO Objectives

- Improve the traditional ICAP market
- Increase system reliability by valuing additional ICAP above the NYCA and Locational Requirements
- Reduce price volatility and send a more stable revenue signal for new resources
- Continue to ensure a competitive, fair, and non-discriminatory market for capacity in the NYCA

Demand Curve Spot Market Auction

- Replaced previous Deficiency Auctions
- Uses a Demand Curve as a proxy for LSE Bids
- The Demand Curves are based on the cost of new entry, with decreasing prices for ICAP above the NYCA or Locational Requirements
  - *Conversely, the Demand Curve increases prices/value for ICAP when resources are short of the NYCA or Locational Requirements*
- Resources have the opportunity to supply ICAP above the NYCA and/or Locational ICAP Requirements
  - *Reduces stranded capacity*

Current NY ICAP Initiatives

- If accepted by FERC, implement mitigation rules for NYC divested generators
- Update demand curve parameters
- Expand ICAP Automation software
- Investigate need for and approaches to a forward capacity market
- Reflect FERC's deliverability requirement in the ICAP market once the FERC accepts the NYISO proposal

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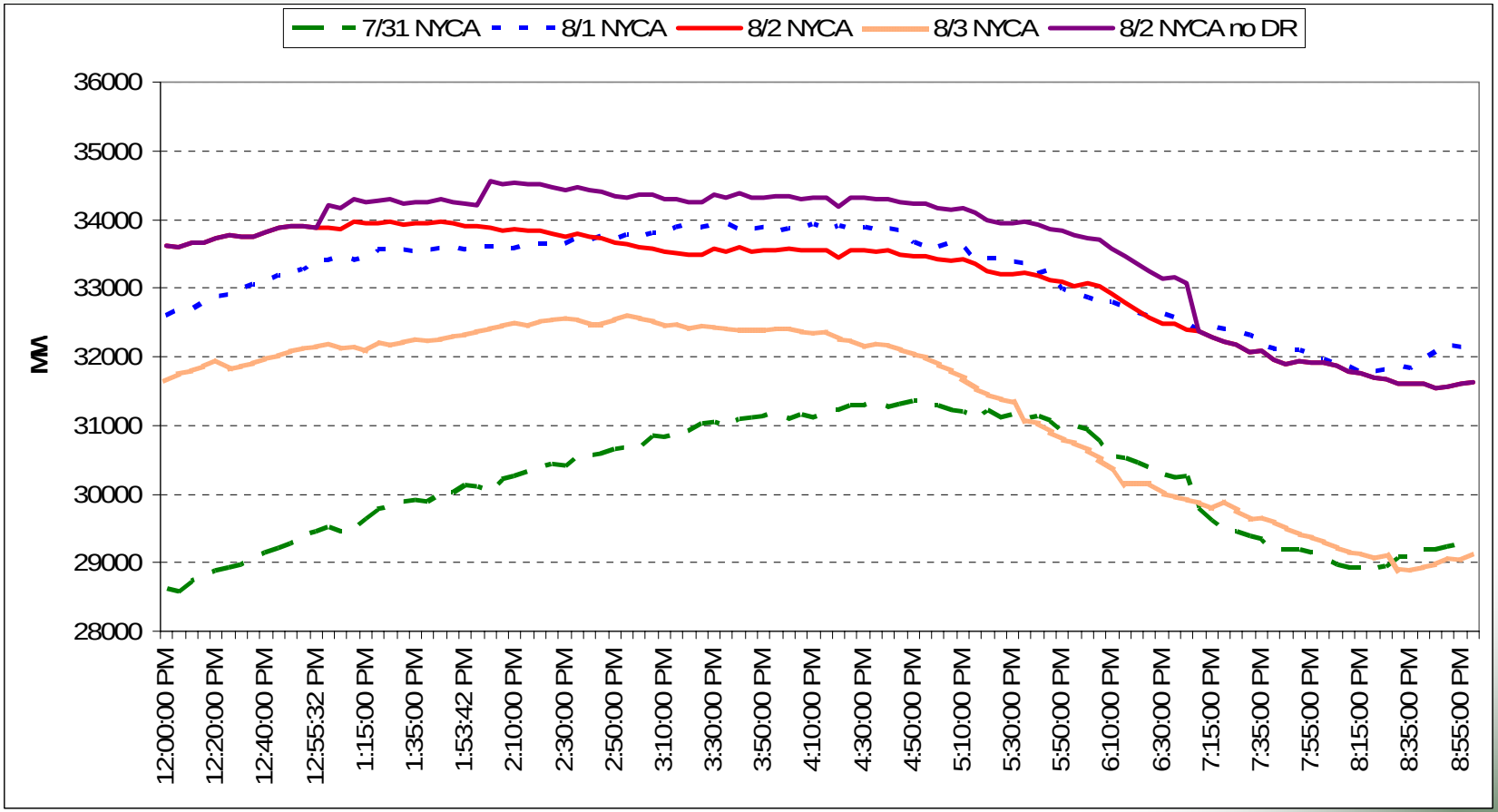
Performance During August 2, 2006 Peak

