

Commodity Prices Drive Change in Electric Industry

Drivers and impacts of low gas prices



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Energy Market Conditions

Current

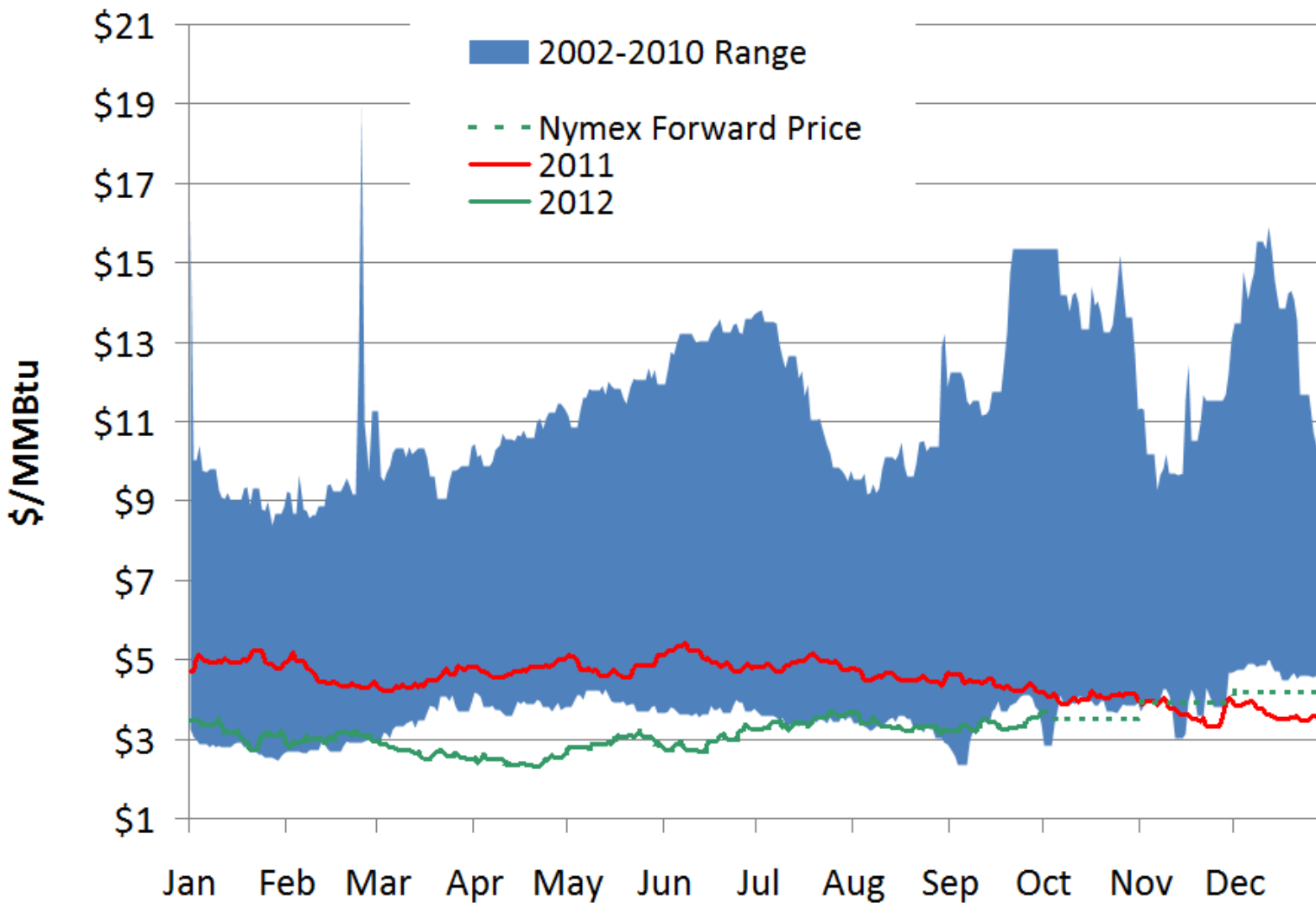
- **Lowest gas prices in over 10 years**
- **Gas Prices dip well below coal prices in 2012**
- **Highest gas production in over 40 years**
- **Displacement of coal-fired generation by natural gas**

Outlook

- **Gas prices rebound from recent lows**
- **Retirement of coal-fired generation**
- **Growing gas consumption from new sources**
- **Vast resource base**
- **Gas supply grows to meet new demands**



