Gas Electric Senior Task Force

John Scarlata
Vice President Gas Supply, PSEG ER&T
June 20, 2013
Topics for discussion

• PSEG- who we are and our gas position

• Northeast gas supply and pipeline expansion

• The basics of gas transportation and capacity

• The effect on the generator going forward
PSEG Power Generating Assets in three competitive markets

- Low cost portfolio
- Fuel flexibility
- Assets near loads
- Poised to benefit in real time markets
- Fleet will maintain diversity and efficiency
- Most sites suitable for expansion
Low-cost supplies of shale gas beneficial to PSE&G customers & PSEG Power

Over 50% of available pipeline capacity can access market area supplies of shale gas

Power generating units sit in close proximity to Marcellus fairway

Power buys approximately 350 BCF/year of gas

Ability to arbitrage gas values from South to North and East to West using our storage and pipeline capacity
Northeast Shale Deposits

Marcellus Shale area: New research shows an estimated 500 trillion cubic feet of natural gas lies within the rock.

Devonian Black Shale Succession: The Marcellus Shale comprises part of this large formation.
Natural Gas Supplies in the Northeast Market Area

- Major pipelines are Transco, Texas Eastern, Tennessee, Columbia and Dominion.
- Traditional supply basins have shifted from the Gulf Coast & Canada to the Pennsylvania-Ohio shale regions.
- The shale phenomenon results in large supply basins at both ends of the pipe that serve the northeast.
- The issue of supply reliability has been enhanced as more supplies are located onshore, insulated from storm disruptions.
- The role of natural gas storage is less definitive going forward due to economics and the location of the fields.
Williams Northern Market Area Projects

Northeast Supply Link
- 12 mi. 42-inch loop
- Compression
- Modifications

Northeast Connector
Rockaway Delivery Lateral

Leidy Southeast
- 27-42 mi. of 42-inch loop
- Compression

Project Name | ISD | MDth/d
--- | --- | ---
Northeast Supply Link | 2013 | 250
Northeast Connector | 2014 | 100
Rockaway Delivery Lateral | 2014 | 647
Leidy Southeast | 2015 | 469

Rockaway Lateral
- 3.3 mi. 26-inch lateral
- NE Connector
- Compression
$4 B of investment opportunities in 2013-2016

<table>
<thead>
<tr>
<th>Project</th>
<th>Phase</th>
<th>Capacity (dth/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJ-NY Expansion</td>
<td>4Q13</td>
<td>800,000</td>
</tr>
<tr>
<td>TEAM 2014</td>
<td>2H14</td>
<td>600,000</td>
</tr>
<tr>
<td>OPEN</td>
<td>2H15</td>
<td></td>
</tr>
<tr>
<td>AIM</td>
<td>2H16</td>
<td>2,000,000</td>
</tr>
<tr>
<td>NEXUS</td>
<td>2H16</td>
<td></td>
</tr>
</tbody>
</table>
Firm Pipeline Transportation (FT) refers to the contracts that are held by a counterparty or shipper that guarantees firm movement of gas between pre-determined receipt & delivery points.

- Typically long term in nature- 15 to 20 years
- Total costs recovered in the fixed payment or demand chg.
- A pipeline path could be from Texas to New York
- Generally allows for in the path deliveries
- Subject to no bump rule
- Total cost commitment could be > $100 million
FT via Capacity Release

A mechanism whereby the owner of FT can offer the use of capacity to a qualified shipper during periods of time when it would otherwise go unused.

- Typically a shorter & varied term - days to years
- The release occurs through the pipeline’s electronic bulletin board.
- Rates vary based on the market
- Deals can be pre-arranged but subject to bid
- Deals less than 1 year can be above max rate
- An efficient mechanism to put surplus capacity into the marketplace.
Interruptible Pipeline Transportation (IT)

Interruptible Pipeline Transportation refers to the right to transport gas between receipt & delivery points on an as available basis

- Short term contracts & can be terminated with limited notice
- No fixed cost obligation; variable costs only
- Rates can be discounted by the pipeline
- IT has the lowest priority on an interstate pipeline.
- Generally allocated on a pro rata or economic basis
- Usually becomes constrained during extreme weather periods
Pipeline storage refers to the contracts that are held by a counterparty or shipper whereby gas is stored in abandoned caverns or similar formations for future use.

- Typically long term in nature- 15 to 20 years
- Total costs recovered in a demand & space charge
- Storage contract provides for space, injection & w/d rights
- Transportation is required to assure deliverability
- Storage formations in the northeast typically provide a single turn annually; Dominion is the largest provider
- The cost of new storage is a challenge in today’s environment
A gas local distribution company (LDC) is responsible for reliability on the coldest day.
The typical incremental customer (residential/small commercial) is a heat sensitive user.
Absent building an LNG plant the LDC will need to buy 365 days of firm capacity to meet a load on a limited number of peak days during the winter season.
The costs for that capacity is included in a fuel recovery mechanism spread over all customers.
Most if not all LDC’s are long seasonal capacity.
This long position is a valuable component for the generator.
Economics of Pipeline Capacity

- 500 mw Combined Cycle Facility
- Approximate daily gas requirements= 100,000/mmbtu/d
- Obtain firm capacity for 50% of the daily gas req’ment
- Pipeline requires 15 year commitment @ $.50/ mmbtu as a fixed reservation payment
- Fixed costs over the life of the gas contract= 50,000 mmbtu/d  x 365 x 15 x $.50/ mmbtu= $ 137 million
What Does This Mean For The Generator?

- Market area gas production has greatly increased the reliability of deliveries
- The utilization of the interstate pipeline system is at an all time high as it relates to capacity factor
- The producer push is designed to get gas to a liquid trading hub; add’l deliveries to the city gate unlikely
- Incremental firm capacity should be looked at on a case by case basis
- While there may be peak day challenges the capacity market is liquid and seasonal space readily available
In Closing - Issues Facing the Industry …

- Reliability should be dealt with regionally at the ISO level; there is no one size that fits all.

- Changes to the energy day should be explored but it may be difficult to reach a consensus.

- Recognition of fuel diversity and the role of alternate fuels.

- Socialization of pipeline capacity & costs.

- The industry needs to be careful to avoid an over-build of gas infrastructure which could impact on the firm LDC customer.