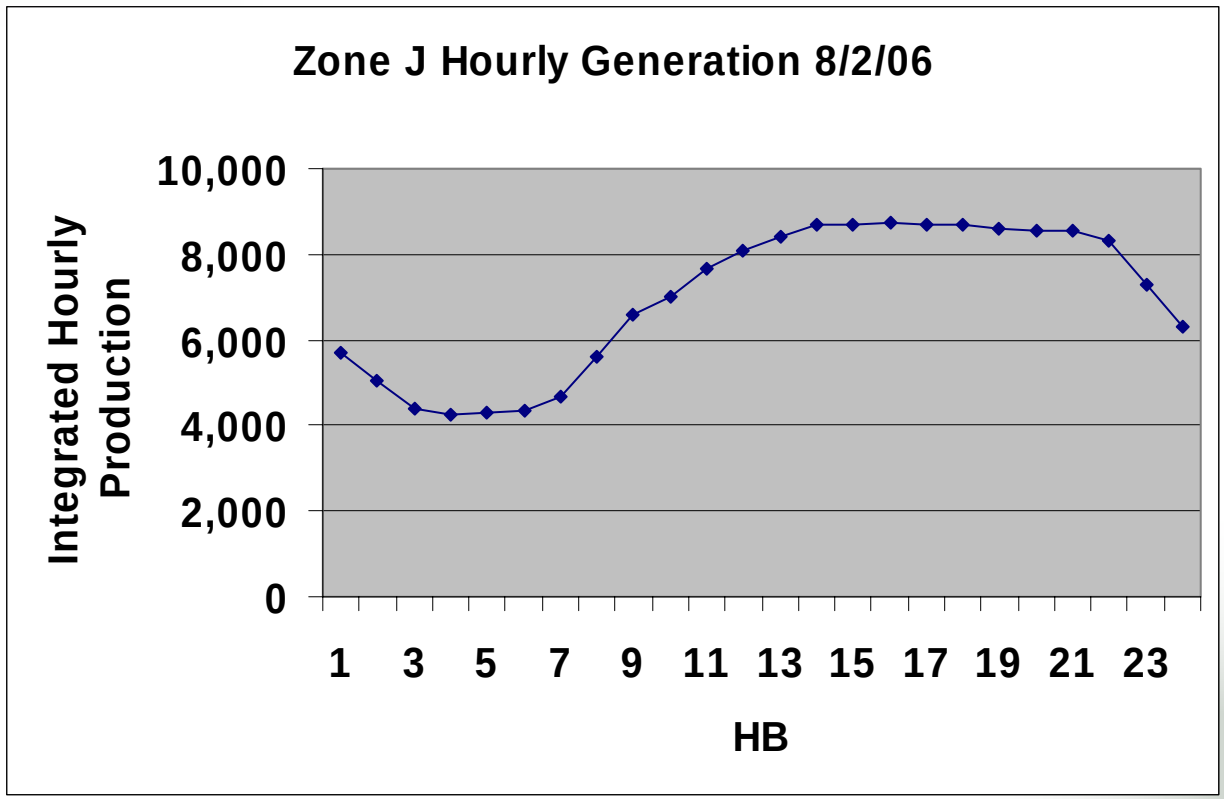
System Conditions

- EDRP and SCR resources were activated in Zones J&K from 1 pm to 7 pm, and Zones A, B &C from 2 pm to 7 pm.
  - *Zones J&K activated for the same reasons as 8/1; A,B &C for Western NY area voltages*
  - *Record Peak Load: 33,939MW*
  - *Fraser SVC and Leeds SVC taken out of normal for Oakdale and Ramapo voltage*
  - *1,300MW of Emergency Energy to ISO-NE in HB13, ISO-NE in 5% voltage reduction*
  - *Emergency Transfer Criteria on the 91 & 92 lines (Leeds-Pleasant Valley) to support SENY & PJM Transfers*
  - *Estimated performance by Zone:*
    - A – 328 MW (300 MW SCR, 28 MW EDRP)
    - B – 60 MW (59 MW SCR, 1 MW EDRP)
    - C – 94 MW (80 MW SCR, 14 MW EDRP)
    - J – 429 MW (334 MW SCR, 95 MW EDRP)
    - K – 261 MW (174 MW SCR, 87 MW EDRP)
    - Total – 1172 MW

