New York
Market Opportunities

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The Roles of the NYISO

Reliable operation of the bulk electricity grid
- Managing the flow of power over 11,000 circuit-miles of transmission lines from more than 350 generating units

Administration of open and competitive wholesale electricity markets
- Bringing together buyers and sellers of energy and related products and services

Planning for New York’s energy future
- Assessing needs over a 10-year horizon and evaluating projects proposed to meet those needs

Advancing the technological infrastructure of the electric system
- Developing and deploying information technology and tools to make the grid smarter
Topics

- Markets for Demand Response Products
- How the NYISO Uses Demand Response Today
- Evolving Integration of Demand Response
- Challenges
- NYISO Distributed Energy Resource Study and Workshop
Markets for Demand Response Products

- **Energy Markets**
  - Schedule and dispatch resources, including price-sensitive demand, economically to meet customer demand 24 hours per day, 365 days per year

- **Reserves & Regulation Market**
  - Keep sufficient resources, including responsive demand, available in ten or thirty minutes to maintain reliable operation
  - Provide regulation services comparable to generators

- **Capacity Market**
  - Assure enough resources, including demand that can be responsive, to assure resource adequacy
How NYISO Uses Demand Response Today

❖ To Maintain Reliability

  ▪ The NYISO directs Demand Side Resources to reduce load for a discrete period of time under emergency conditions on the grid

❖ To Enhance Market Efficiency

  ▪ Demand Side Resources compete economically with other supply resources to provide energy or operating reserves and regulation service

    ▪ For real-time services, requires continuous two-way communication between the NYISO and demand-side resource
Demand Response for Reliability

- During July 15-19 heat wave, a new, record peak load (33,956 MW) was set on July 19
- NYISO deployed DR in the downstate region every day of the heat wave
- NYISO deployed DR statewide on July 18-19 – providing an estimated 1,000+ MW of peak shaving
<table>
<thead>
<tr>
<th>Summer</th>
<th>Registered Resources (# &amp; MW)</th>
<th>Events</th>
<th>Average Hourly Response</th>
<th>Energy Payments</th>
<th>Average payment per MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>292 712 MW</td>
<td>23 hours Downstate 18 hours Upstate</td>
<td>361.2 MW</td>
<td>$4.2 Million</td>
<td>$502</td>
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<tr>
<td>2002</td>
<td>1,711 1,591 MW</td>
<td>22 hours Downstate 10 hours Upstate</td>
<td>319.5 MW</td>
<td>$3.3 Million</td>
<td>$500</td>
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<tr>
<td>2003</td>
<td>1,419 1,531 MW</td>
<td>22 hours Statewide (2003 NE blackout)</td>
<td>635.3 MW</td>
<td>$7.2 Million</td>
<td>$537</td>
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<tr>
<td>2004</td>
<td>2,030 1,570 MW</td>
<td>No events</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>2005</td>
<td>2,356 1,605 MW</td>
<td>4 hours East and Downstate</td>
<td>207.5 MW</td>
<td>$0.8 Million</td>
<td>$976</td>
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<tr>
<td>2006</td>
<td>2,575 1,720 MW</td>
<td>35 hours Downstate 5 hours Upstate</td>
<td>357.8 MW</td>
<td>$8.5 Million</td>
<td>$678</td>
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<td>2007</td>
<td>2,705 1,802 MW</td>
<td>20 hours Downstate in TDRP events only</td>
<td>10.91 MW</td>
<td>$0.11 Million</td>
<td>$500</td>
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<td>2008</td>
<td>3,711 2,108 MW</td>
<td>No events</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>2009</td>
<td>4,067 2,384 MW</td>
<td>No events</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>2010</td>
<td>4,386 2,498 MW</td>
<td>31 hours Downstate: 19 hours TDRP, plus 12 hours ICAP/SCR &amp; EDRP</td>
<td>1.85 MW (TDRP)</td>
<td>$1.09 Million</td>
<td>$500</td>
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<td></td>
<td></td>
<td></td>
<td>178.1 MW (ICAP/SCR &amp; EDRP Energy)</td>
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<td>2011</td>
<td>5,807 2,173 MW</td>
<td>11 hours Downstate 5 hours Upstate</td>
<td>7/21/11: 414.2 MW 7/22/11: 1065.2 MW</td>
<td>$3.8 Million</td>
<td>$500</td>
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<tr>
<td>2012</td>
<td>5,032 1,888.2 MW</td>
<td>39 hours Downstate: including 9 hours TDRP, 30 hours ICAP/SCR &amp; EDRP, 20 hours Upstate ICAP/SCR &amp; EDRP</td>
<td>3.6 MW (TDRP)</td>
<td>$5.9 Million</td>
<td>$514</td>
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<td></td>
<td>1195.8 MW (June 21, 2012 Statewide ICAP/SCR &amp; EDRP)</td>
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</table>
Evolving Integration of Demand Response

- NYISO DR programs have been developed incrementally over time to provide specific market products -- Program rules restrict joint participation in multiple markets

- Dispatchable DR
  - Will provide flexibility for demand response resources to offer and be scheduled in energy and ancillary services markets, as qualified, and participate as a capacity resource
  - Will provide NYISO with the ability to use demand response resources participating in its real-time markets via resource-specific dispatch instructions
Dispatchable DR Concept

Program participation is mutually exclusive

A demand response resource may enroll as a Dispatchable DR or as one of the types of Reliability DR
Challenges

- Baseline Methodology
- Measurement & Verification
- Duration of Load reduction obligation increasing
- Visibility and control of behind-the-meter supply sources for real-time services
NYISO Distributed Energy Resource (DER) Study

- Emphasis on data gathering
- The report will identify factual information about DERs and will not make recommendations on market design or policy
- The NYISO’s intention is to use the final report as a predicate to discussing with its stakeholders potential new market rules and business practices for the treatment of DERs
Distributed Energy Resource Study and Workshop

- Key areas of interest to the NYISO
  - *Behind-the-Meter Applications and Customer Motivations*
  - *State of DERs*
  - *Retail Rates, Regulations and Incentives*
  - *Analysis of ISO/RTO Treatment of DERs*

- Workshop date
  - *December 13, 2013 – NYISO Corporate Center - Rensselaer*

- Format
  - *Panel discussions arranged around the key components of the study effort*
Markets & System Operations 2017 - Broader Broader Regional Markets, Gas-Electric Coordination, Smart Grid – System Visualization & Security

Gas Distribution Companies

Electric System Status

Coordinate Operations & Practices

Operational Flow Orders

Gas Pipelines

NYISO Control Center

PMU Data

Demand - Smarter

Characteristics

- On-site generation
  - Fuel cell
  - PV cells
- Storage
  - Thermal storage
- Participates in DR Programs
- Price Sensitive

Challenges

- Load Forecasting
- Price-driven grid instability
Markets & System Operations 2017 - Deeper
DR, PV, PEV aggregation and Wind/Solar integration
The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.

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