

# North American Natural Gas Market Outlook

*Prepared For:*

## Gas/Electric Partnership

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Purvin & Gertz, Inc.



PURVIN  
& GERTZ  
INC.

# North American Natural Gas

- Ø Purvin & Gertz - Background
- Ø U.S. Economy and GDP Outlook
- Ø U.S. Gas Market's Current Situation and Outlook
  - § U.S. Lower 48 Associated Natural Gas Supply and Demand
  - § Canada Gas Market Overview
- Ø Henry Hub Price Forecast
- Ø N.A. Inter-Regional Gas Flows
- Ø Conclusions



# Purvin & Gertz – Background

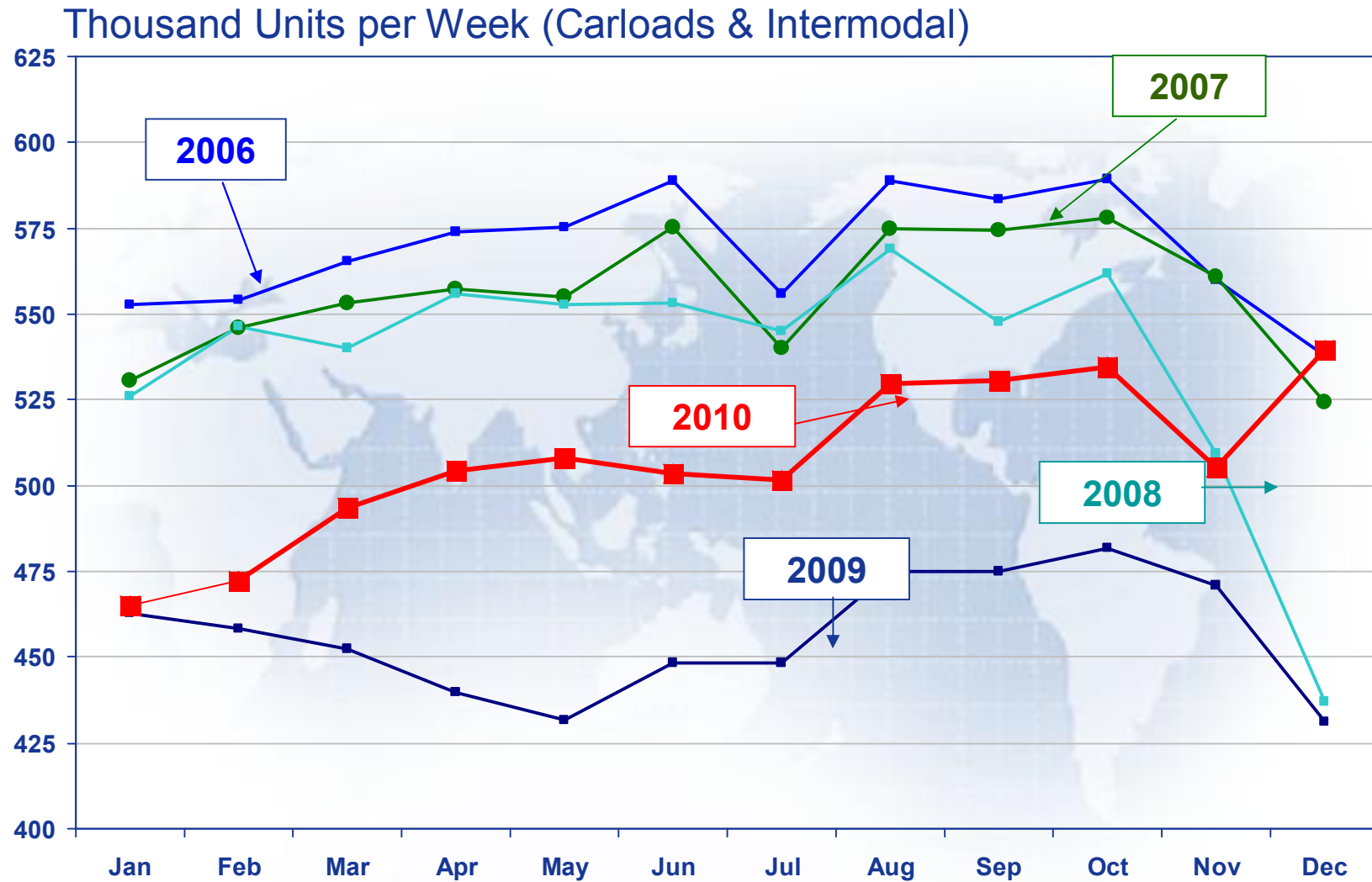
- Ø Founded in 1947 – in business for 64 years
- Ø Independent global firm owned by active consultants
- Ø Provide technical, commercial and strategic advice in the petroleum, natural gas, gas liquids, chemical and power generation industries
- Ø Consulting staff of Chemical Engineers/MBAs
  - § Technical, commercial and financial experience with an average of 25 years firm-wide