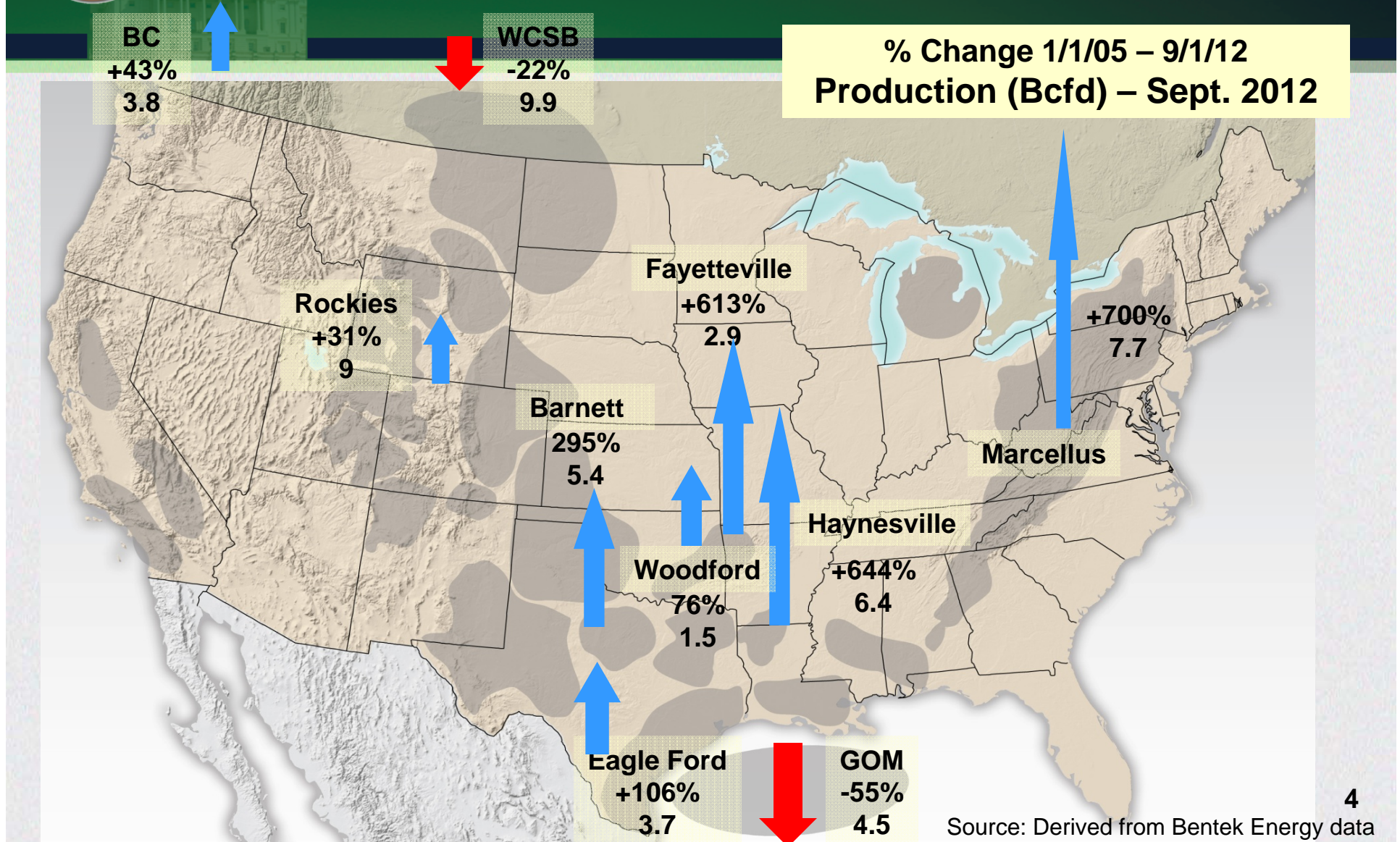
Lowest gas prices in over 10 years





Regional changes in gas supply

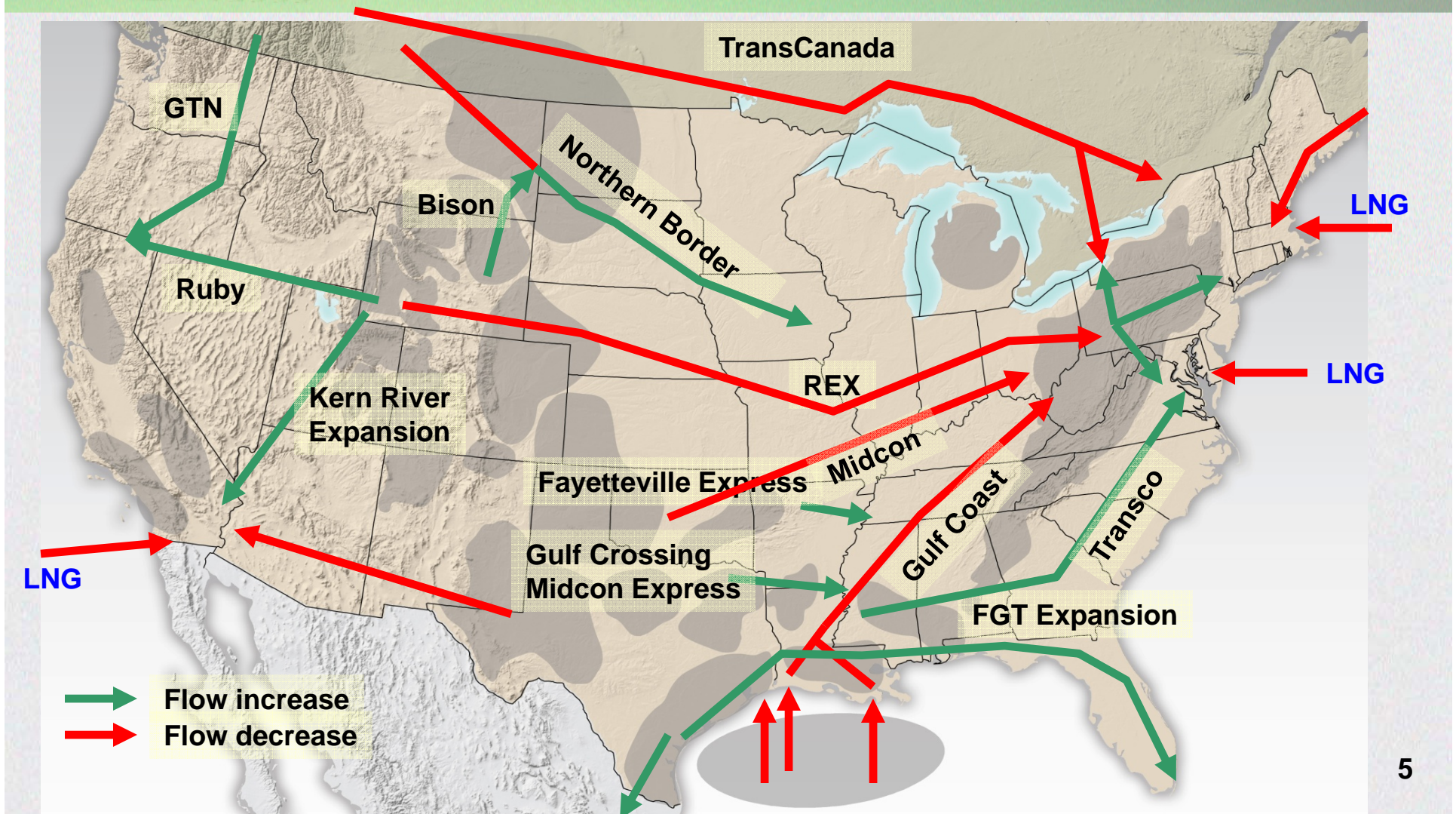
Growth in North American gas production, 2005 - 2012





