



24th World Gas Conference
ARGENTINA | 2009
5-9 October

The Global Energy Challenge:
Reviewing the Strategies
for Natural Gas

Underground Gas Storage and Gas Strategies in North America

Fredrick W. Metzger – Kinder Morgan Energy Partners

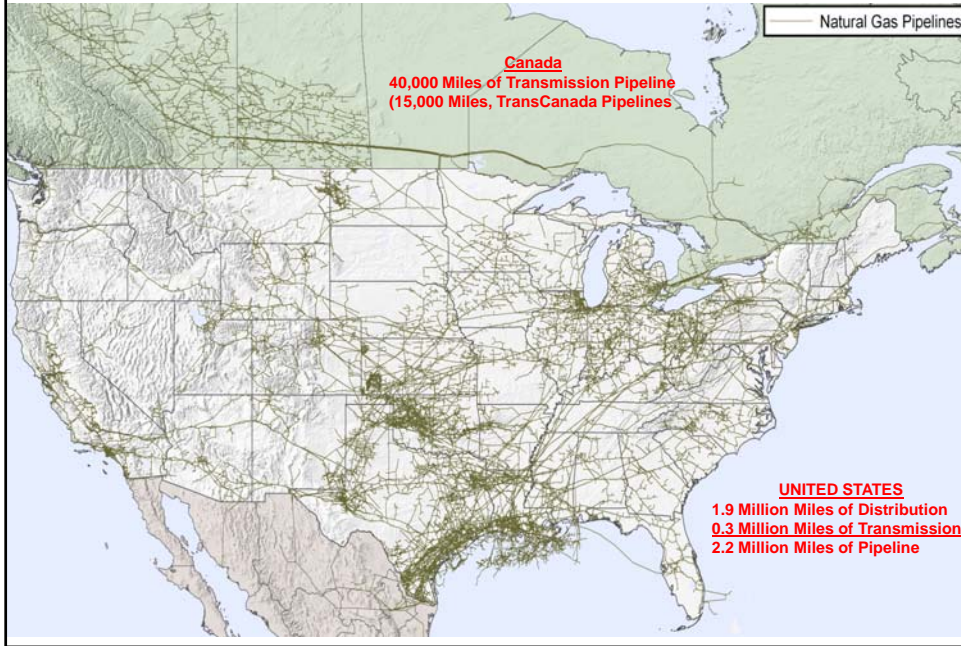
2009 World Gas Conference
October 5 - 9, 2009
Buenos Aires, Argentina

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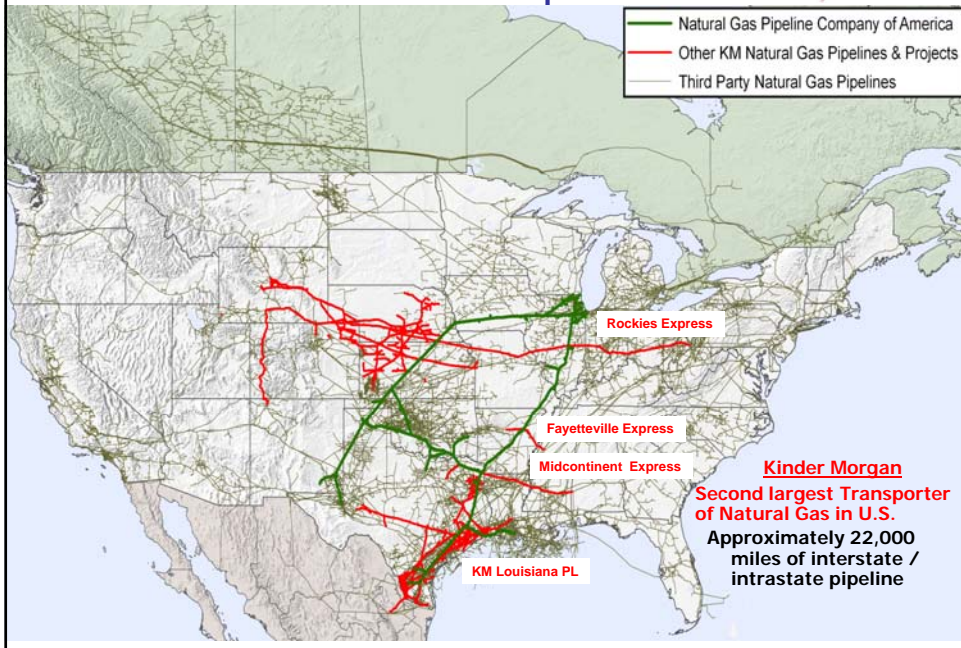
Underground Gas Storage and Gas Strategies in North America

- Introduction
- Natural Gas Transportation
- Underground Gas Storage
- Natural Gas Exploration & Production Activity
- Dramatic Changes in the Dynamics of the Gas Industry
 - When will LNG Imports Increase as Predicted?
 - When will the Arctic Natural Gas flow South?

North American Gas Pipelines

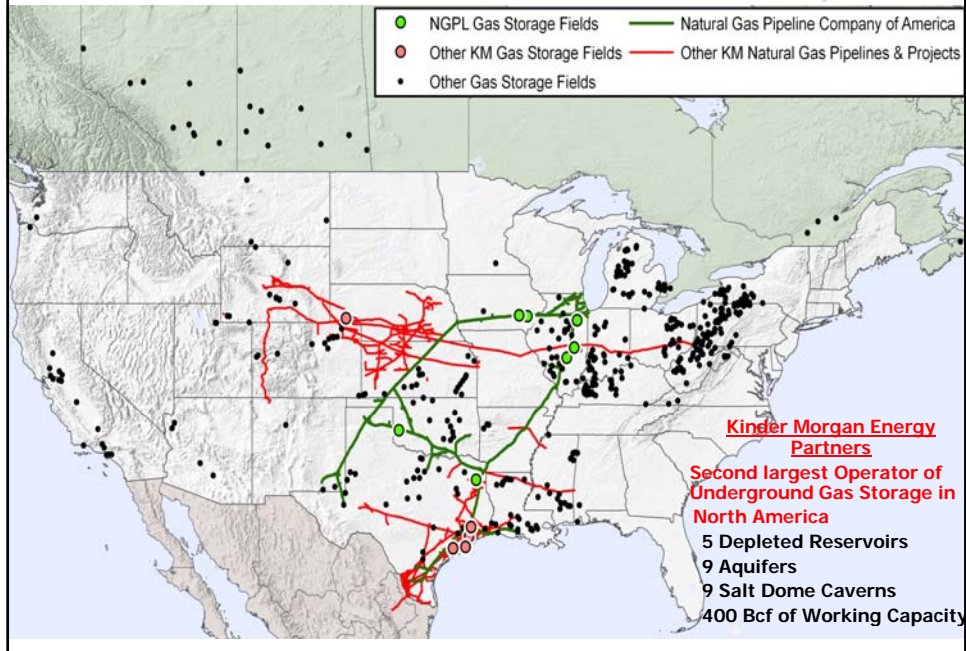


North American Gas Pipelines



North American Gas Storage

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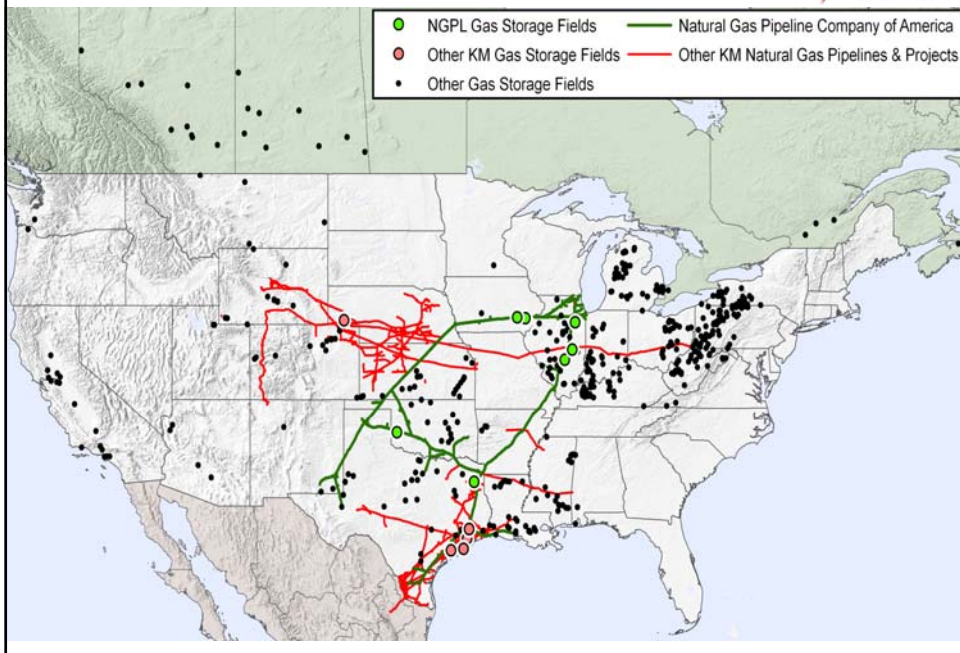
United States Storage Industry

