Gas & Electric Coordination: The Need for Information Sharing

Kelli Joseph, Ph.D.
Gas & Electric Analyst
New York Independent System Operator

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What drives the need for information sharing?

1. Differences in market timing between the gas and electric sectors
   - *Electric*: Bidding and price/quantity uncertainty
   - *Gas*: Nomination and quantity uncertainty

2. The market structure of the gas system
   - *Long-term natural gas transportation contracts for local gas distribution companies (LDCs) play an important role in pipeline financing.*

3. The physical reality of the way gas moves through the pipeline system
   - *Pressure balancing drives pipeline system flexibility*
Natural Gas & Power Generation

- Low natural gas prices have led to an increase in natural gas-fired generation
- Gas-fired generation matched coal-fired generation for the first time last year
- The electric sector now represents the largest natural gas consuming sector
New York State Gas Demand

- Average NYS gas demand: 3.3 Bcf/day
- Average Electric Demand: 1.4 Bcf/day
- Electric sector gas use up 30% since 2008

Source: EIA Natural Gas Consumption by End Use
Statewide Fuel Mix

Natural Gas & Dual Fuel (Gas & Oil) total 53% of statewide capacity

Downstate Fuel Mix

New York City

- Gas: 23%
- Oil: 5%
- Gas & Oil: 72%

Long Island

- Gas: 16%
- Oil: 21%
- Gas & Oil: 60%
- Renewables: 3%

Proposed Additions

Natural gas projects account for nearly 70% of all proposed new capacity.
Differences in Market Timing

- **Gas Day**: 10 a.m. – 10 a.m. (ET)
- **Electric Day**: 12:00 a.m. – 12:00 a.m.
- **NYISO**
  - *Day-Ahead bids*: 5 a.m.
  - *Day-Ahead scheduled posted*: 11 a.m.
- Bid without knowing the *price* of gas
- *Nominate* gas prior to receiving a firm operating commitment
Differences in Market Timing

8-9 a.m.
Purchase and Nominate Gas for Electric Day 2

12 a.m.
Electric Day 1

5 a.m.
Submit Bids for Electric Day 2

11 a.m.
NYISO DA Schedule Posted for Electric Day 2

10 a.m. (ET)

Typical Summer Load

Typical Winter Load

Gas Day 1

Gas Day 2
Market Structure of Gas System

- The gas pipeline system – as it exists today – was not designed to serve a mostly gas-fired electric system
- Local gas distribution companies (LDCs) buy long-term firm transportation contracts
- Additional pipeline capacity?
  - *Pipelines cannot charge existing customer base*
  - *Must demonstrate in the public interest: Typically through long-term FT contracts*
Market Structure of Gas System

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Generators in competitive wholesale markets have little incentive to purchase long-term primary firm transportation contracts

- Fixed monthly charge to reserve pipeline capacity
- Bid incremental variable costs
Physical Gas Flow

- Line pack, compressor stations, gas injections, gas storage
- Flexibility in balancing agreements
  - Overtake
  - Undertake
- Flexibility on timing of gas taken
  - Non-ratable takes
Physical Gas Flow

- Restrictions on flexibility:
  - System Alert
  - Ratable Takes
  - Operational Flow Order (OFO)
- “Over-nominations” managed by priority
Potential Reliability Concerns

- Day-Ahead assumptions versus Real-Time System Conditions
  - *More or less load than expected*
  - *Transmission line outage*
  - *Generator Trip*

- Requires system operator actions to ensure contingencies do not impact system reliability
Potential Reliability Concerns

- Timing differences make it difficult for generators to nominate with certainty
  - *Day-ahead schedules posted after schedule gas.*
  - *Nominations are not easily made on peak usage days, holidays, overnight, early morning.*

- Depending on:
  - *How much gas a generator nominated*
  - *How much gas a generator already burned*
  - *Pipeline system conditions at the time*

- In addition to creating headaches for pipeline system operators – a generator may or may not be able to respond to real-time dispatch signal – potentially putting electric system reliability at risk
Different types of Gas Generators

- Directly connected
- Behind the city-gate
  - *For example: NYC and Long Island*
  - *New York Facilities System (Con Ed and National Grid)*
- Even with primary firm on the interstate, generators behind the city-gate run the risk of being interrupted when the LDC pipeline system is stressed
What kind of information is needed?