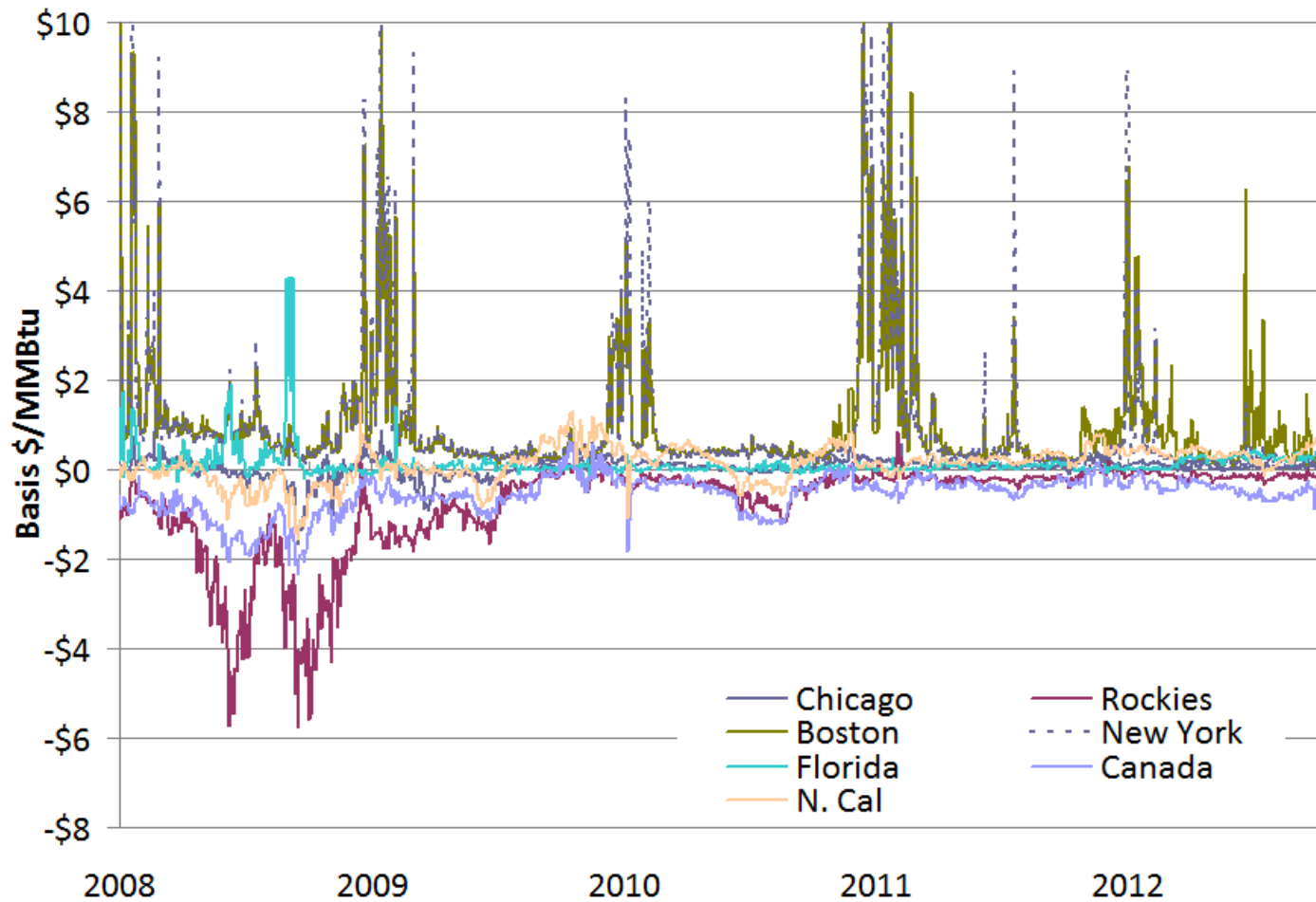
Pressures on transportation routes

Reconfiguration of gas corridors





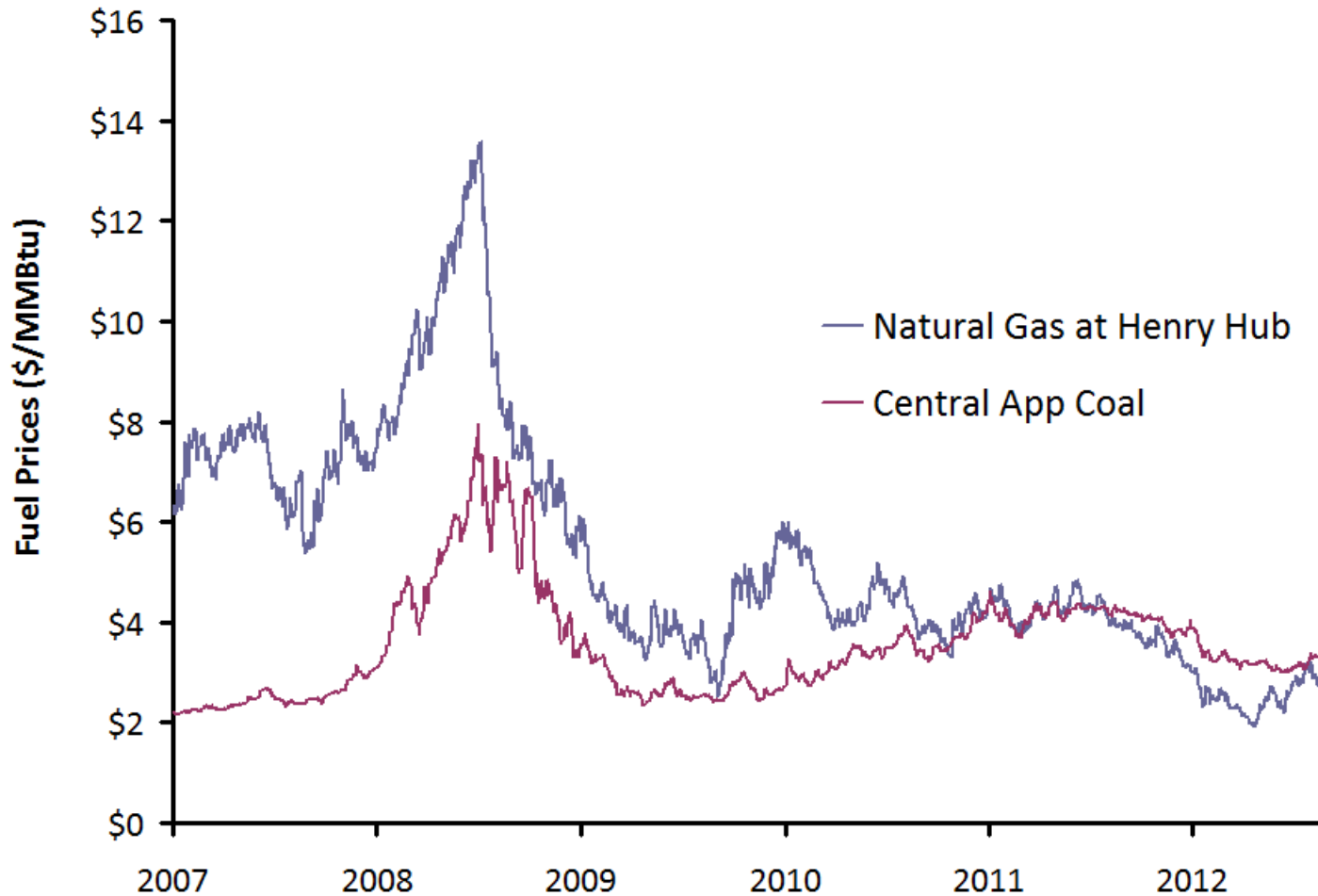
Pressures on transportation routes Basis to Henry Hub Shrinks



Source: Derived from Intercontinental Exchange data



Gas prices dip below coal prices in 2012

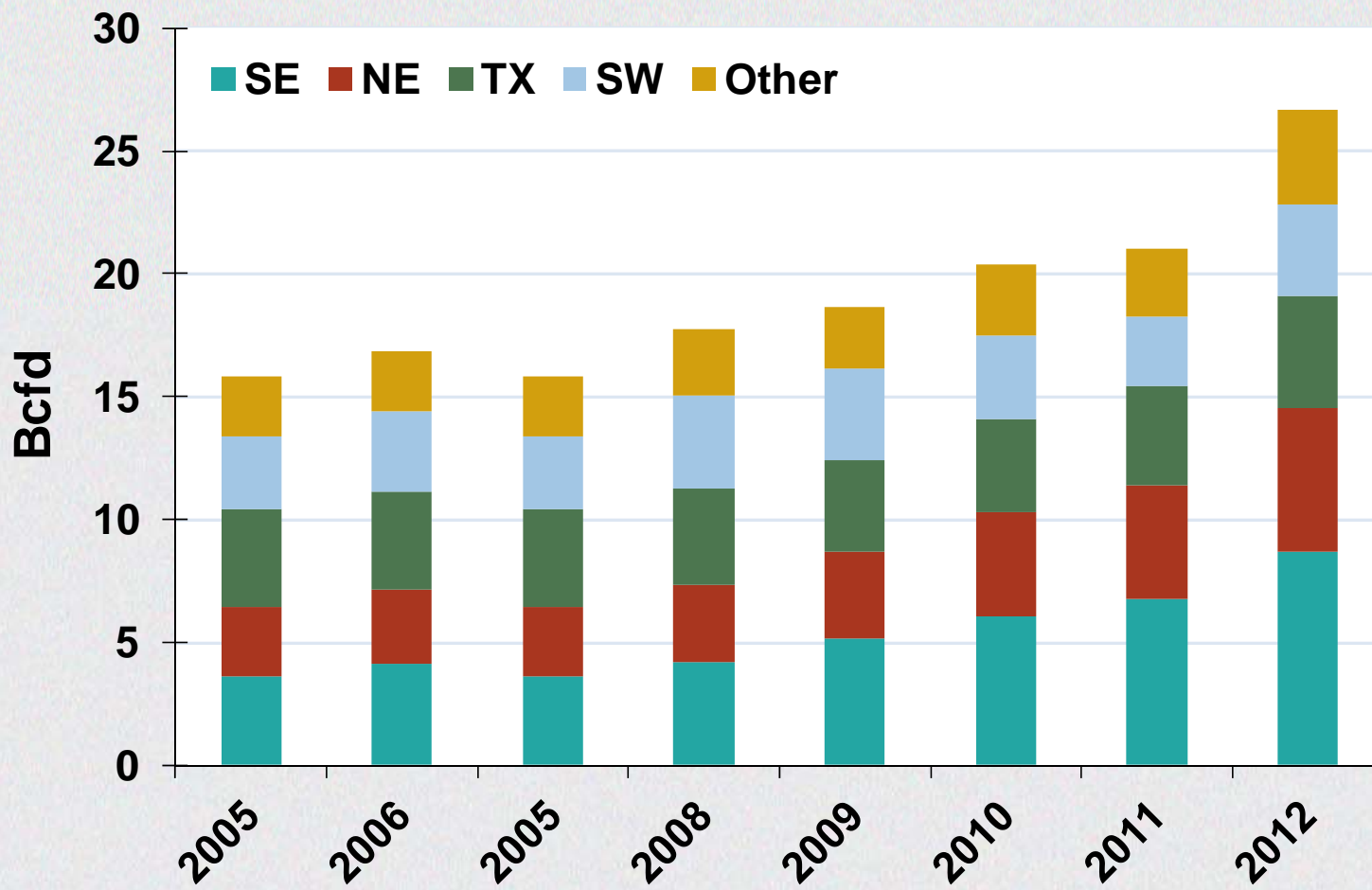


*Coal price adjusted for power plant efficiency

Source: Derived from Intercontinental Exchange data



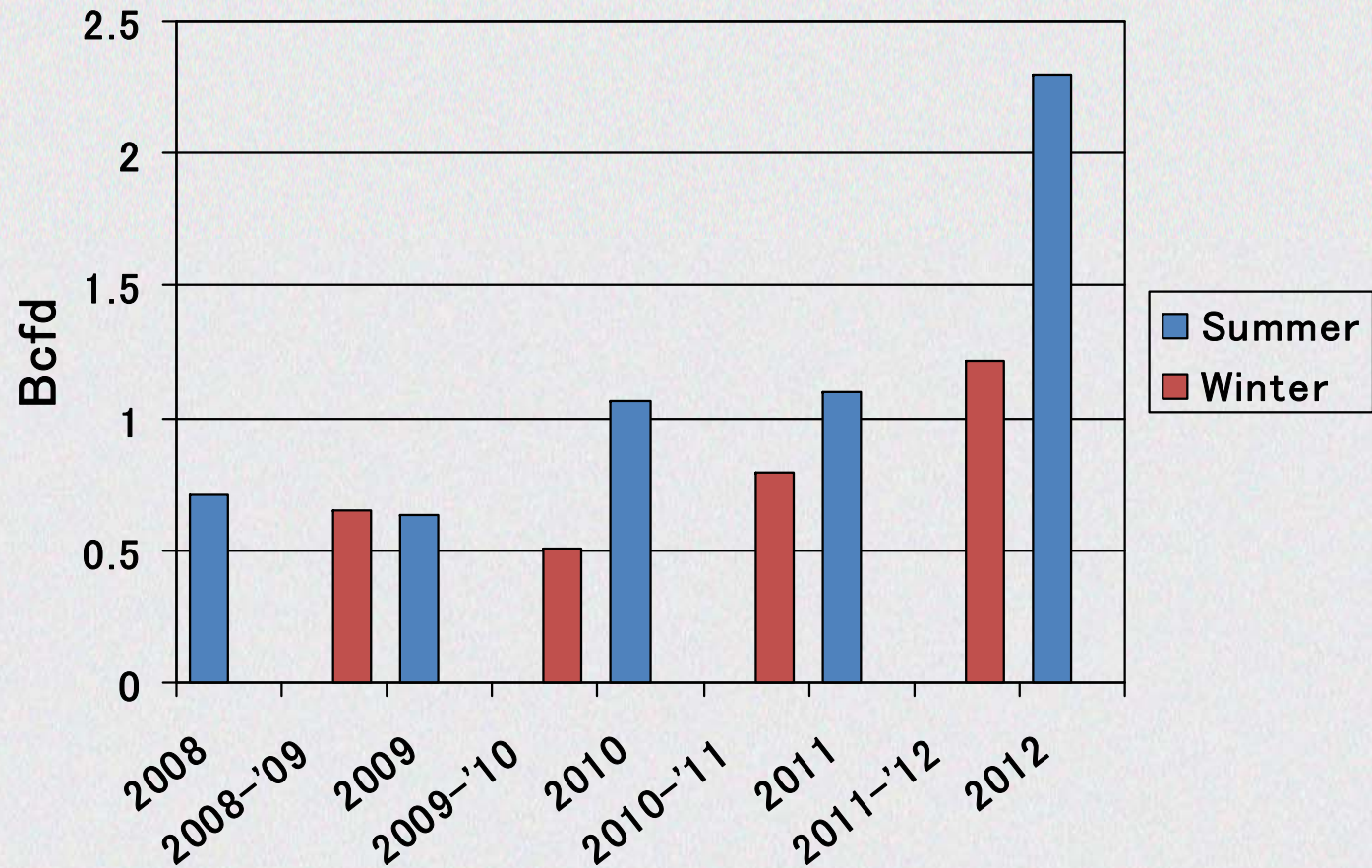
U.S. Power burn grows to 40% of U.S. gas market in 2012