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- 75 Storage Operators
- 400 Storage Facilities – 30 States
 - 326 facilities in depleted oil and gas reservoirs
 - 43 facilities in aquifer reservoirs
 - 31 facilities in salt caverns
- 4,300 BCF of Working Gas Capacity (122 BCM)
- 85-90 BCF per day of peak deliverability (2.5 BCM/D)
- Operate over 17,500 Storage Facility Wells

North American Gas Storage

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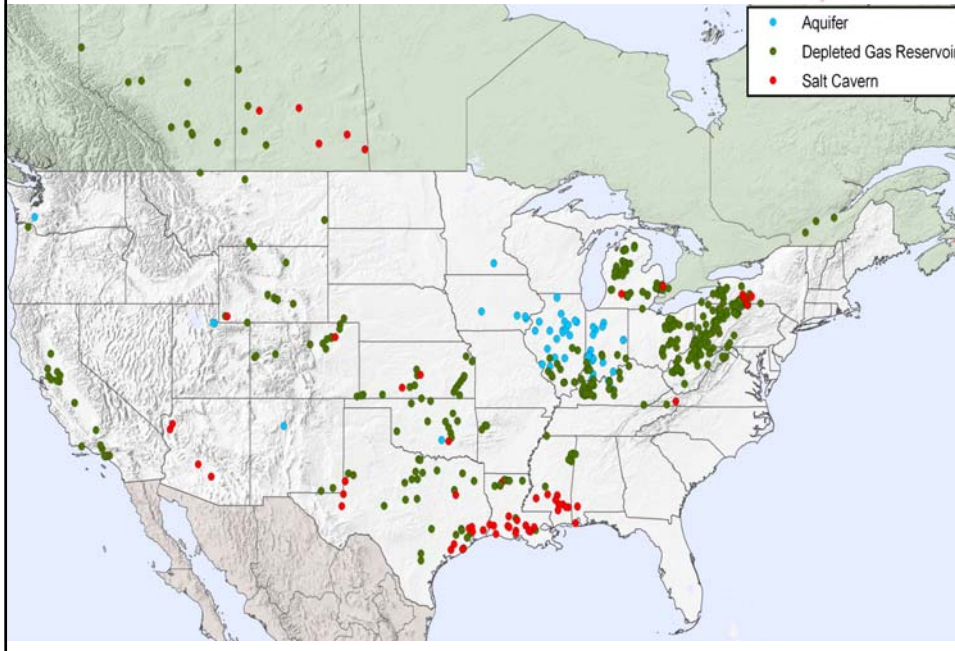


Canadian Storage Industry

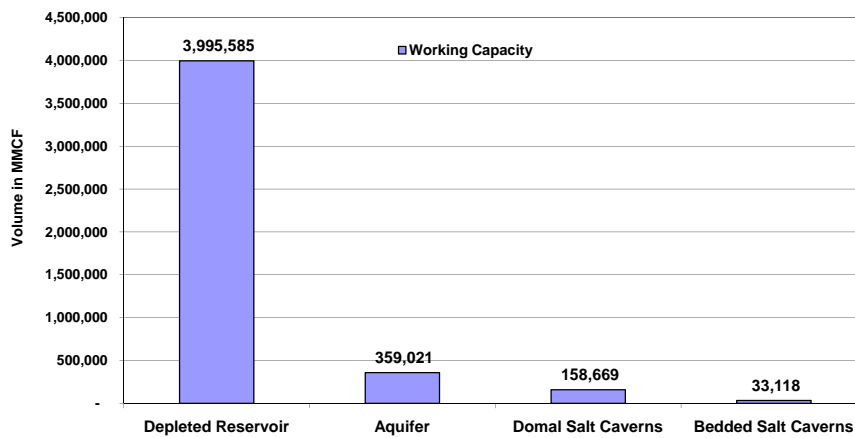
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- 9 Storage Operators
- 50 Storage Facilities – 5 Provinces
 - 42 facilities in depleted oil and gas reservoirs
 - 0 facilities in aquifer reservoirs
 - 8 facilities in salt caverns
- 650 BCF of Working Gas Capacity (18 BCM)
- 5-10 BCF per day of peak deliverability (150-300 MMCM/D)
- Operate over 650 Storage Facility Wells

