PJM Gas Electric Senior Task Force
Gas-Electric Issues

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Outline

- FERC regulatory highlights
- Gas-Electric Day Scheduling
- Enhanced Natural Gas Pipeline Flexibility
- Capacity Release
- Latest Natural Gas Dynamics
# U.S. Natural Gas Industry at a Glance

<table>
<thead>
<tr>
<th>Participants</th>
<th>Miles of Pipe</th>
<th>Regulatory Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Producers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,000 Independents</td>
<td></td>
<td>Unregulated prices</td>
</tr>
<tr>
<td>24 Majors</td>
<td></td>
<td></td>
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<tr>
<td><strong>Pipelines</strong></td>
<td>210</td>
<td>305,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interstate - FERC*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrastate - State Commissions</td>
</tr>
<tr>
<td><strong>Natural Gas Marketers</strong></td>
<td>260</td>
<td>Unregulated</td>
</tr>
<tr>
<td><strong>Underground Storage</strong></td>
<td>120</td>
<td>560 fields</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interstate - FERC*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrastate - State Commissions</td>
</tr>
<tr>
<td><strong>Local Gas Utilities</strong></td>
<td>1500</td>
<td>1,139,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>State Commissions</td>
</tr>
<tr>
<td><strong>End Users</strong></td>
<td>Residential 61 million</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Commercial 5 million</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial 200 thousand</td>
<td></td>
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<tr>
<td></td>
<td>Electric Utilities 500</td>
<td></td>
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<tr>
<td></td>
<td>Unregulated</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Dept. of Energy, Energy Information Administration, AGA*
Certificate Policy
PL99-3-000

• New Certificate Policy Statement issued on September 15, 1999
• Clarification of Certificate Policy Statement issued on February 9, 2000
• Clarification issued on July 26, 2000
• Policy applied to facts of each case
• GOALS:
  – Foster Competition
  – Consider Captive Customers
  – Avoid Unnecessary Physical Impacts
  – Achieve Optimal Amount of Facilities
  – Encourage Complete Record
  – Expedite Review Time
Discounted Rates

- Order No. 436 (1985) allowed pipelines to maximize throughput by offering discounts to specific shippers when necessary to retain or attract business.
- Pipelines can discount cost-based rates in competitive markets to meet gas-on-gas and/or alternative fuel competition.
- Discounts must be made to all similarly-situated shippers.
- If using SFV rate design, pipelines can discount rate between (fully-allocated) maximum rate and (variable costs) minimum rate.
- Fuel usage is example of variable costs.
- Pipelines cannot discount below variable costs; concerns about anti-competitive predatory pricing, cross-subsidization, social waste.
- Discounting has been prevalent in certain regions of the U.S.
NAESB Nominations Timelines

<table>
<thead>
<tr>
<th>Nomination Deadline for Shippers</th>
<th>Point Operator Confirmation Deadline</th>
<th>Receipt of Final Scheduled Quantities by Shippers &amp; Point Operators</th>
<th>Effective Start Time for Gas Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 a.m. CCT Timely</td>
<td>3:30 p.m. CCT</td>
<td>4:30 p.m. CCT</td>
<td>9:00 a.m. CCT on the next gas day</td>
</tr>
<tr>
<td>6:00 p.m. CCT Evening</td>
<td>9:00 p.m. CCT</td>
<td>10:00 p.m. CCT</td>
<td>9:00 a.m. CCT on the next gas day</td>
</tr>
<tr>
<td>10:00 a.m. CCT Intraday 1</td>
<td>1:00 p.m. CCT</td>
<td>2:00 p.m. CCT</td>
<td>5:00 p.m. CCT on the same gas day</td>
</tr>
<tr>
<td>5:00 p.m. CCT Intraday 2</td>
<td>8:00 p.m. CCT</td>
<td>9:00 p.m. CCT</td>
<td>9:00 p.m. CCT on the same gas day</td>
</tr>
</tbody>
</table>
Services Vary by Regional Need

Example of Transportation Services

- Firm Transportation Service
- No-Notice Firm Transportation Service
- Firm Transportation Backhaul
- Small Customer Firm Transportation Service
- Small Customer No-Notice Firm Transportation Service
- Negotiated
- Lateral Specific
- Interruptible Transportation Service
- Load Management
- Park and Loan Service
- Title Transfer Tracking Service
- Storage
Coordinating Gas-Electric Scheduling

- Gas Day begins at 9 AM CCT (10 AM EST)
- No standard electric day
- Gas-fired generators are often required to acquire gas without knowing if they will be dispatched
- Some gas-fired generators often exhaust their gas entitlements before the end of the operating day
  - Pipeline balancing requirements sometimes limit generation often during ramp periods
- Cross-Industry stakeholders continue to express that the lack of synchronization between the timing of day-ahead electric commitments and the scheduling timeline for natural gas transportation is a problem
Varying Demand Profiles

Overlay of Gas Electric Scheduling
Central Time

Electric Transmission Markets
Organized (i.e. RTO) Markets
Gas Scheduling

Day Ahead

Operating Day

Start of existing Gas Day

Reserve & Schedule transmission service

Prior Gas Day

Current Gas Day

Electric load by time zone (normalized)

Source: INGAA, FERC staff, Ventyx.
Industry Reaction to Adjusting Gas-Electric Scheduling

• Benefits
  – Could improve nomination efficiency
  – Could allow market participants to better align fuel arrangements and pipeline delivery commitments
  – Gas pipelines generally receptive to adjusting the natural gas transportation Timely Nomination Cycle suggesting little operational impact