Source: Derived from Bentek Energy data



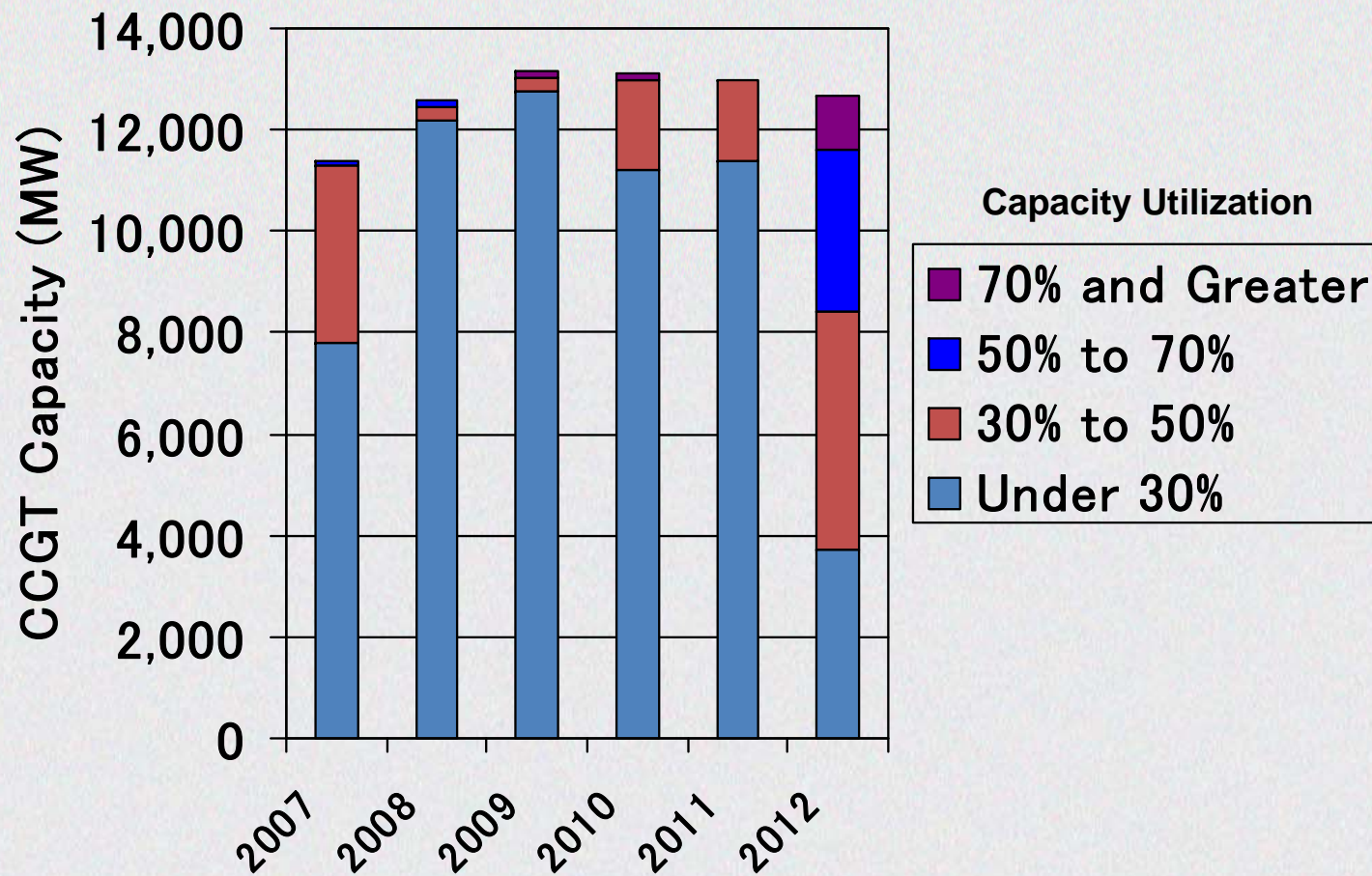
Midwest power burn more than doubles in 2012



Source: Derived from Bentek Energy data



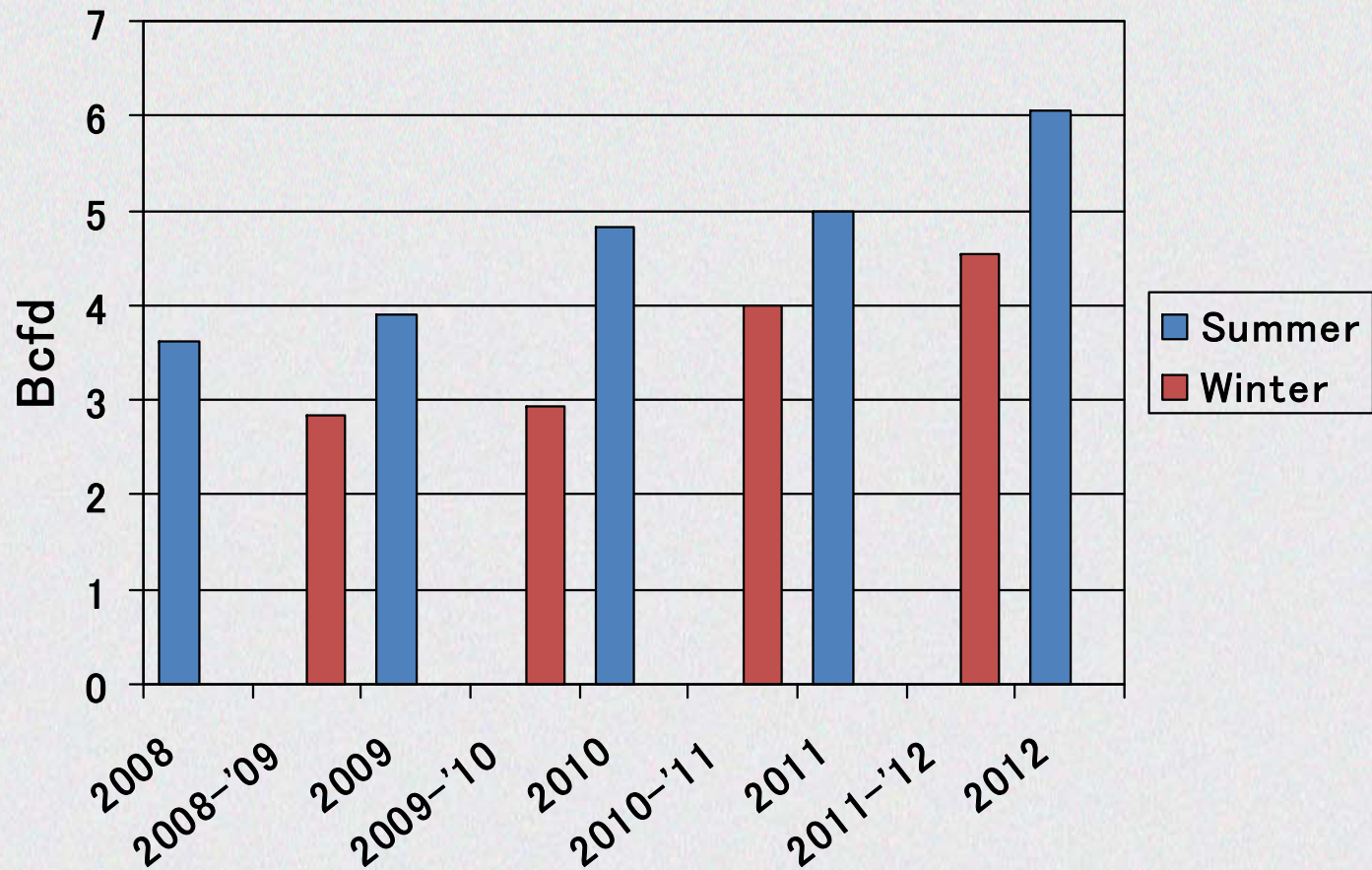
CCGT generation utilization increases in MISO