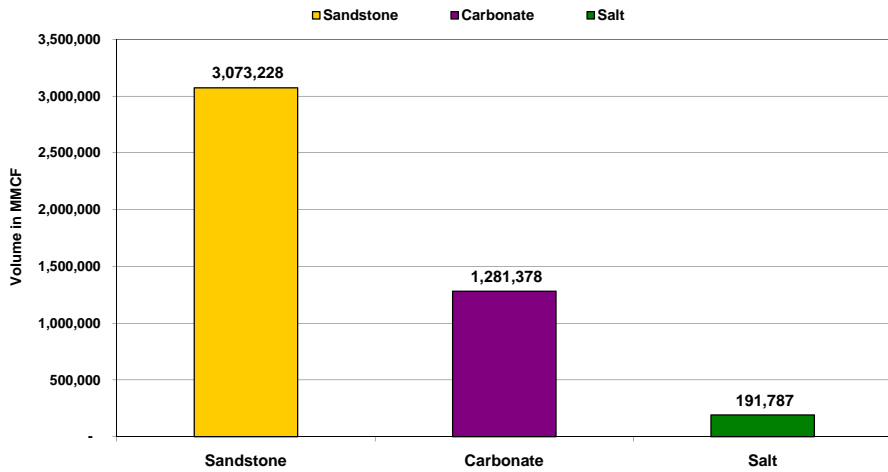
North American Storage Types



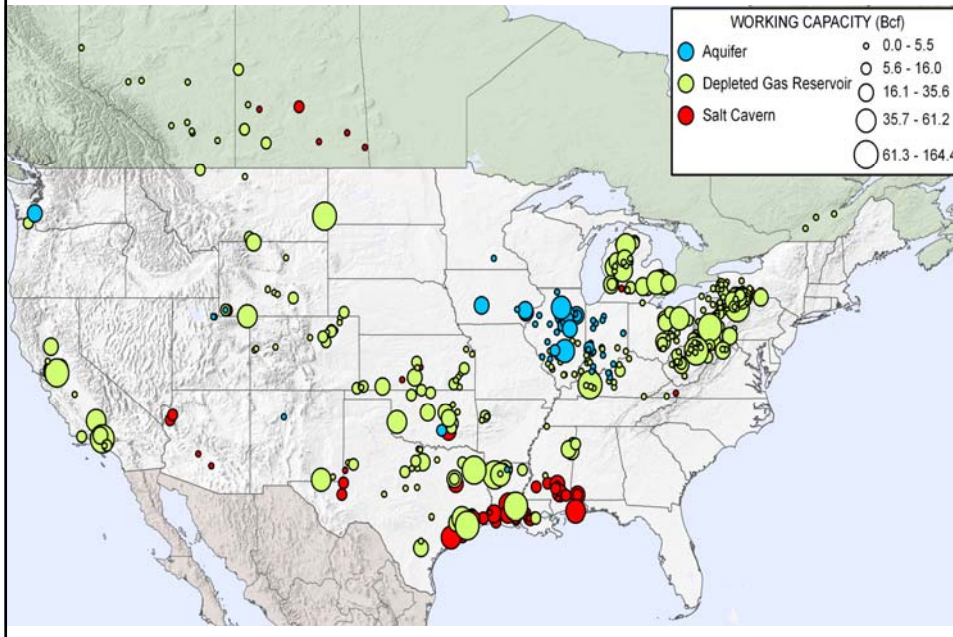
North American Storage Types



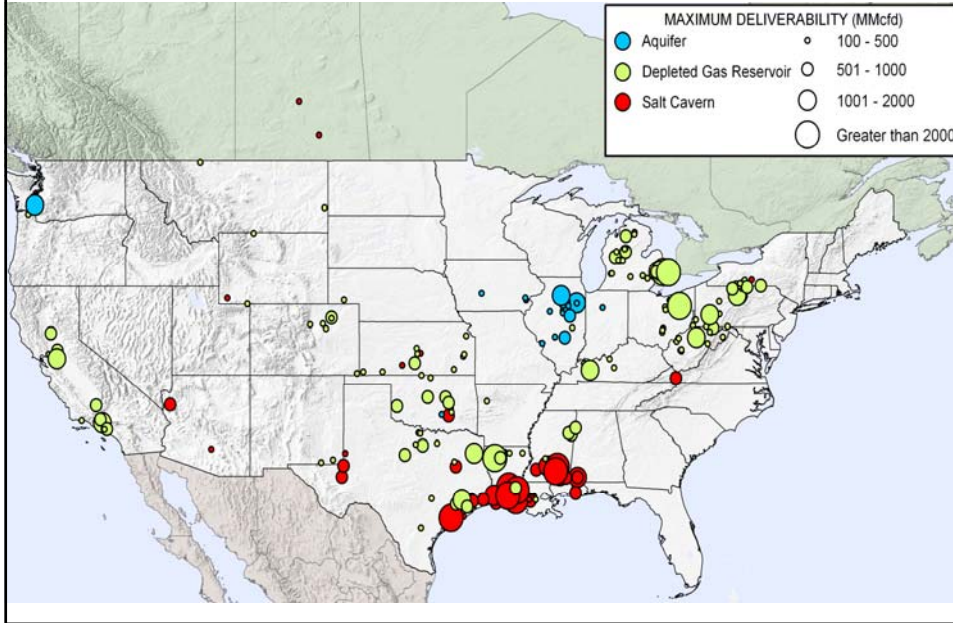
North American Storage Reservoir Geology



