
The Changing Energy Landscape

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Todd Busby

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- **Changes for Coal Generation**
- **Changes in Fuel Markets**
- **Current Market Indicators**
- **Summary**

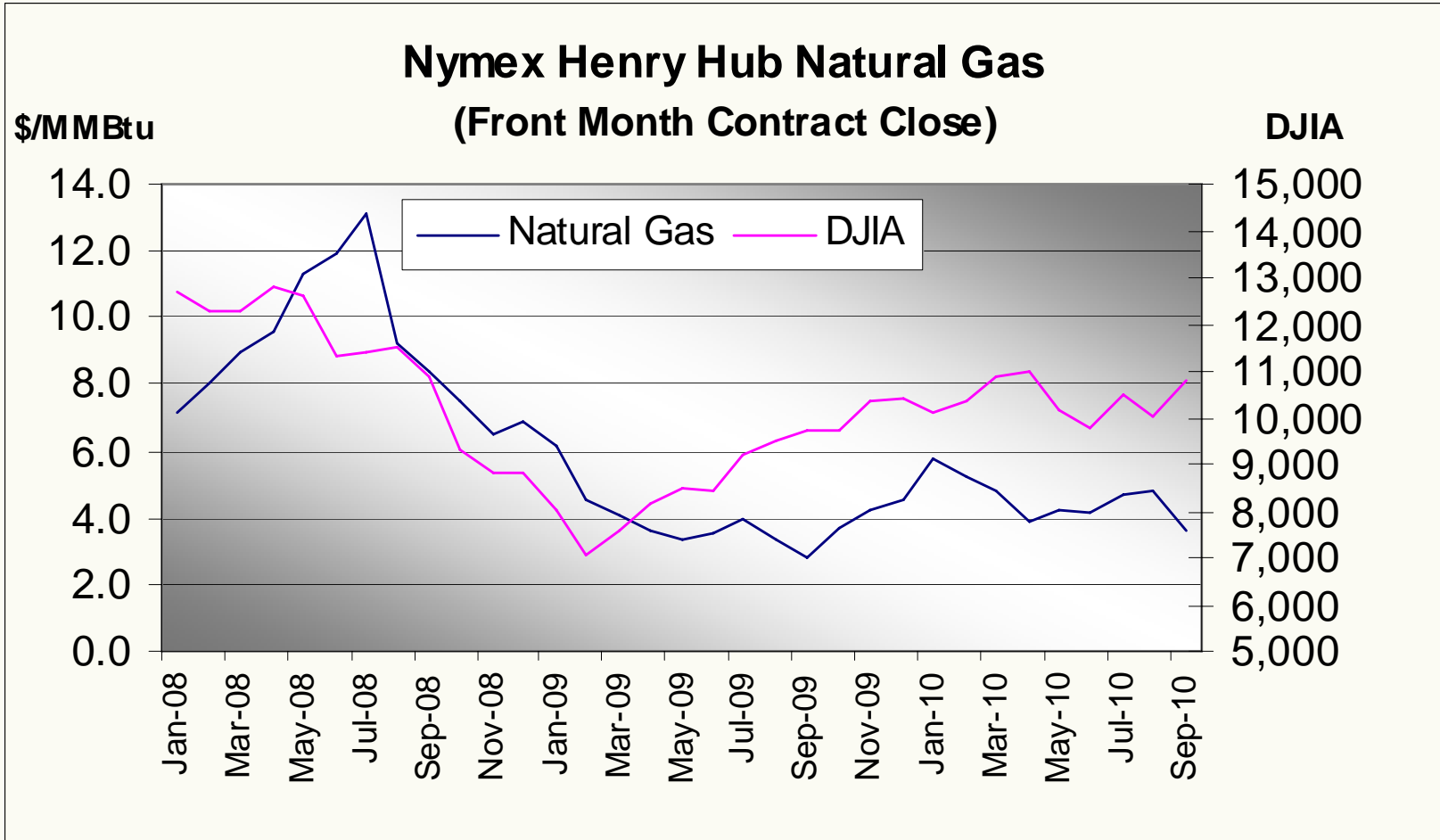
Changes for Coal Generation

- The average age of the 340 GW US coal fleet is ten years older than the overall average for US generation
- The cost of installing emission controls may force companies to accelerate retirement of coal units, particularly smaller, older units
- Industry estimates place between 15% and 30% of the existing US coal fleet at risk for early retirement due to increased costs arising from proposed environmental regulations

Changes in Fuel Markets

- Throughout the decade and until recently, natural gas supply has been constrained and extremely volatile
- The Barnett Shale discovery in Texas fundamentally changed supply
- The Marcellus Shale Formation in the Appalachian Basin is estimated to hold between 300 to 500 TCF of recoverable reserves
- Shale gas continues to be a growing source of US supply and should provide a dampening effect for natural gas price volatility in the near term
- The use of fossil fuels for electric generation continues to face environmental and regulatory scrutiny, but must remain a key source of supply for energy independence

Natural Gas Prices



What Does This Mean?

- The generation portfolio mix will change
- New generation will be required
- Investment will be needed from both utilities and IPPs
- Generation from natural gas units will increase
 - Expansion of physical infrastructure
 - Evolution of gas scheduling protocols to sync with gas generation requirements
- Generation from renewable resources will increase
 - Expansion of transmission system
- Coal generation must remain in the mix