Source: Derived from SNL data



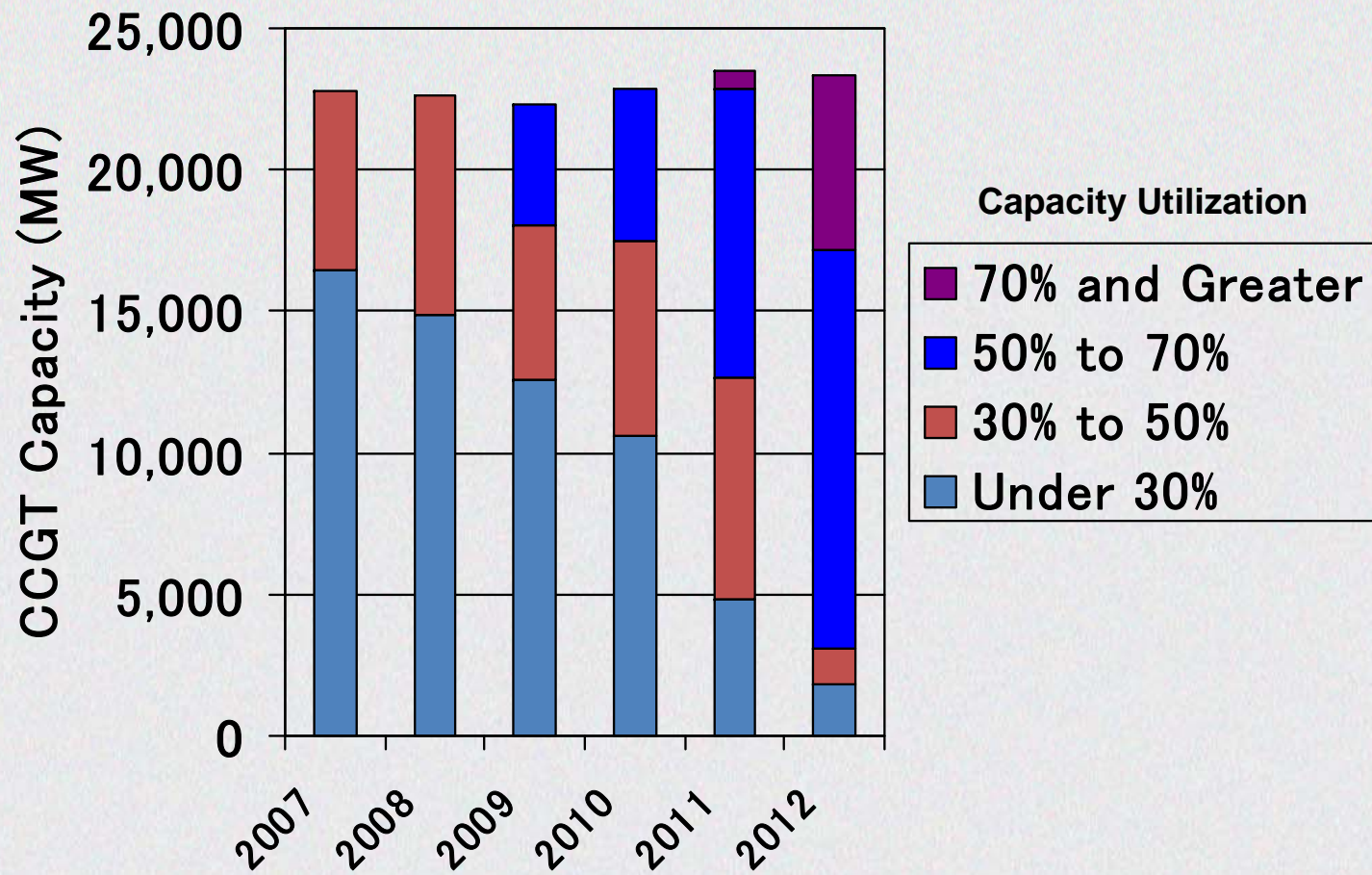
Record Northeast seasonal power burn



Source: Derived from Bentek Energy data



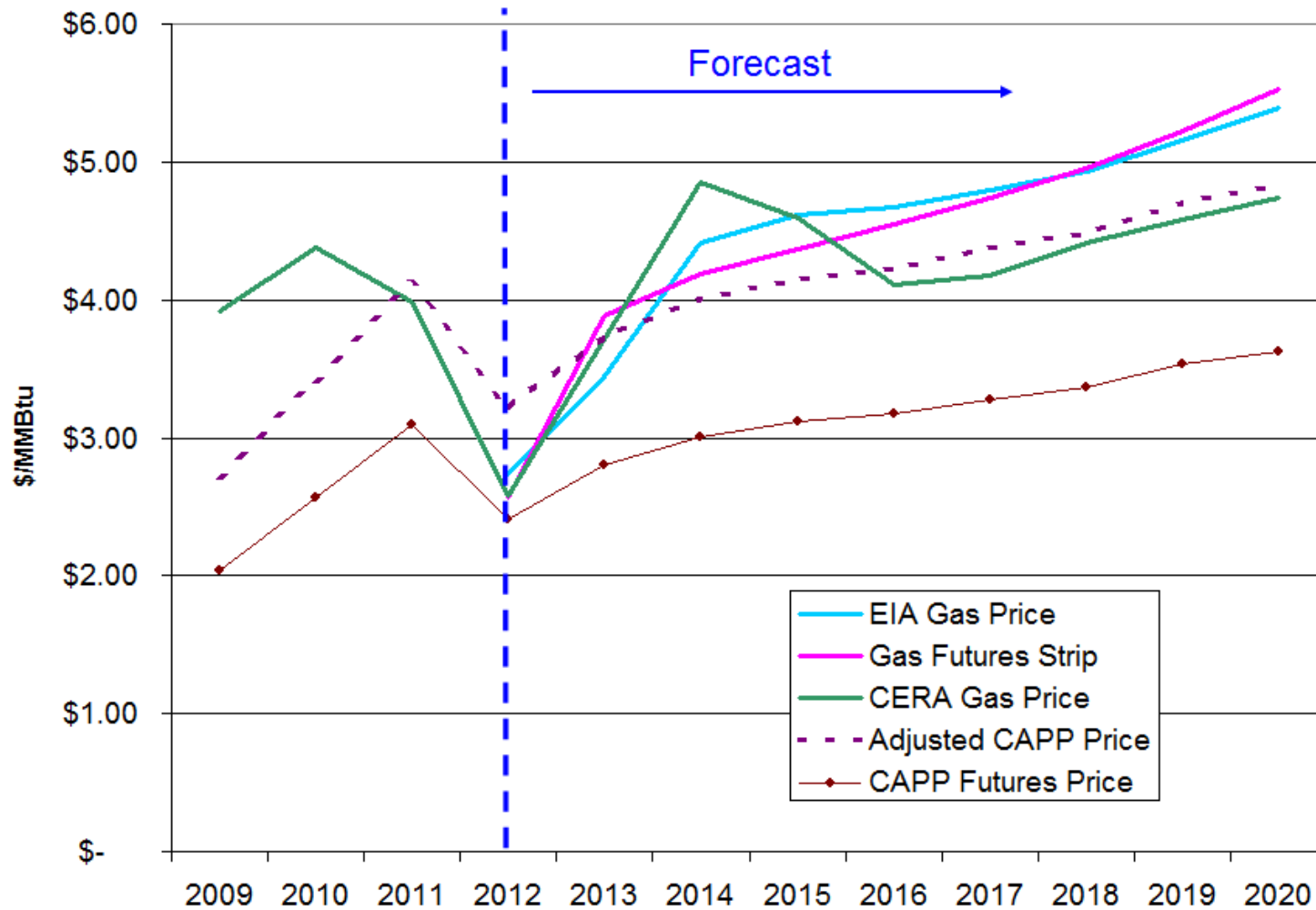
CCGT utilization increases in PJM



Source: Derived from SNL data