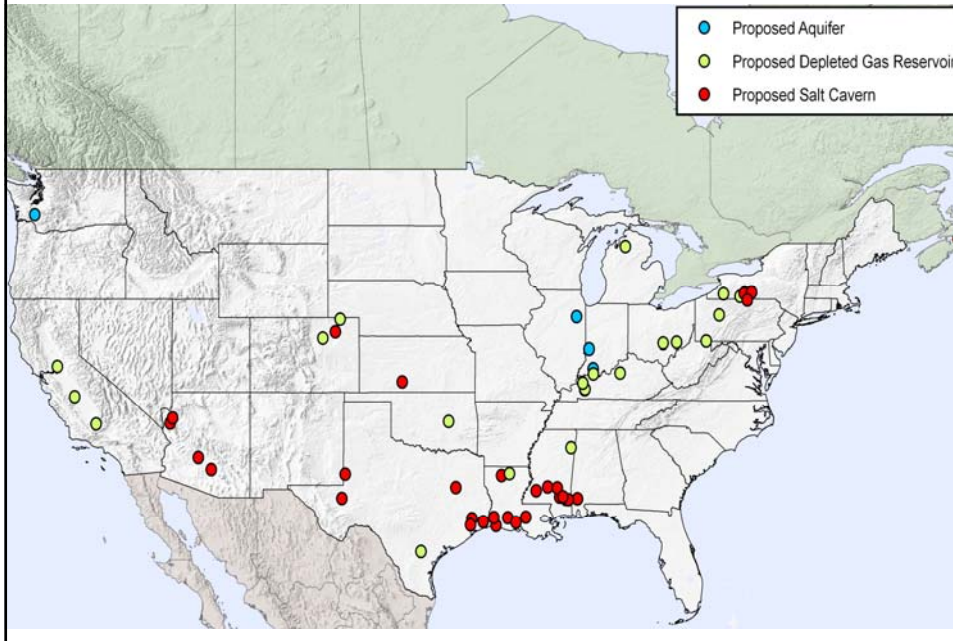
North American Storage Capacity



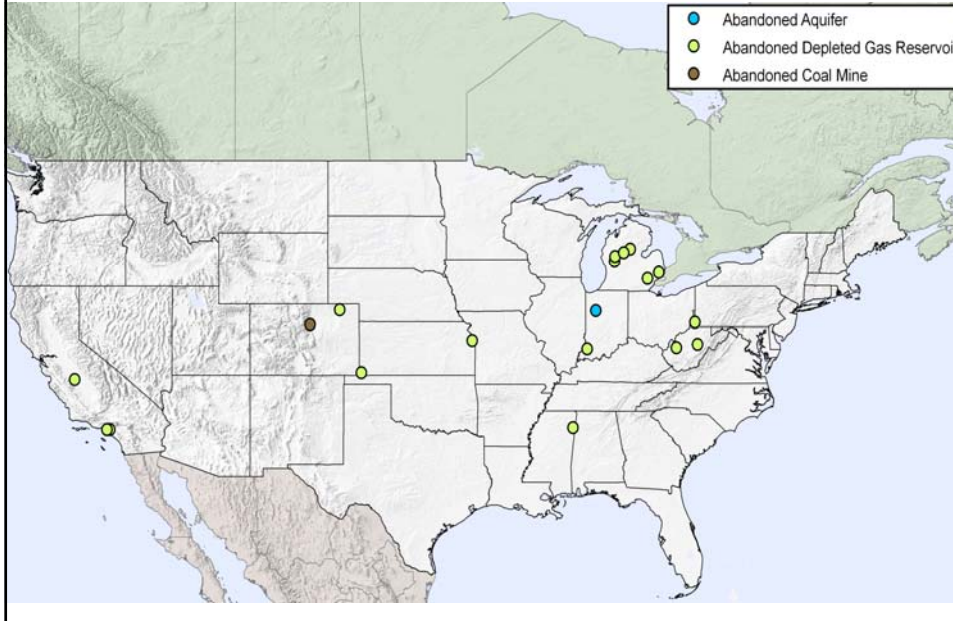
Maximum Deliverability



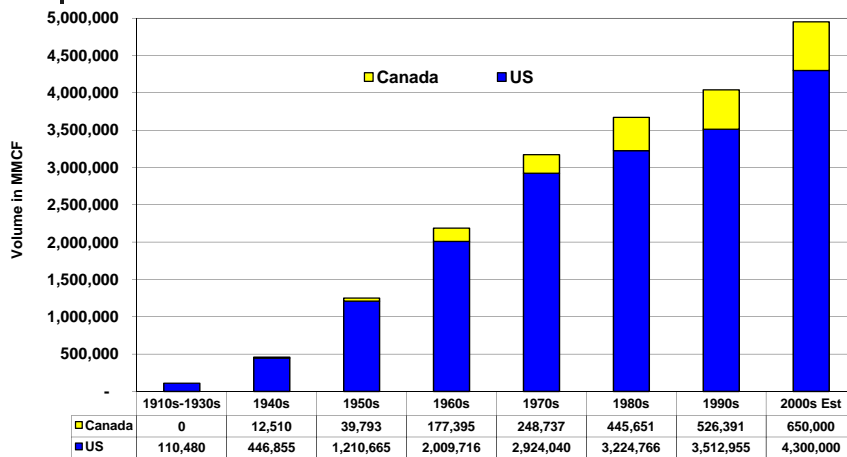
New Storage Developments



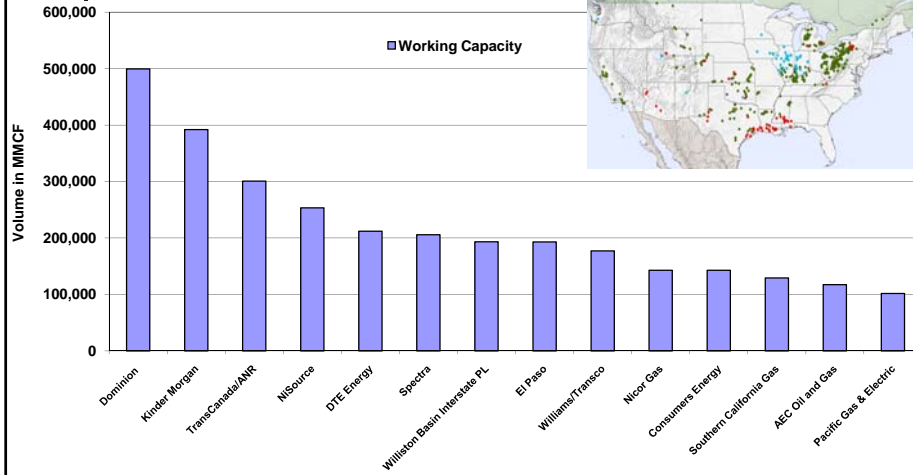
Abandoned Storage Fields



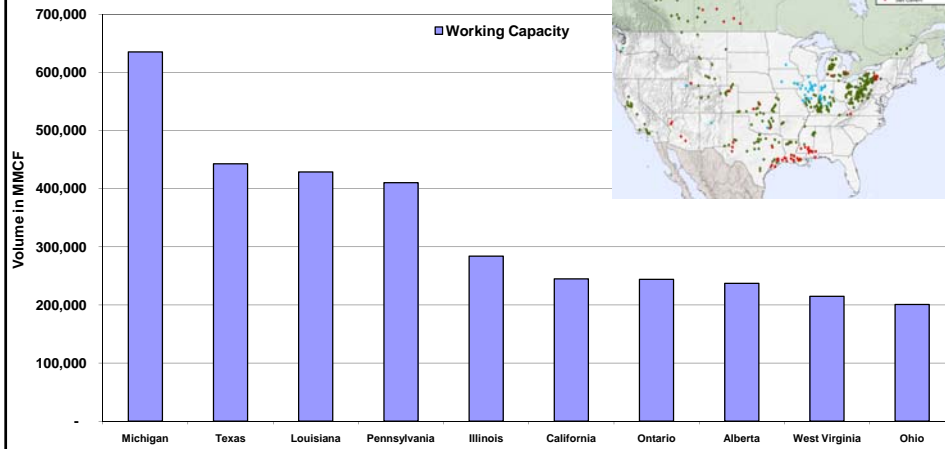
Cumulative North American Storage Development History



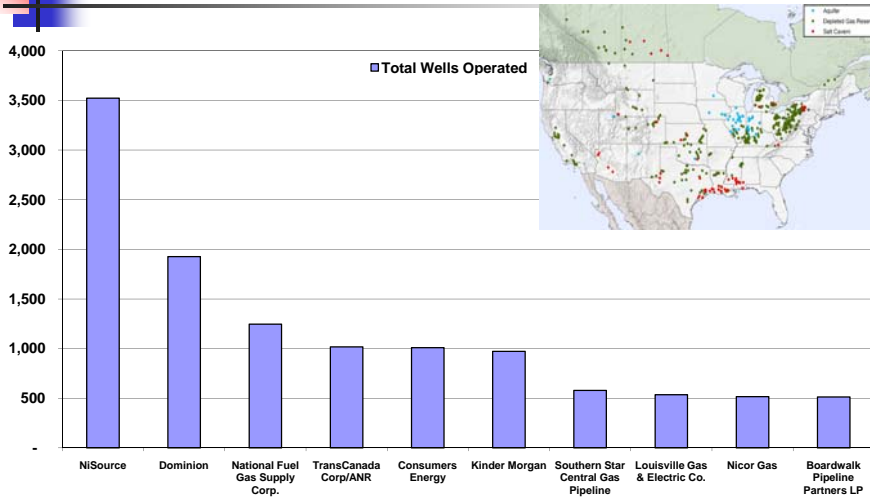
Top North American Operators



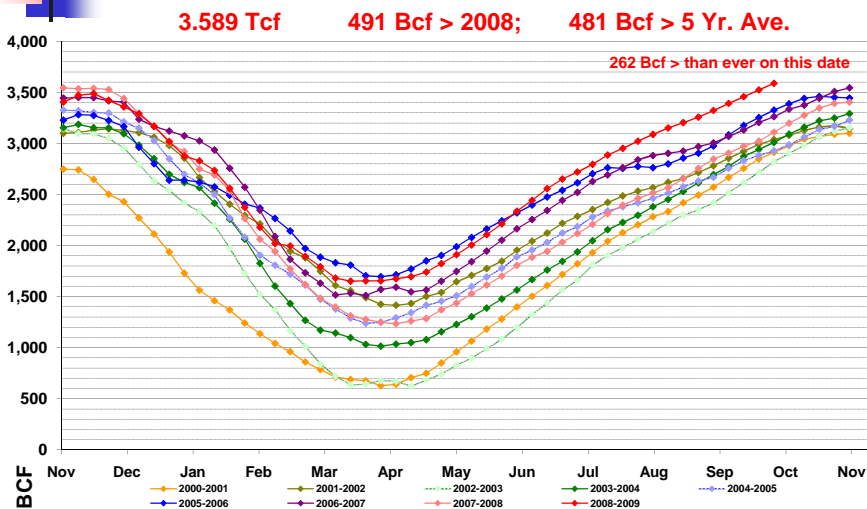
Working Capacity by US State and Canadian Province



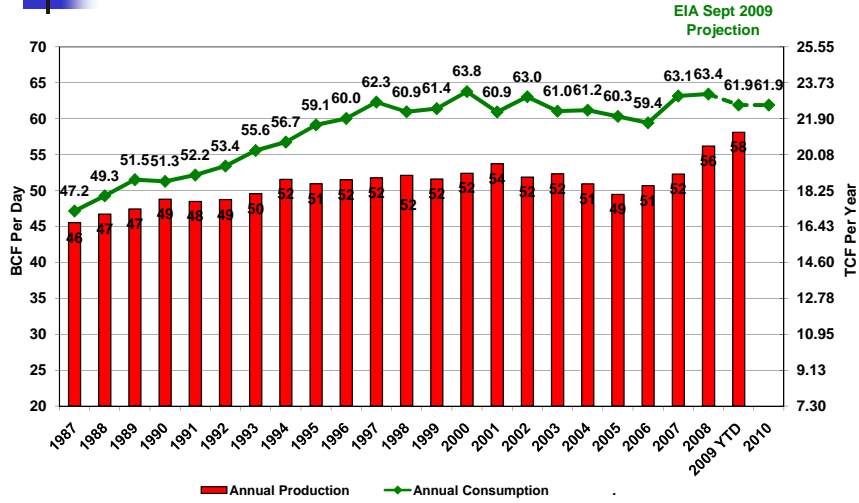
Total Wells by Operator



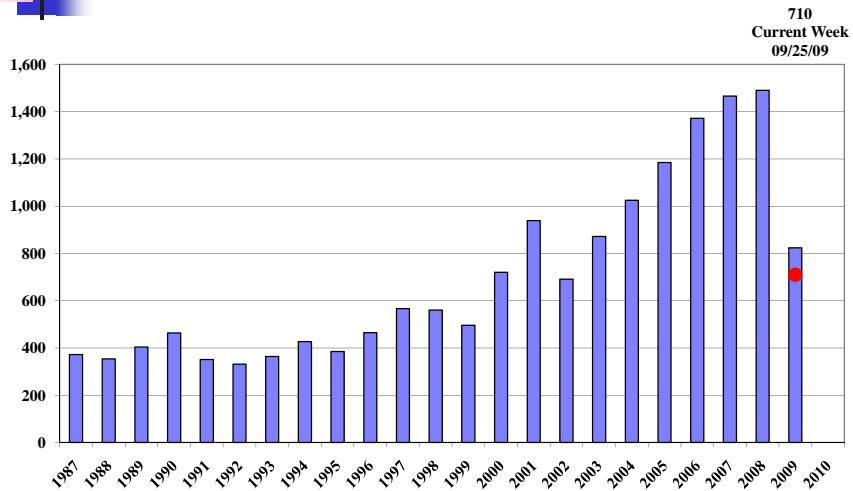
United States Storage Inventory Through September 25, 2009