• Difficulties
  – Misalignment of gas-electric days
  – Less accurate scheduling could result due to stale weather and real-time load forecasts
  – No clear consensus for the adjustment of electric and natural gas days
• Additional intraday nomination cycles on top of the existing four opportunities – not uniform so benefits are limited when trading across pipelines occurs
• Generally industry participants suggest that additional cycles provide opportunities to respond to real-time changes in electric load
• Spectra also suggested that the majority of its natural gas capacity continues to be scheduled during the Timely Nomination Cycle
## Pipelines Adding Flexibility

<table>
<thead>
<tr>
<th>Region</th>
<th>Pipeline</th>
<th>Capacity/Initiative</th>
<th>Docket No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>Trailblazer Pipeline</td>
<td>Additional nomination opportunities</td>
<td>RP13-240</td>
</tr>
<tr>
<td>Gulf Coast/ Southeast</td>
<td>Gulf South Pipeline</td>
<td>Optional enhanced nomination service offering 8 additional cycles</td>
<td>RP13-294</td>
</tr>
<tr>
<td>Gulf Coast/ Southeast</td>
<td>Florida Gas Transmission</td>
<td>A third intraday nomination cycle</td>
<td>RP13-203</td>
</tr>
<tr>
<td>West</td>
<td>Transwestern Pipeline</td>
<td>Framing system balancing and operational issues</td>
<td>RP13-404</td>
</tr>
<tr>
<td>Southeast</td>
<td>East Tennessee Natural Gas</td>
<td>Additional Nomination opportunities</td>
<td>RP13-676</td>
</tr>
</tbody>
</table>

Source: FERC filings.
Industry Reaction to Adjusting Pipeline Nominations

• **Benefits**
  – At conferences generators expressed support - would allow them to reschedule gas for the morning electricity market ramp
  – Pipelines generally not opposed to this

• **Difficulties**
  – Regional differences in current nomination cycles
  – Regional differences in requested number of nomination cycles
  – Which cycles can be “bumpable”?
Increasing Pipeline Flexibility-Capacity Release

- Current pipeline capacity release program is designed to permit expeditious and flexible releases, in a transparent and not unduly discriminatory manner, to the shipper placing the highest value on the capacity.

- Order No. 636, the Commission permitted firm shippers to enter into a pre-arranged release with a specific replacement shipper:
  - exempted prearranged releases from bidding if they were (1) releases of 31 days or less, because bidding would be administratively difficult or (2) at the maximum rate, so that no other shipper could beat the prearranged deal.

- Order No. 712 created two additional bidding exemptions:
  - asset manager arrangement (AMA) or under state-approved retail access programs.
Expanding Capacity Release

- Conference participants indicated that expanding the types of capacity releases that could be pre-arranged without bidding would be beneficial.
- For example, an LDC could agree to release its capacity to a gas-fired generator in times of electric reliability events based on a determination that the gas-fired generator’s greatest need for gas generally occurred at times when the LDC had less need for gas.
  - In this circumstance, the counter-party to the transaction is important to both the releasing shipper and the replacement shipper.
- Capacity release availability still subject to regional infrastructure constrained environment.
Marcellus Effects On Gas Market Dynamics

- REX deliveries into Northeast through the Dominion South Hub have declined during the winter with Marcellus Production growth.
- Much of the new Marcellus production is rich in natural gas liquids (NGLs) posing gas quality issues on Northeast pipelines.
- Additional pipeline capacity bringing Marcellus gas to the Southeast markets is on the horizon.
REX Flows Decline Seasonally with Lower Dominion South Hub Spread

Source: Bentek Energy.
Price Effects from new Transco hub on REX

- Marcellus began displacing Rockies gas deliveries to the Northeast since Transco’s Stagecoach MARC I hub entered service on December 1
  - Dominion South is a major hub for REX deliveries of Rockies gas into the Northeast and last winter experienced significant declines as more economic local Marcellus production displaced Rockies deliveries.
  - This trend continued though 2012/2013 winter with the new MARC I hub as Transco flows reversed to flow east on the Leidy Line linked to the Stagecoach Hub ranging from 300 MMcf/d to 400 MMcf/d.

- This placed additional downward pressure on prices at Dominion South reducing the profitability of Rockies deliveries on REX into the Northeast

- Rockies gas deliveries on REX have been diverted to the Midwest markets, particularly Ohio, Indiana and Illinois
Gas Quality Issues Due to Wet Gas

- Wet Marcellus gas threatens Northeast pipeline gas quality standards.
- The REX pipeline is bringing more gas onto the Texas Eastern Pipeline (TETCO) at the Clarington delivery point in east Ohio in order to maintain gas quality standards
  - Producers have been drilling more liquid rich gas plays in the Marcellus recently raising the ethane content of the gas stream delivered to eastern pipelines. Gas processing plants in the Northeast currently leave the ethane in the gas stream as historically the gas supply has been only dry.
  - As more wet gas enters the pipeline the BTU content increases and can exceed pipeline gas quality standards.
- TETCO is the only Northeast pipeline to require supply blending so far.
  - On June 12, the pipeline ordered REX shippers to deliver more Rockies dry gas to the Clarington, OH REX delivery terminus, by June 18 to blend with high ethane gas from the Marcellus.
  - On July 3, TETCO issued a stricter order requiring 250 MMcf/d of Rockies gas for blending
- Sunoco/Mark West’s Mariner West project, a 50 Mbd pipeline is expected to enter service in July to deliver NGLs from a fractionator in Western Pa. to Sarnia, Ontario. Enterprise’s 190 Mbd ATEX pipeline is expected to enter service in early 2014 linking the Marcellus to the company’s NGL storage complex in Mt. Belvieu, Texas.