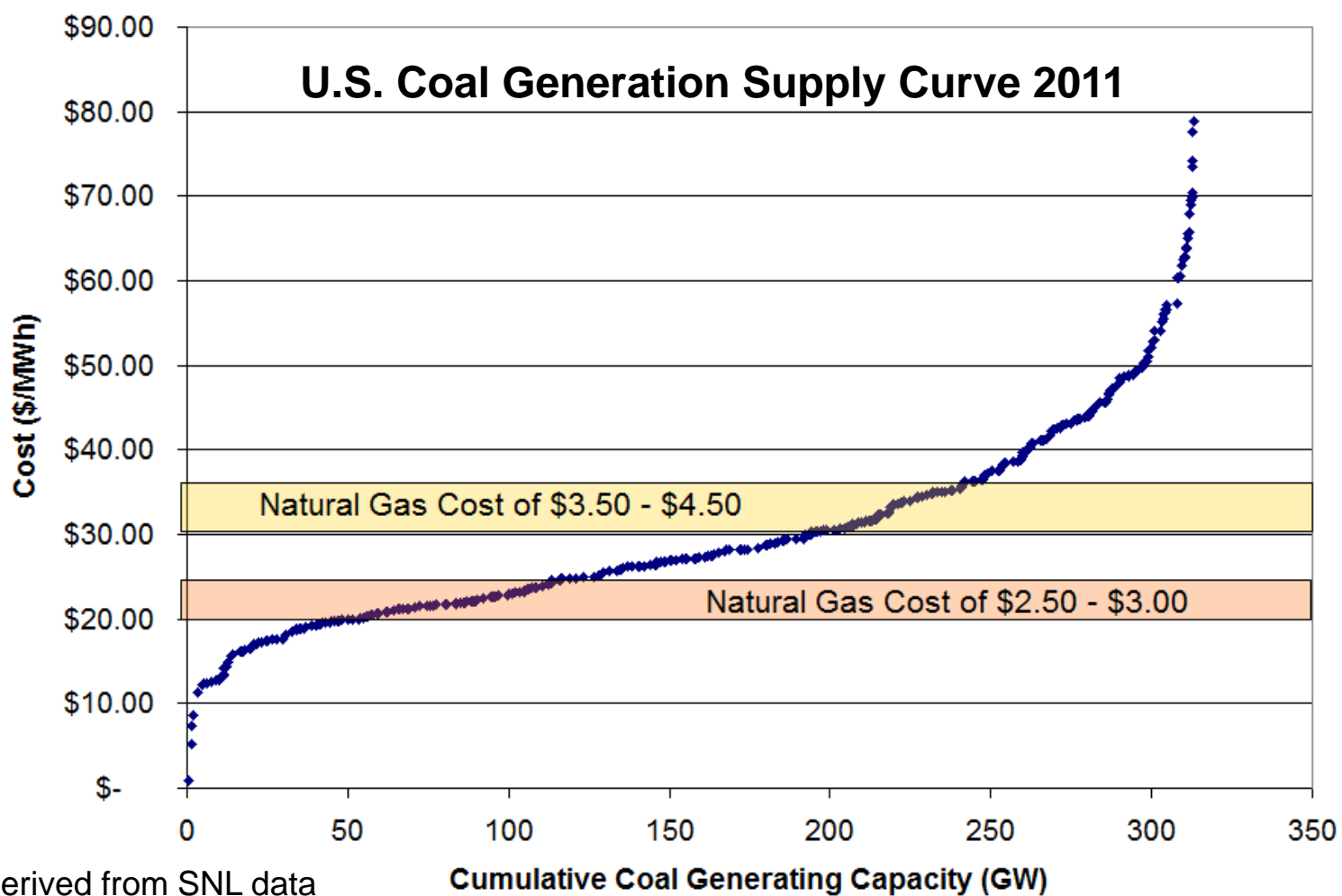


Natural gas prices forecast to rise





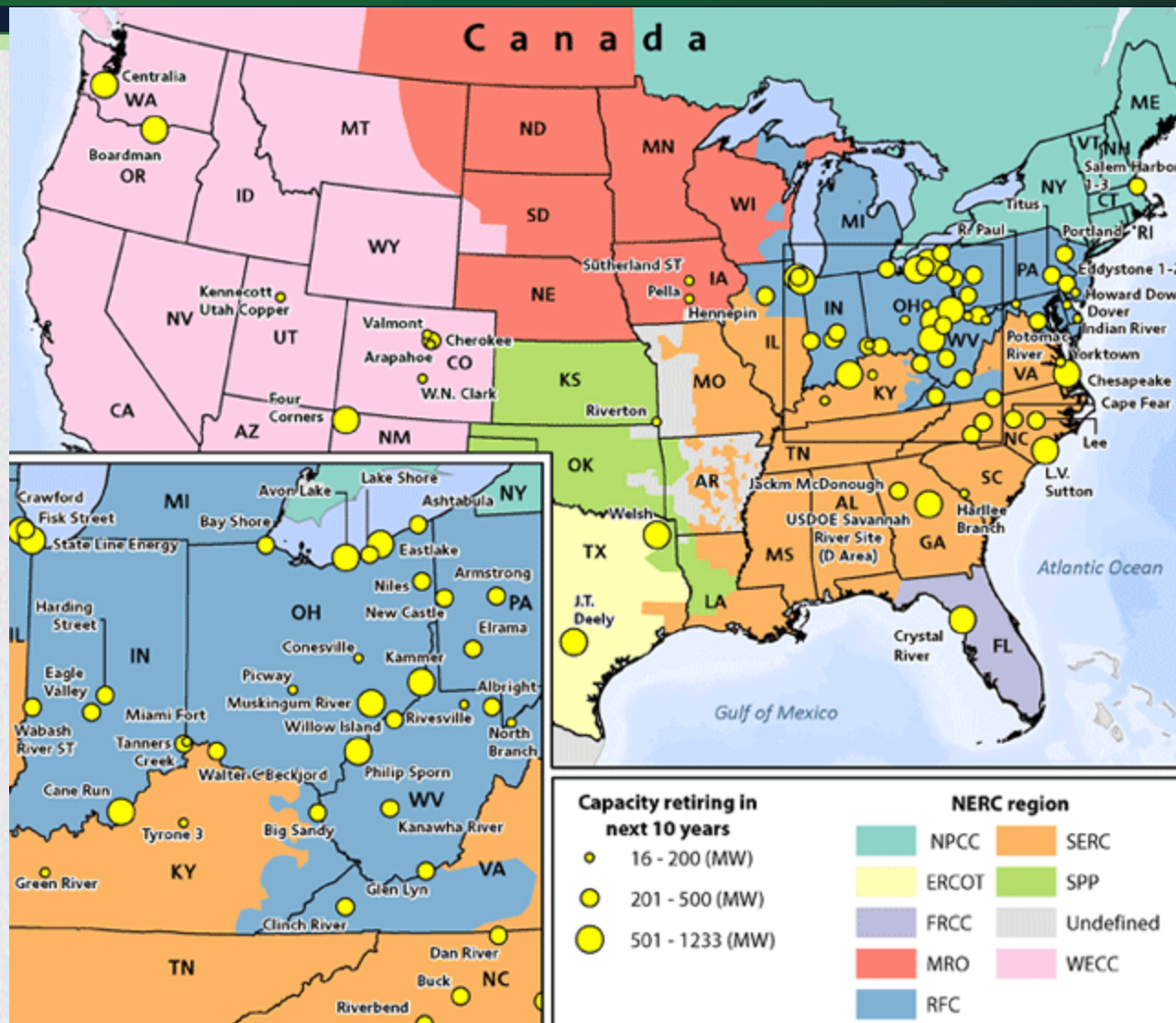
Substitution of gas for coal generation



Source: Derived from SNL data



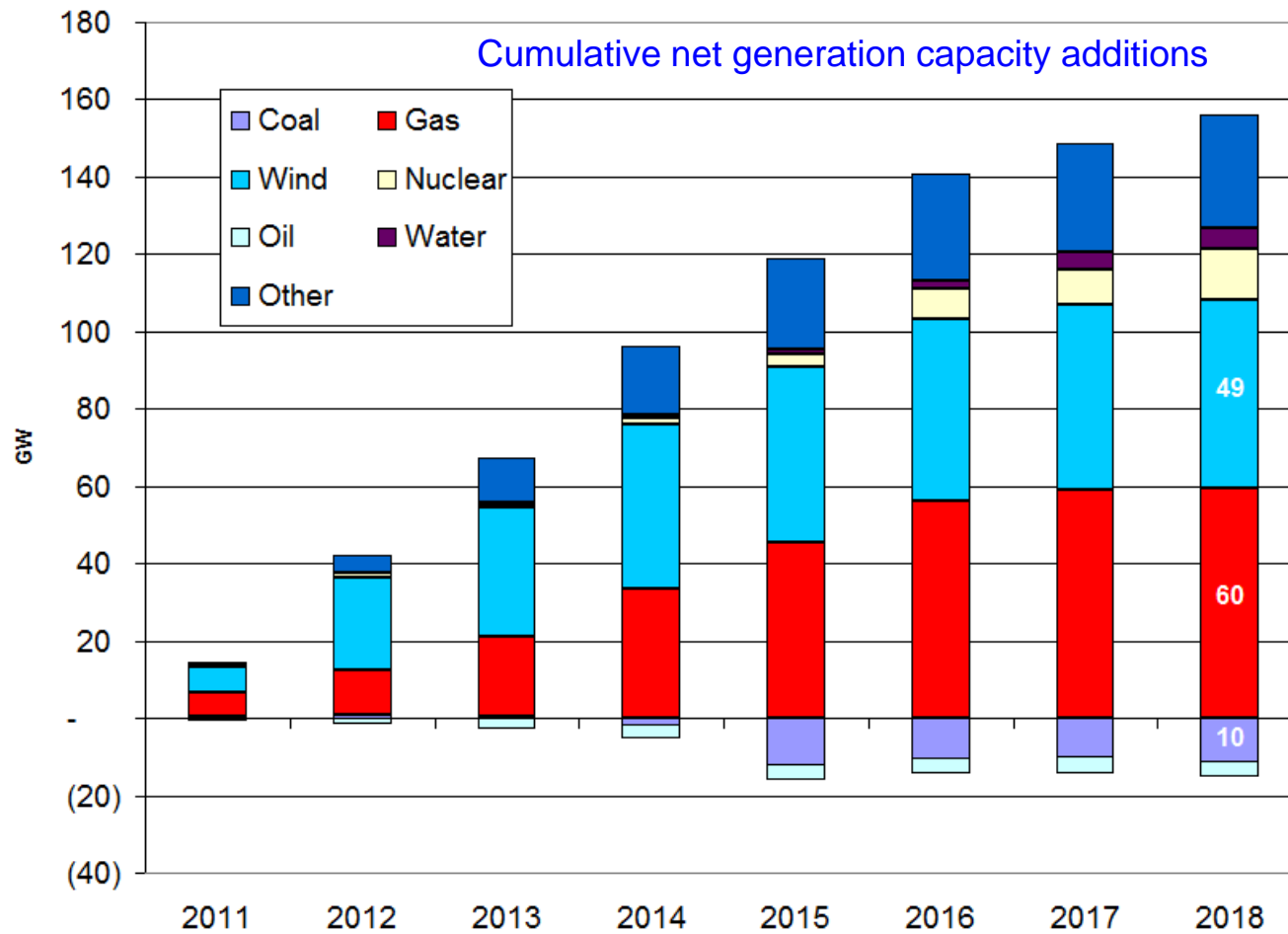
25,000 MW of coal-fired capacity could retire by 2021