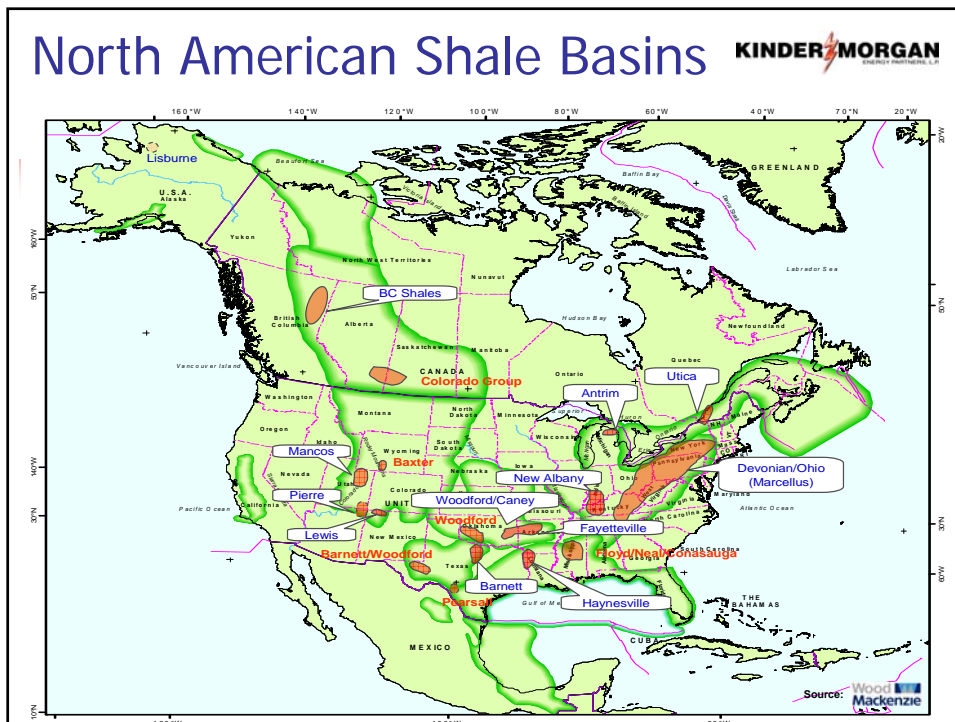
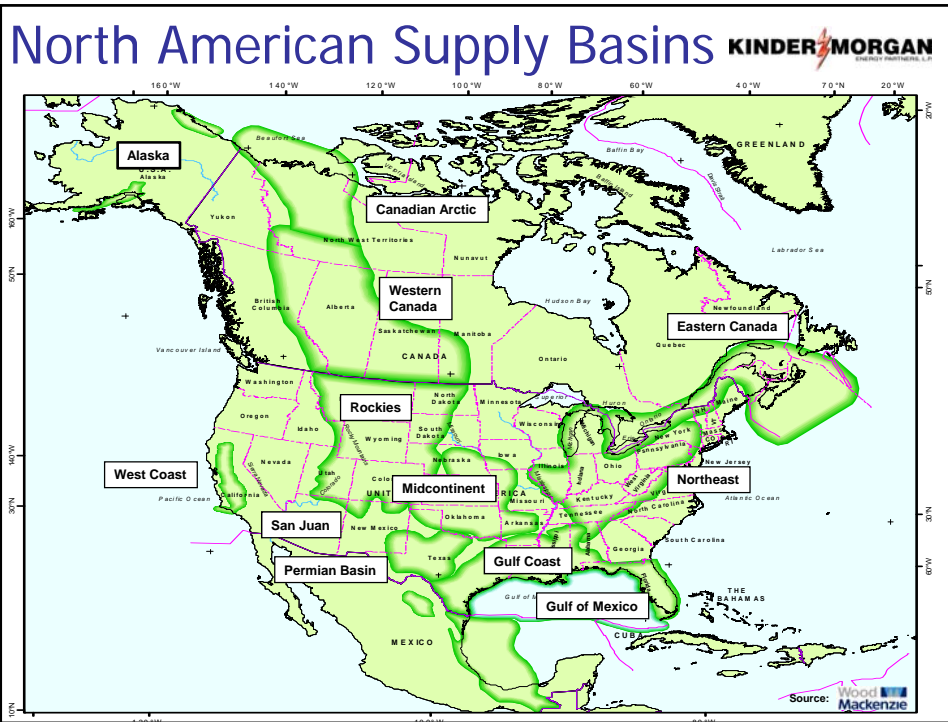


