Changing the Mix with EPA Climate Regulations

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Driving Demand for Natural Gas
Abundant Supply

Estimates of U.S. Recoverable Natural Gas
(trillion cubic feet)

- Proved Reserves
- Non-shale Gas Resources
- Potential Shale Gas Resources
- Total Resource (Uncategorized)

Potential Gas Committee
EIA
CERA, MIT
NPC, INGAA
ICF

Potential Shale Gas Resources

Potential Gas Committee
0 '00 '02 '04 '06 '08 '10 '12 '14
EIA '08 '09 '10 '11 '12 '13 '14
CERA, MIT '10 '10
NPC, INGAA '11 '11
ICF '09 '12 '13 '15

Proved Reserves
Non-shale Gas Resources
Potential Shale Gas Resources
Total Resource (Uncategorized)

Abundance of natural gas resources as estimated by different organizations over time.
Reserves Volume and Cost

U.S. & Canada Supply Curve

Production Efficiency

Natural Gas Production Efficiency

Source: EIA, Baker Hughes
Annual Storage Fills

Source: EIA
2014 Weekly Storage Injections

Weekly Natural Gas Storage Injections and Price

Source: EIA, NYMEX Henry Hub Price
Current Production Trend

Source: EIA Short-term Energy Outlook, July 2015
2015 Annual Energy Outlook: Domestic Production Forecast (Bcf/d)

Source: EIA Annual Energy Outlook, 2015
North American Pipeline Network Additions

U.S. Pipeline Capacity Additions (Bcf/d)

- Cumulative Additions: 61 Bcf/d
- Cumulative Additions: 131 Bcf/d
- Announced Projects: 55 Bcf/d

Source: EIA
Potential Infrastructure Implications

![Graph showing incremental interstate pipeline capacity additions in the Intermediate Demand (blue) and High Demand (red) Cases compared to the Reference Case (gray), 2015 to 2030]

Source: DOE, Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector, February 2015
Existing Tools and Market Policy Changes

• Market Policy Changes to Enable Infrastructure Investment
  – Capacity Assurance Measures (e.g. PJM)
  – Pay for Performance Measures (e.g. ISO-NE)

• Existing tools for reliable delivery
  – Pipeline Services
  – Alternative Contracting Mechanisms
  – Long term contracts or reserve investments
Reliable Delivery for Baseload Power

Natural Gas Supply

Firm Transportation and Storage /Flexible Services or appropriate portfolio management

Storage Location (Depleted Reservoir, Salt Cavern, Aquifer)

Natural Gas-Fired Power Plant
111(d) Implementation Matters

A Few Reminders

• What it means to comply with an average annual standard
• Why considering infrastructure adequacy requires a forward looking assessment
• What natural gas generation has to offer as a low-cost compliance option

Critical Design Considerations

• Rate-based standards (versus mass based standards) and separate treatment of new natural gas units enable states’ economic growth
  – Especially true for states that are benefiting from the manufacturing renaissance brought about by abundant, affordable natural gas liquids
• Rate-based compliance keeps consumer costs down