Source: SNL Energy



Gas dominates future generation capacity



Source: Derived from SNL data



Natural gas spurring 50 major industrial projects 2012-2018

30

NEW PROJECTS

17 Petrochemical
10 Steel
1 Fertilizer
1 Gas-to-liquids
*1 LNG

15

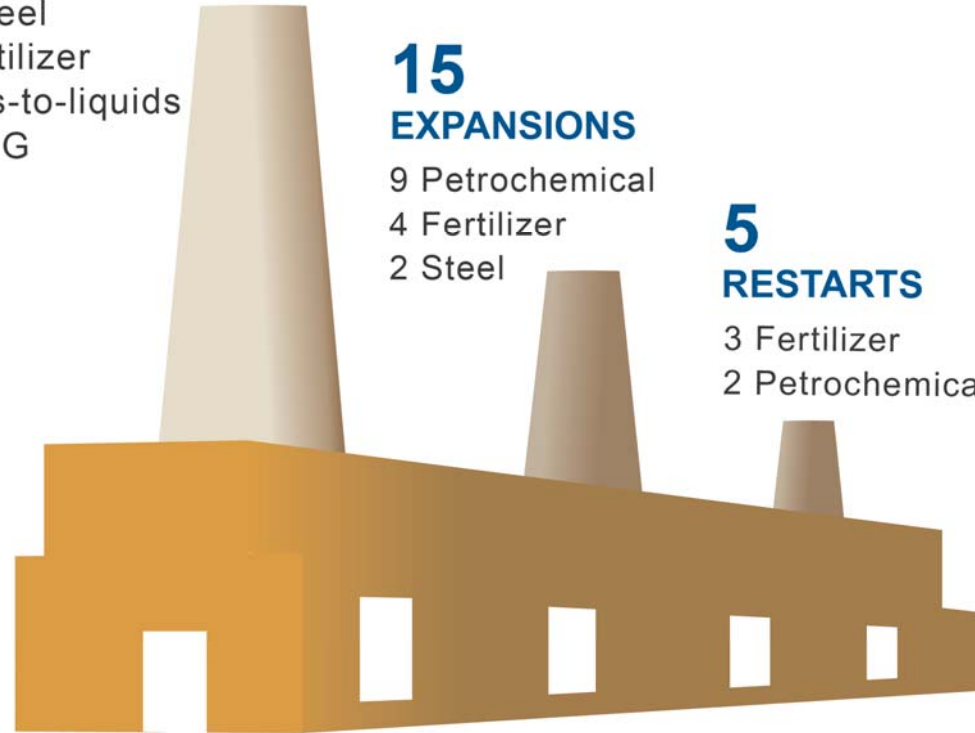
EXPANSIONS

9 Petrochemical
4 Fertilizer
2 Steel

5

RESTARTS

3 Fertilizer
2 Petrochemical

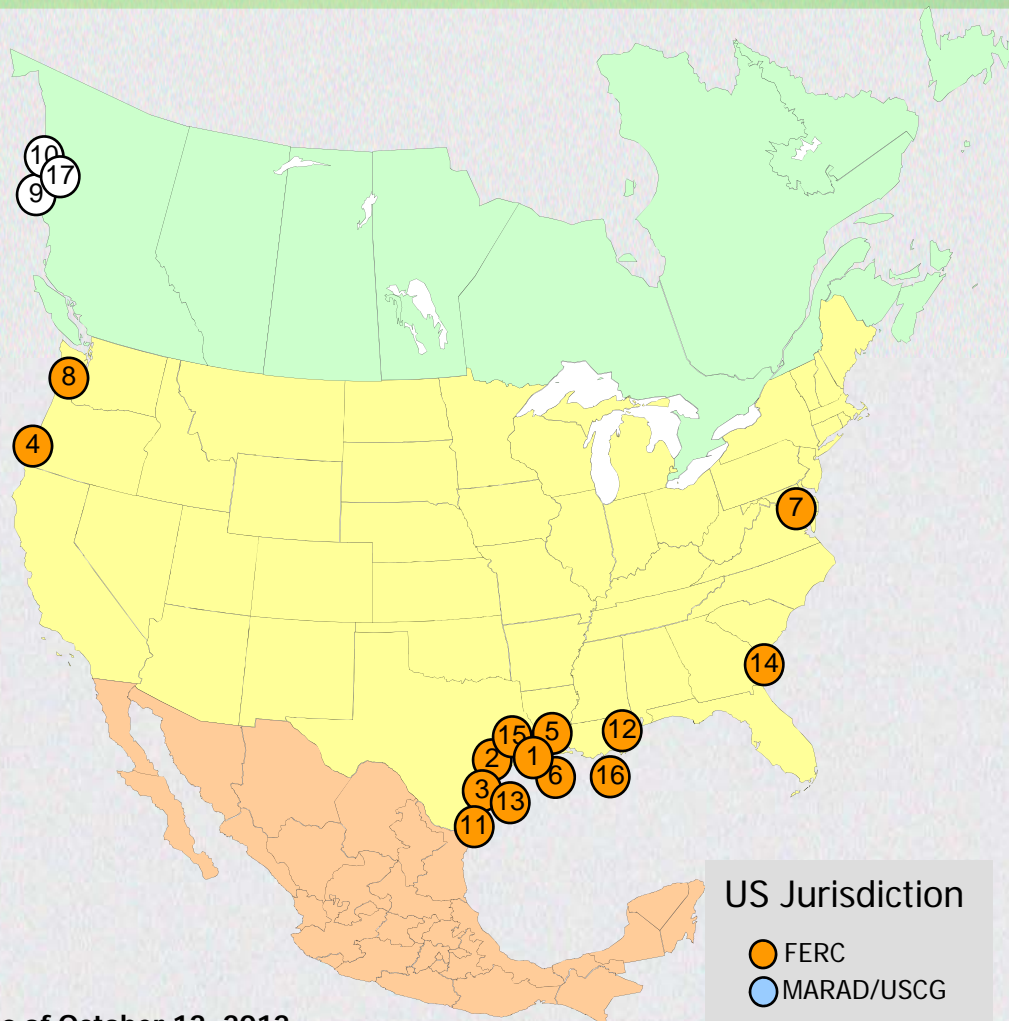


*1 LNG project (Sabine Pass) with DOE/FERC approval

Source: Energy Ventures Analysis, Inc.