United States Gas Production & Consumption

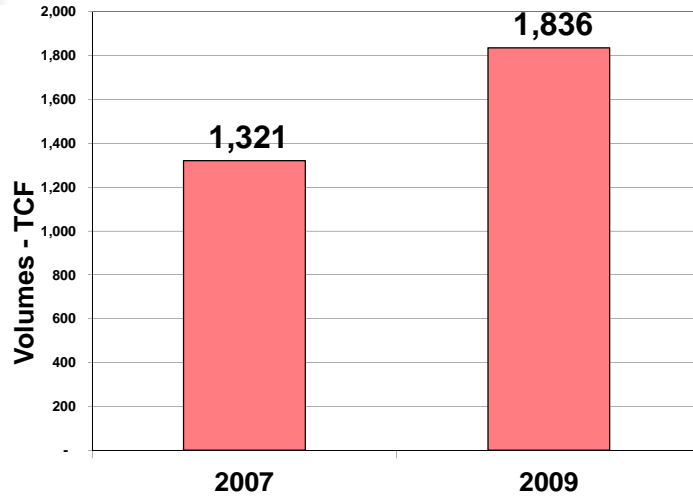


Rigs Drilling for Gas in the United States



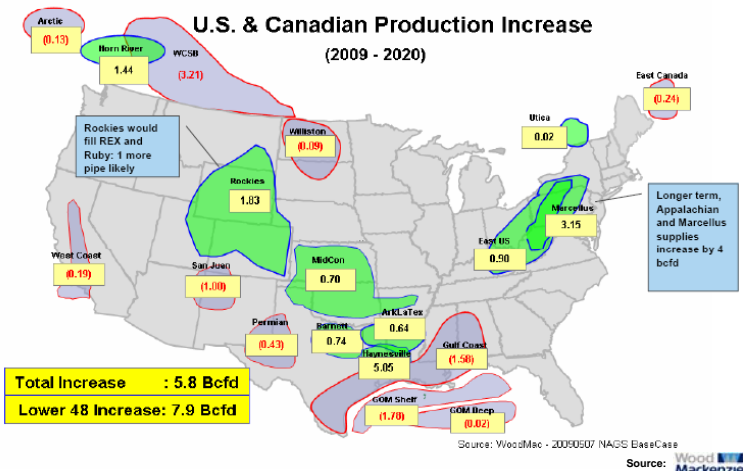


United States–Potential Gas Resources

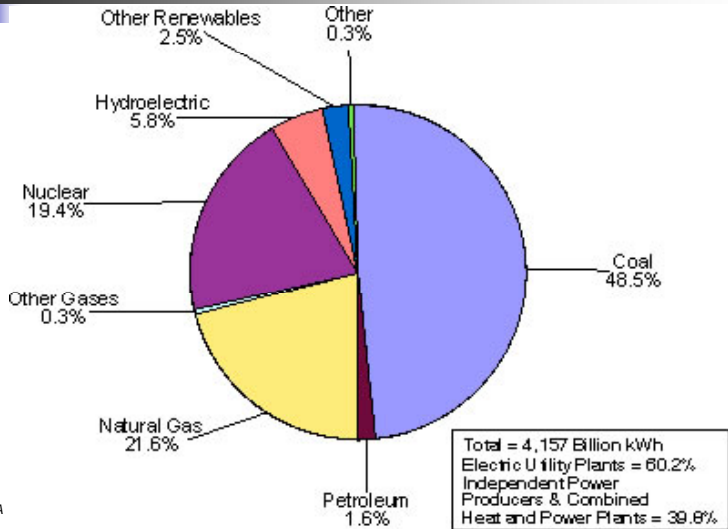


Long Term Supply Outlook Shale Production Changes Everything

Supply Push – The Midstream Story



US Electric Generation - 2007

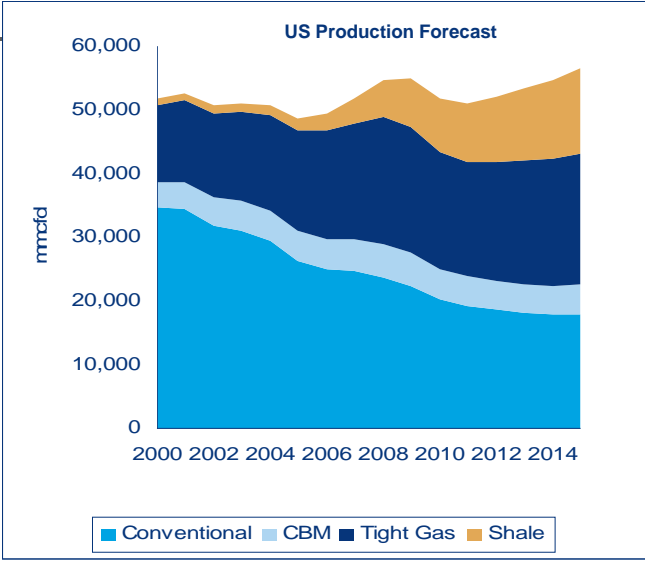


Source US EIA

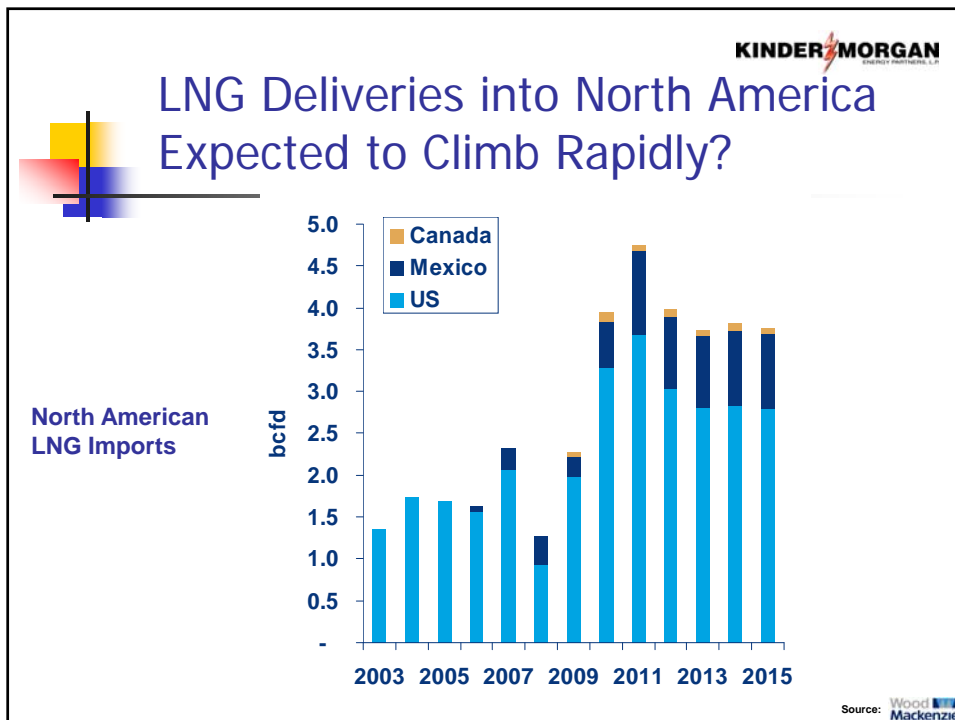
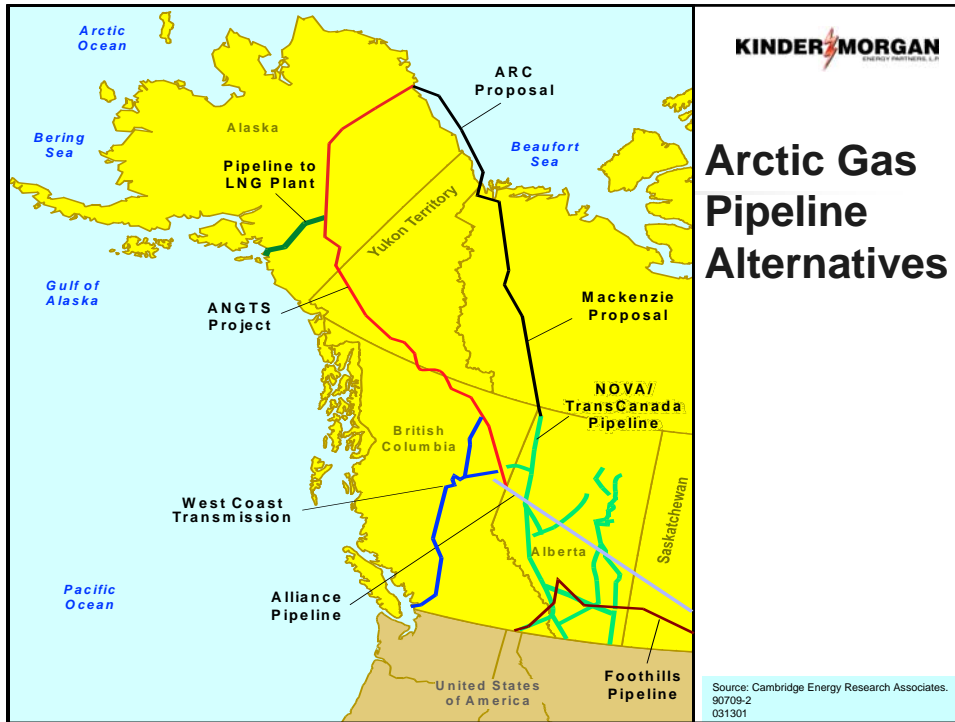
Supply Surge driven by Shale Gas