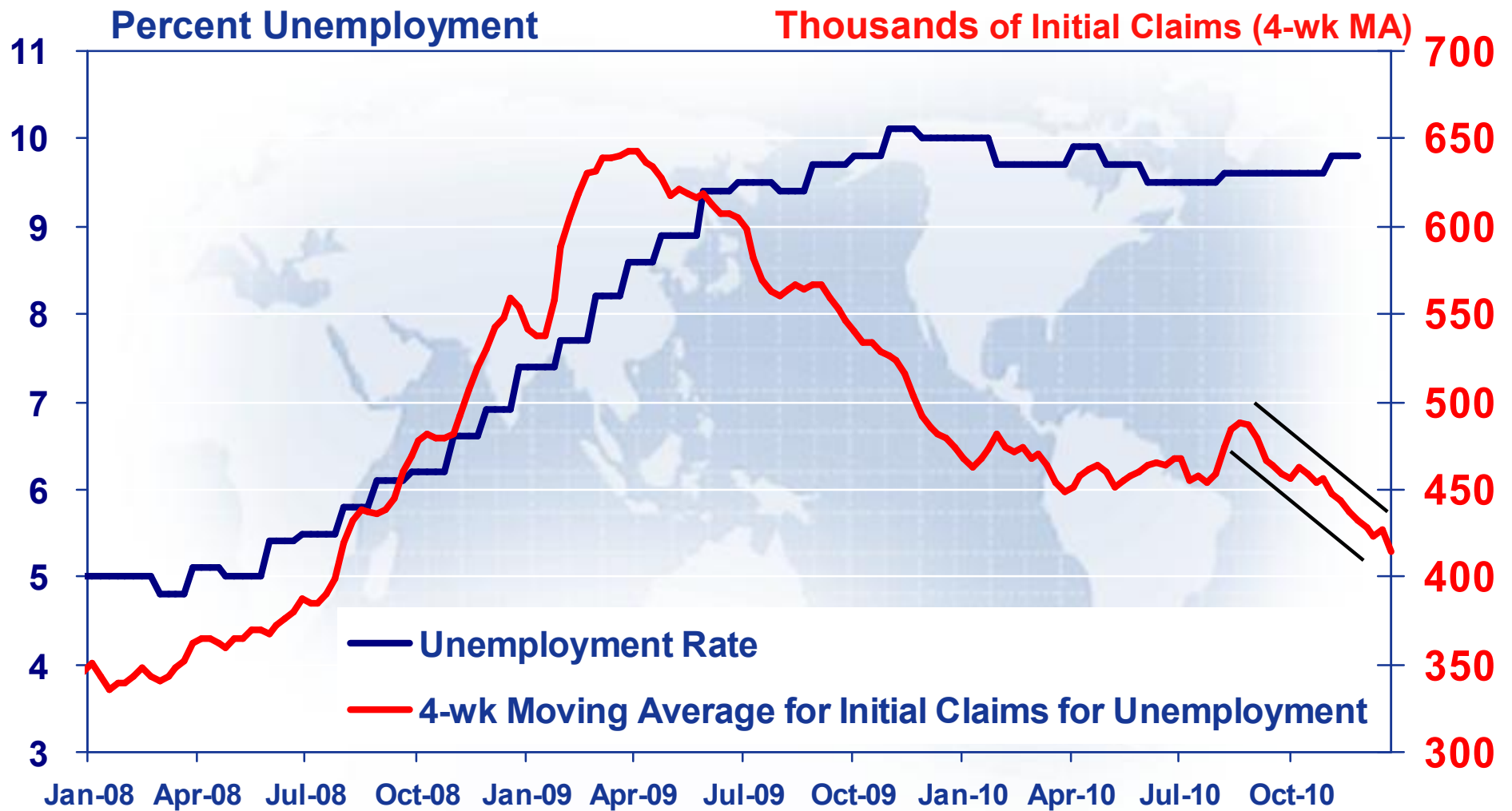
Combining our global presence and local knowledge to provide world class assistance . . .