- Day Ahead and Real-Time electric scheduling assume fuel availability
  - Changes in real-time system conditions may require generators to be dispatched outside of the day-ahead schedule
- Actions taken by system operators to maintain reliability are an attempt to prevent an emergency situation
- Communication/Coordination between pipelines, LDCs, gas-fired generators, and system operators
Information Needed/ Possible Procedures

- Two types of system conditions that would require coordination:
  - *Day-to-Day dispatch changes*
  - *Emergency – as defined by either system*

- The type of communication required could differ

- Who is actually doing the communicating could differ
Information Needed/ Possible Procedures

- **FERC Order 698**
  - Allows pipelines to request hourly burn profiles from directly-connected generators
  - Allows ISO/RTOs to request information regarding service levels for gas transportation and for gas supply
Information Needed/Possible Procedures

- **Day-to-Day:**
  - Generators already manage their fuel requirements: Including nomination restrictions, pipeline maintenance/outage impacts
  - Generators already notify the NYISO of any limitations (derates)

- LDCs could also request hourly burn profiles
- Generators could modify their profiles throughout the day
- Notification could include detail on how Generators and Pipelines/LDCs can manage the imbalance, if it can be managed
During specific system conditions (e.g. Anticipated Extreme Cold Weather, etc.) it could be helpful for the NYISO to know next-hour fuel capability of generators:

- How much gas nominated
- How much gas already burned
- How much alternate fuel available
- Alternate fuel on-site and time to re-fuel
Information Needed/ Possible Procedures

- Emergency – as defined by either system
- Specific procedures already in place
  - *If a generator is identified as being critical to maintaining reliability, communicate with pipelines/LDCs to determine if capacity to transport gas*
  - *Even in this case – however – gas may not be available*
- Pipelines have responsibility to serve primary firm transportation holders
- LDCs have requirement to serve their “human needs” customers
  - *Generators often do not fall into either category.*
Implications of Information Sharing

- What if a generator has overtaken gas from the pipeline, but is certain they can work around any imbalances?
  - At what point do pipeline operators notify system operators that a generator’s actions cannot be accommodated?
Implications of Information Sharing

- What if a generator is assuring the ISO/RTO they will have gas, yet the pipeline or LDC is anticipating that they cannot handle the current imbalance, and has notified the system operator?
  - Perhaps the generator is working with a marketer to schedule gas, but has not yet placed the nomination, so the pipeline or LDC is unaware that the expected imbalance may not occur.

- What happens when the anticipated reliability concern does not occur, but generator profits were impacted because of ISO/RTO or pipeline actions?
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.

www.nyiso.com
APPENDIX
New York State Gas Demand 2012

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<th>Winter</th>
<th>Summer</th>
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<tr>
<td>Generator</td>
<td>29%</td>
<td>61%</td>
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<td>39%</td>
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<table>
<thead>
<tr>
<th>Total (Bcf)</th>
<th>Winter</th>
<th>Summer</th>
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<tbody>
<tr>
<td>Generator</td>
<td>6.9</td>
<td>9.9</td>
</tr>
<tr>
<td>Residential/Commercial/Industrial</td>
<td>17.0</td>
<td>6.5</td>
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</tbody>
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NAESB WGQ Nomination and Scheduling Standards and Procedures (EST)

- **Day-Ahead**
  - *Timely Nomination Cycle:* 12:30 p.m.
  - *Evening Nomination Cycle:* 7:00 p.m.

- **Gas Day**
  - *Intraday 1 (ID1) Cycle:* 11:00 a.m.
  - *Intraday 2 (ID2) Cycle:* 6:00 p.m.
NAESB WGQ Nomination and Scheduling Standards and Procedures

- Scheduling Priorities:
  - Primary Firm
  - Secondary Firm
  - Interruptible
  - Other
    - Authorized Overrun
    - Imbalance