The current economy and low price will reverse growth in the near term



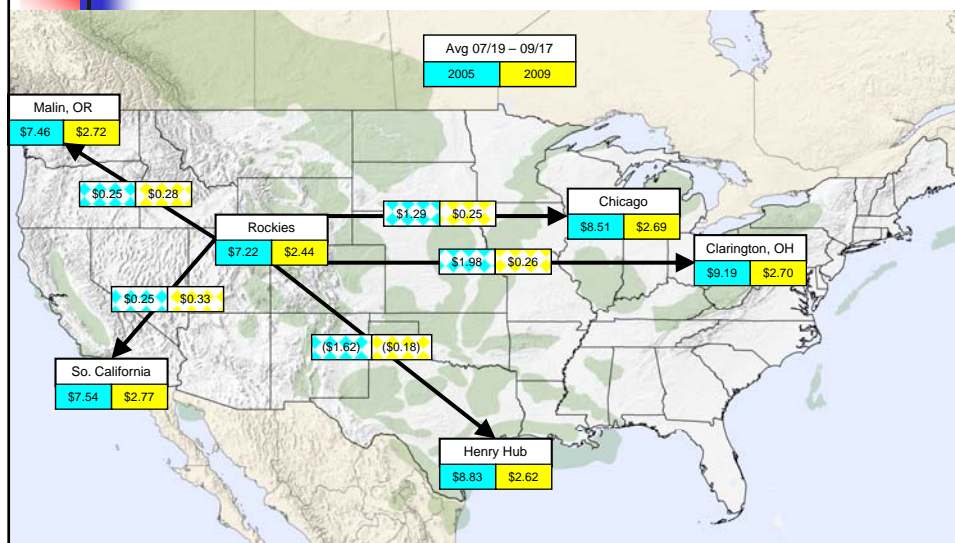
Source: Wood Mackenzie

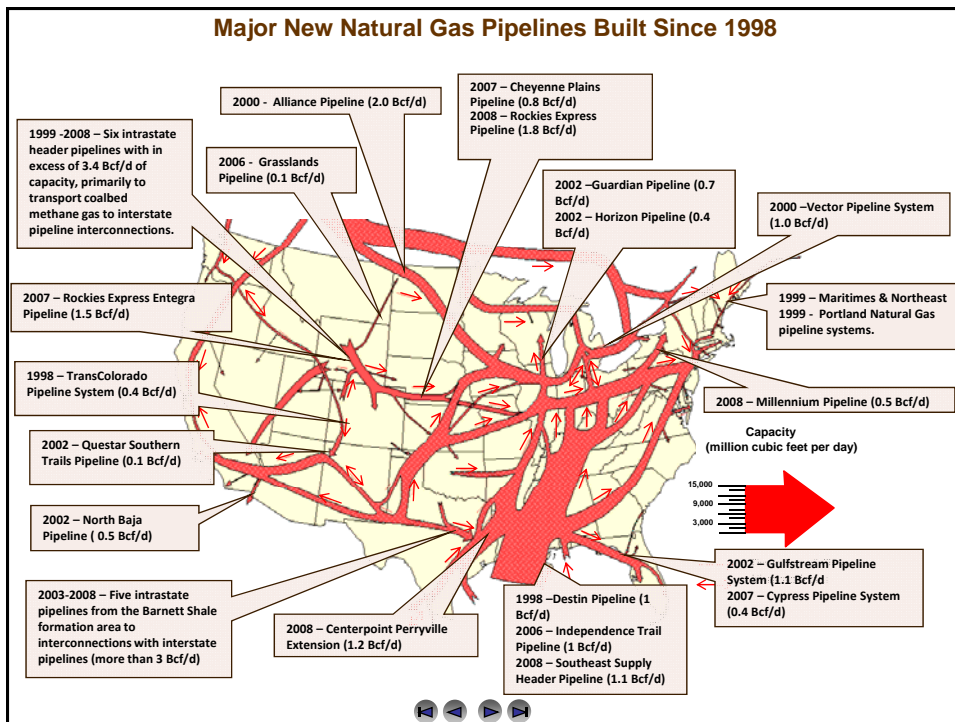
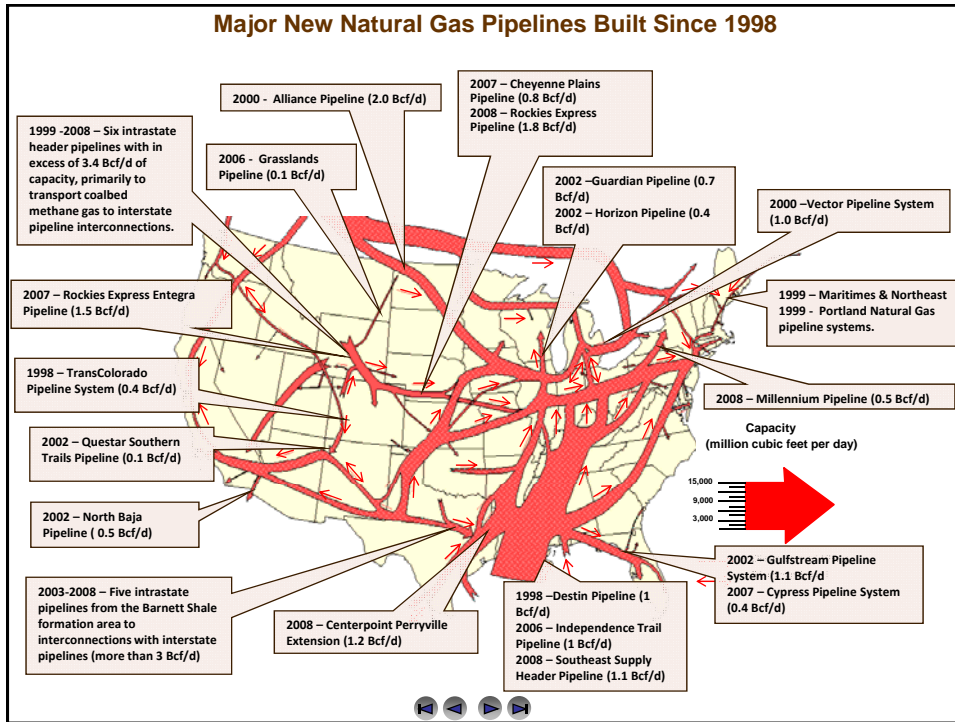


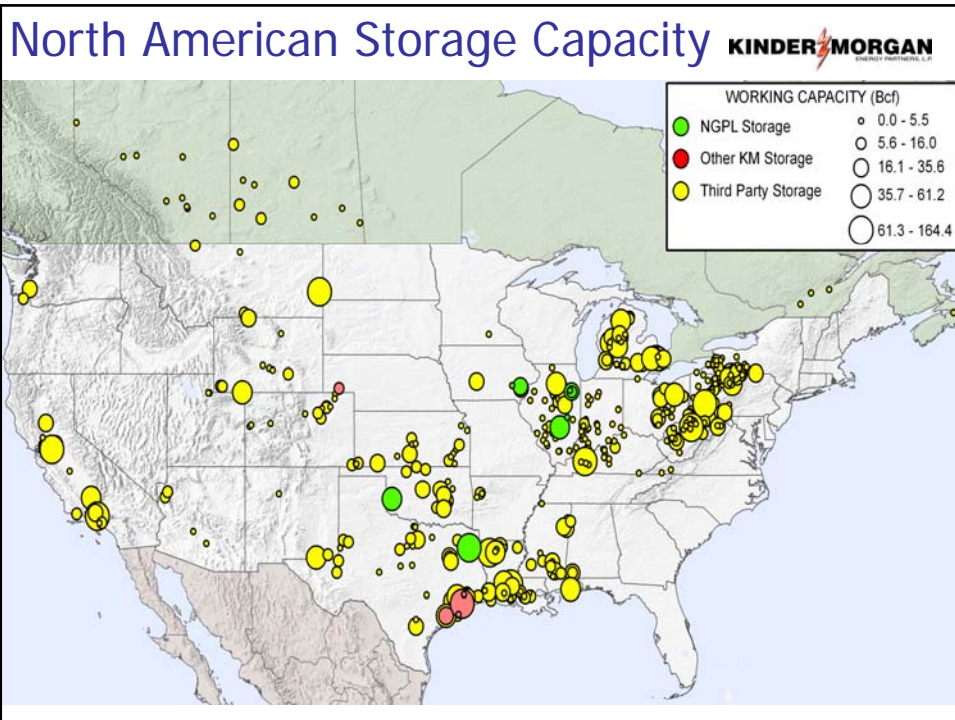
Underground Gas Storage and Gas Strategies in North America

- Conclusions
- Natural Gas Transportation – Shifts from south to north to west to east
- Underground Gas Storage – Growth 80-100 Bcf/year working gas
- Natural Gas Exploration & Production Activity – Significant growth in shale gas production underway.
- Dramatic Changes in the Dynamics of the Gas Industry – will continue
- 100's of years remain in the North American natural gas era!

Transportation Drivers (2005 vs Current)







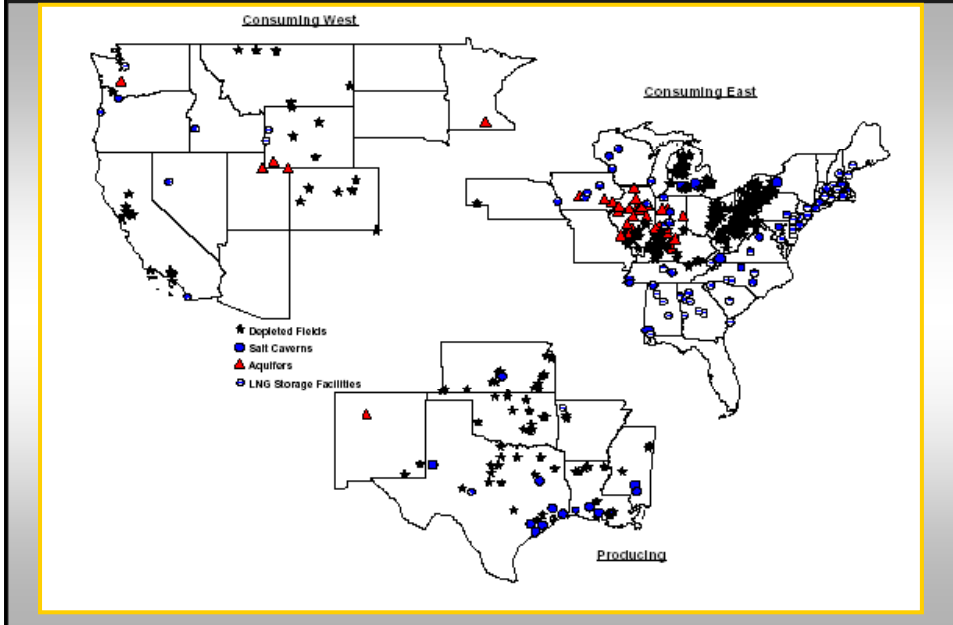
Gas Storage by Region

- **The Consuming East (including Eastern Canada) region relies extensively on storage gas to meet peak demand during the winter months. Its share of US and E. Canada totals:**
 - 54% of total working gas capacity
 - 54% of the storage deliverability (44 Bcf/d out of 80)
 - Approximately 65% of gas consumption