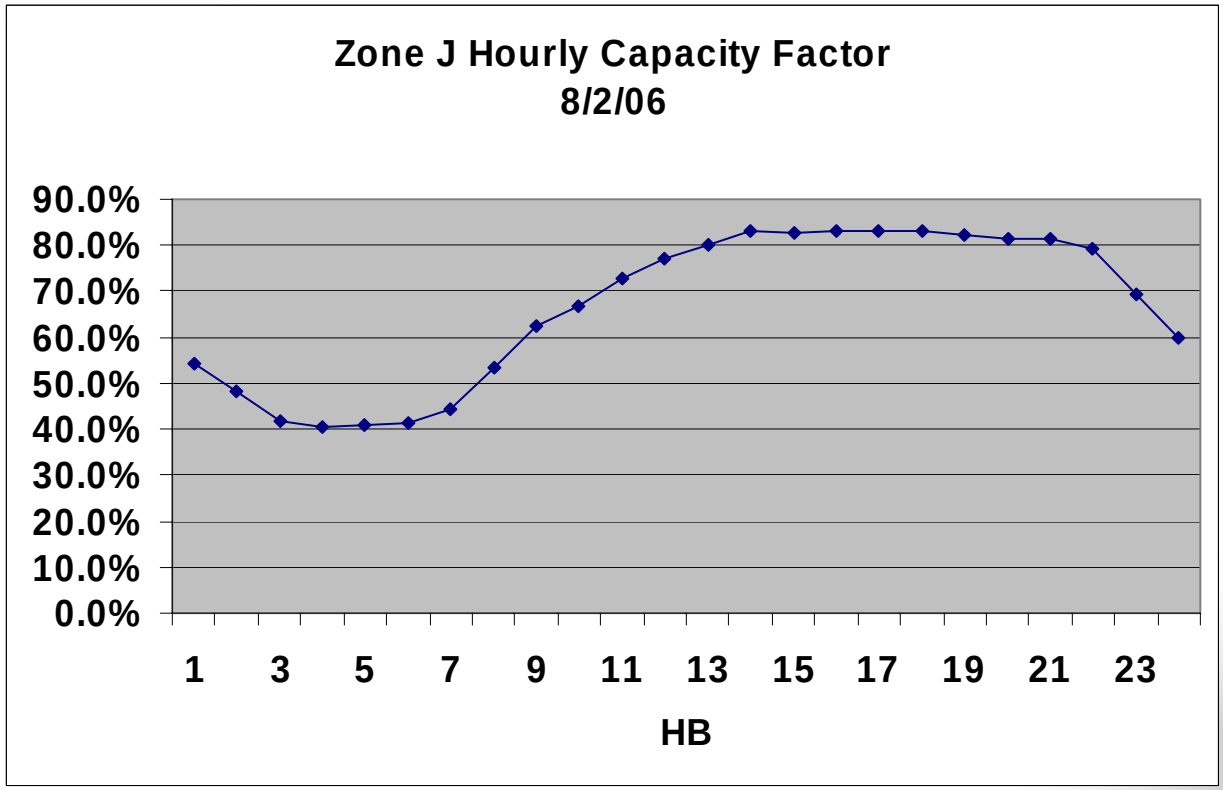
NY Control Area Load on 8/2/2006



Peak Day In-City Generation



Generation was at max output or standby



Steam Units provide the most cycling

Maximum Generation Hour

	MWH Generated	Hourly Capacity Factor
CT	2,030	77.1%
CC	2,006	72.0%
Steam	4,704	92.6%
Total	8,741	83.2%

Minimum Generation Hour

	MWH Generated	Hourly Capacity Factor
CT	806	30.6%
CC	2,099	75.5%
Steam	1,342	26.4%
Total	4,247	40.5%

Questions?

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