Over 27 Bcfd of LNG export projects proposed



US Jurisdiction
 ● FERC
 ○ MARAD/USCG

As of October 12, 2012

Export Terminal

APPROVED - UNDER CONSTRUCTION

U.S. - FERC

1. Sabine, LA: 2.6 Bcfd (Cheniere/Sabine Pass LNG)

PROPOSED TO FERC

2. Freeport, TX: 1.8 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction)
3. Corpus Christi, TX: 2.1 Bcfd (Cheniere – Corpus Christi LNG)
4. Coos Bay, OR: 0.9 Bcfd (Jordan Cove Energy Project)
5. Lake Charles, LA: 2.4 Bcfd (Southern Union - Trunkline LNG)
6. Hackberry, LA: 1.7 Bcfd (Sempra – Cameron LNG)
7. Cove Point, MD: 0.75 Bcfd (Dominion – Cove Point LNG)
8. Astoria, OR: 1.30 Bcfd (Oregon LNG)

PROPOSED CANADIAN SITES IDENTIFIED BY PROJECT

SPONSORS

9. Kitimat, BC: 0.7 Bcfd (Apache Canada Ltd.)
10. Douglas Island, BC: 0.25 Bcfd (BC LNG Export Cooperative)

POTENTIAL U.S. SITES IDENTIFIED BY PROJECT SPONSORS

11. Brownsville, TX: 2.8 Bcfd (Gulf Coast LNG Export)
12. Pascagoula, MS: 1.5 Bcfd (Gulf LNG Liquefaction)
13. Lavaca Bay, TX: 1.38 Bcfd (Excelerate Liquefaction)
14. Elba Island, GA: 0.5 Bcfd (Southern LNG Company)
15. Sabine Pass, TX: 2.6 Bcfd (ExxonMobil – Golden Pass)
16. Plaquemines Parish, LA: 1.07 Bcfd (CE FLNG)

POTENTIAL CANADIAN SITES IDENTIFIED BY PROJECT

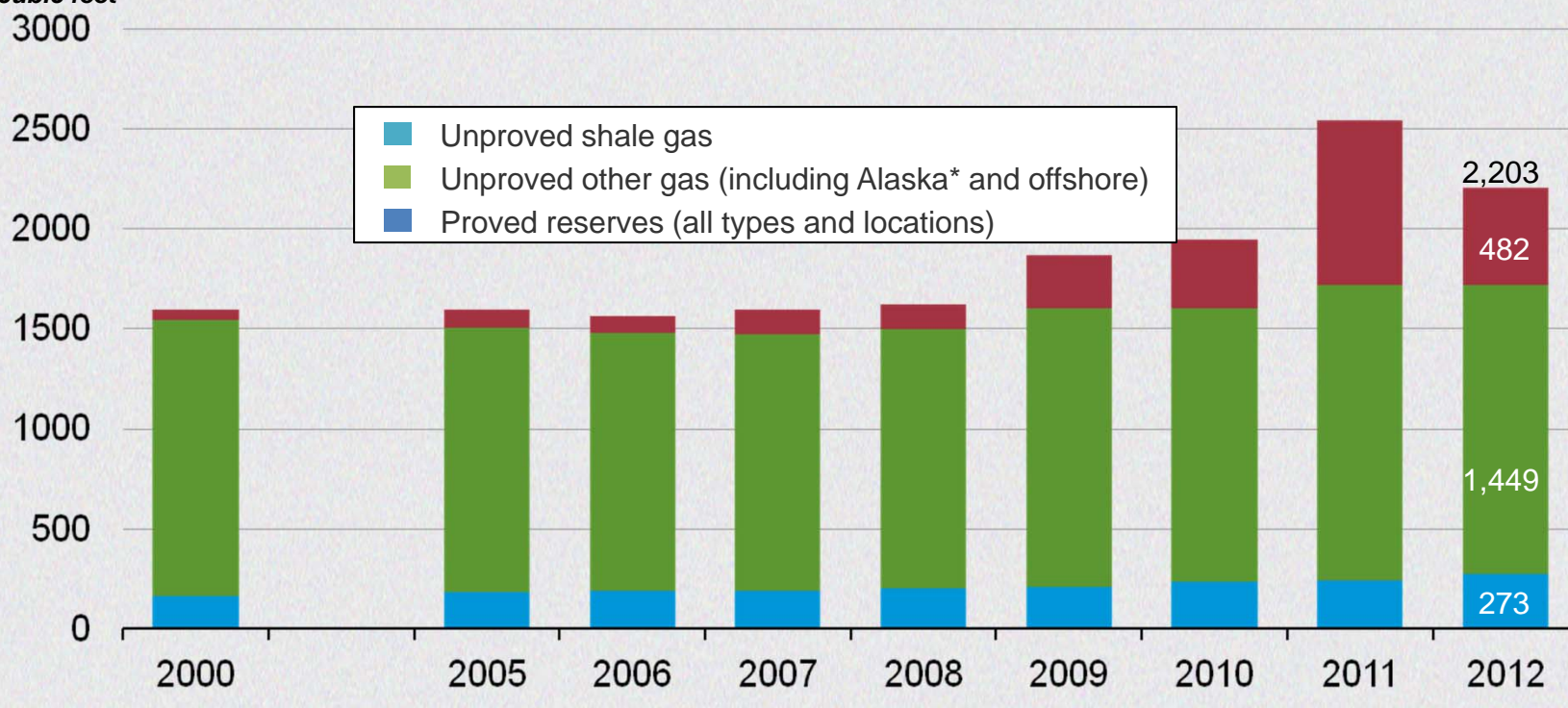
SPONSORS

17. Prince Rupert Island, BC: 1.0 Bcfd (Shell Canada)



Over 100 years of Technically Recoverable Natural Gas Resources

U.S. dry gas resources
trillion cubic feet



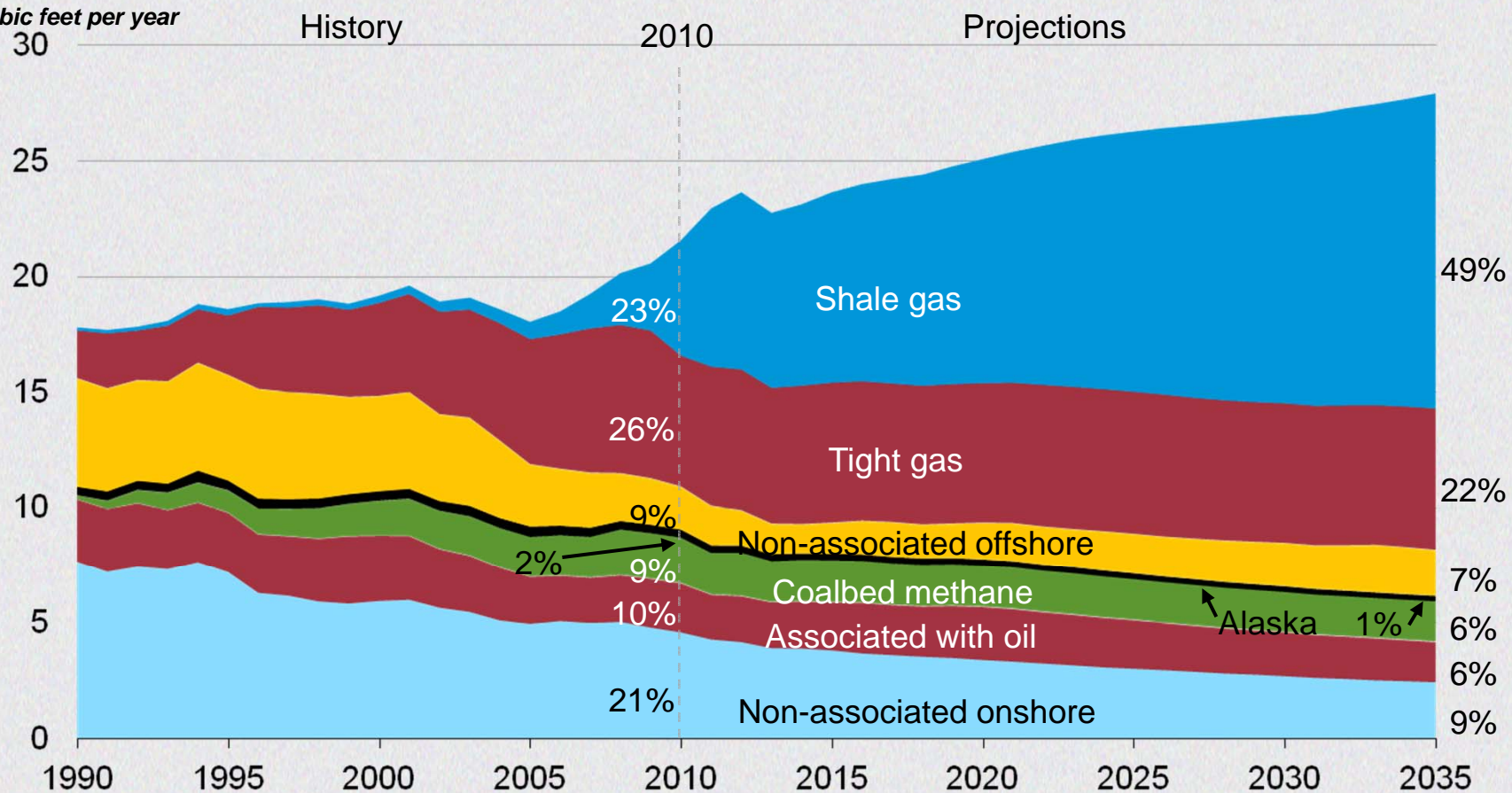
*Alaska resource estimates prior to AEO2009 reflect resources from the North Slope that were not included in previously published documentation.

Source: EIA, Annual Energy Outlook



Shale gas offsets declines in other U.S. natural gas production sources

U.S. dry gas production
trillion cubic feet per year





Conclusions

- **Shale gas revolution has brought low cost gas to generators**
- **Long run gas prices likely to average \$4-5/MMBtu**
- **Gas fired generation is most likely source of gas demand growth**
- **Other sources of growth will be industrial load**
- **LNG exports???**
- **Gas production should grow to meet demand growth**