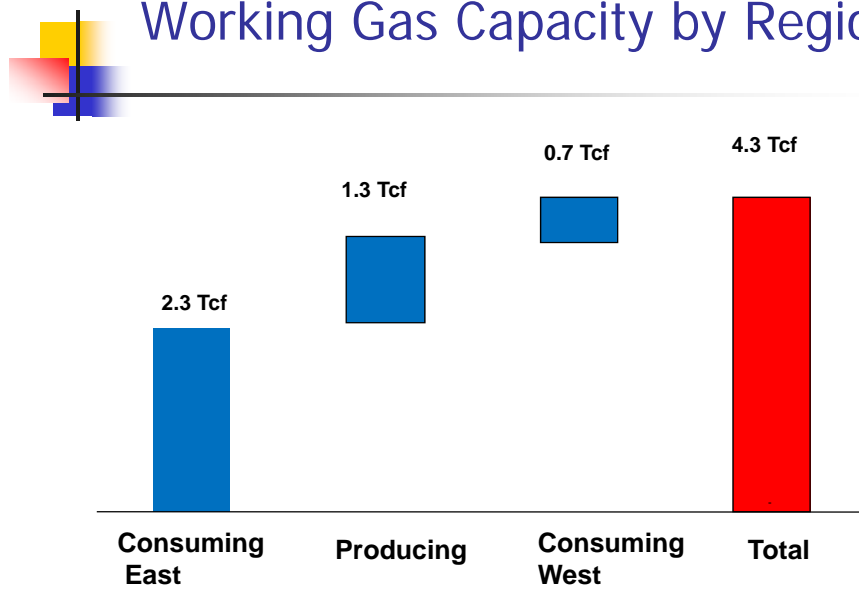
- **Due to storage and transport limitations into the U.S. Northeast, it is difficult to secure adequate storage services and hence price spikes occur almost every winter**

- **Much of the storage in the Producing Region are linked to market centers and play a vital role in the efficient export and transmission of natural gas to other areas**

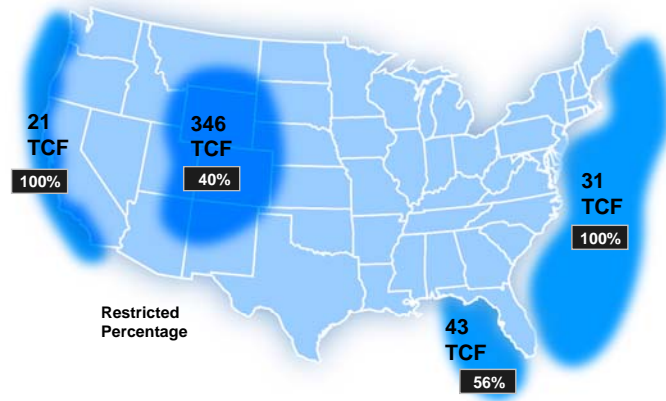
EIA Gas Storage Regions



Working Gas Capacity by Region



Major Portions of the Gas Resource Base are Not Accessible

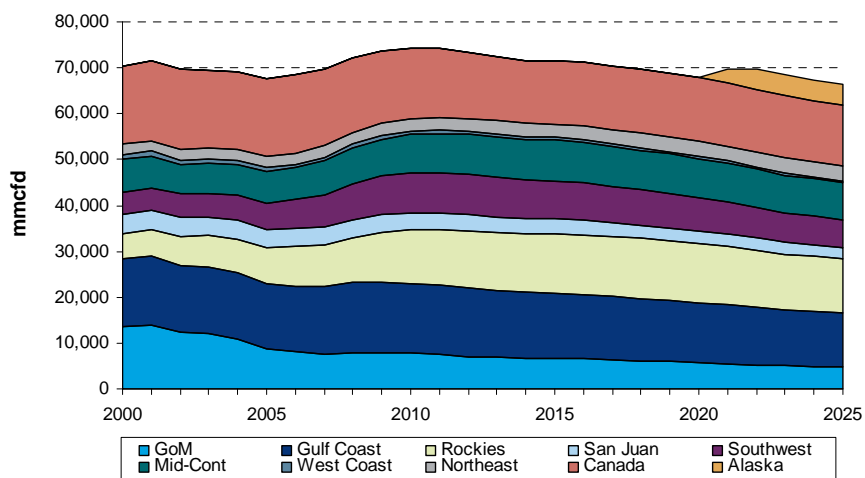


Approximately 29 trillion cubic feet (TCF) of the Rockies gas resources are closed to development and 108 TCF are available with restrictions.

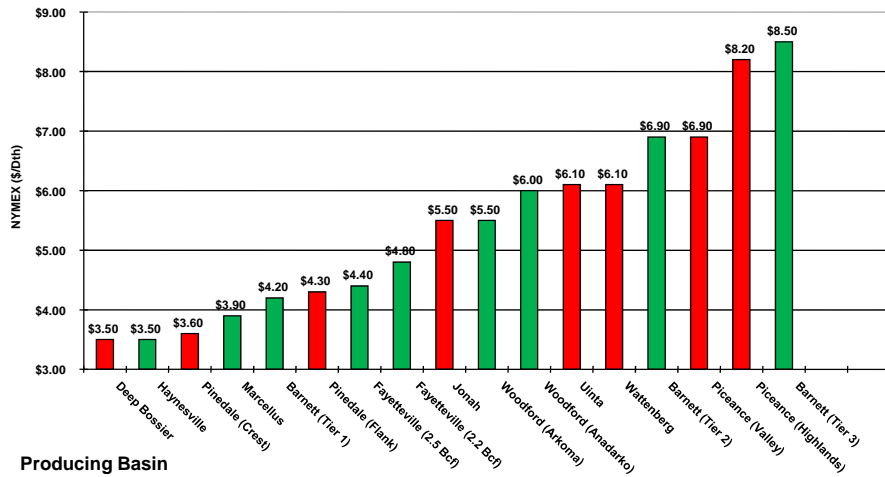
Source: AGA

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North American Supply Forecast

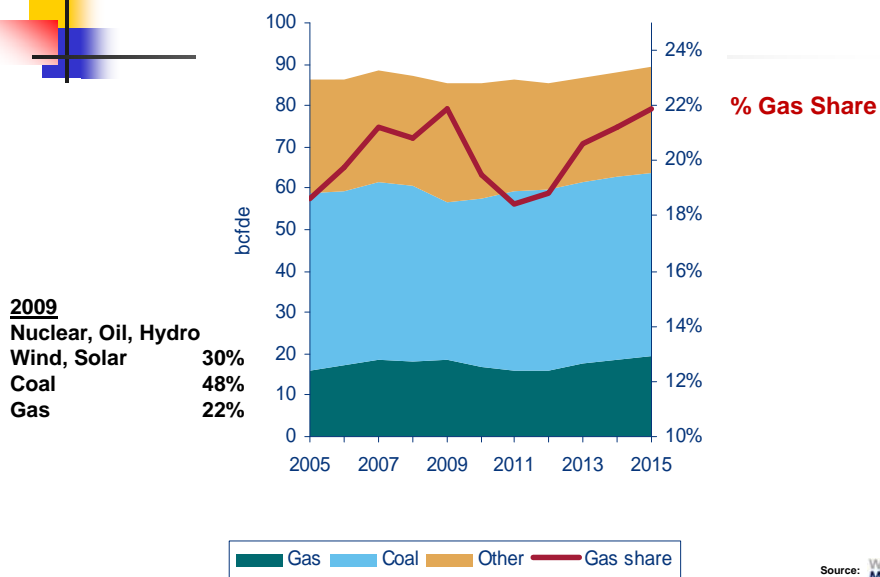


Basin Development Costs per Mcf for a 10% IRR



Source: Morgan Stanley

Electric Power Generation



Source: Wood Mackenzie