# Rail traffic remains well above last year and is closing on 2006-2007 level of movements

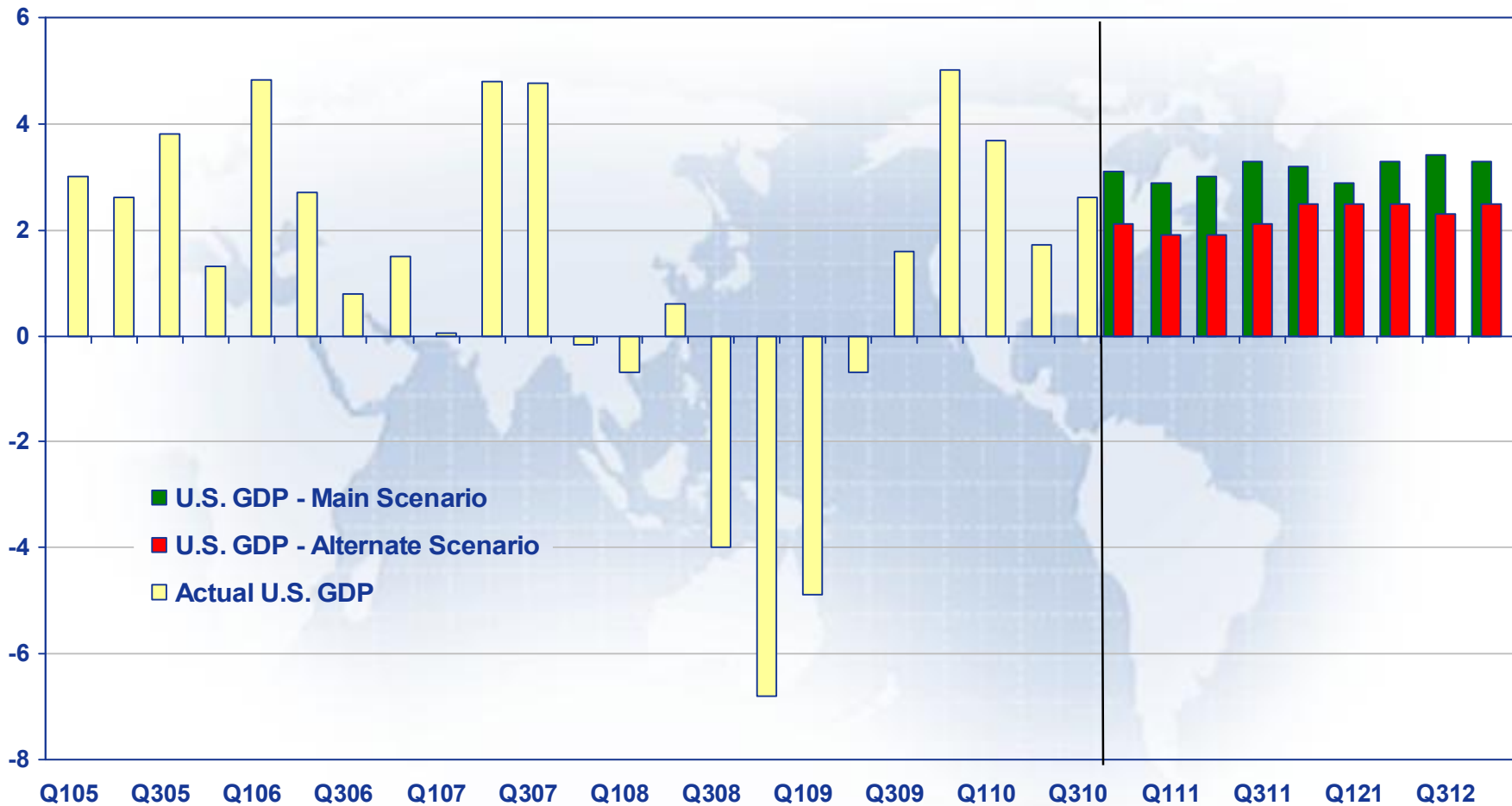


# U.S. initial unemployment claims has trended lower, but remains large exposure



# Moderate U.S. GDP growth forecast for 2010 at 2.6%; 2011 to improve by another 2.4%

U.S. GDP % of growth (Quarter-to-Quarter Change)



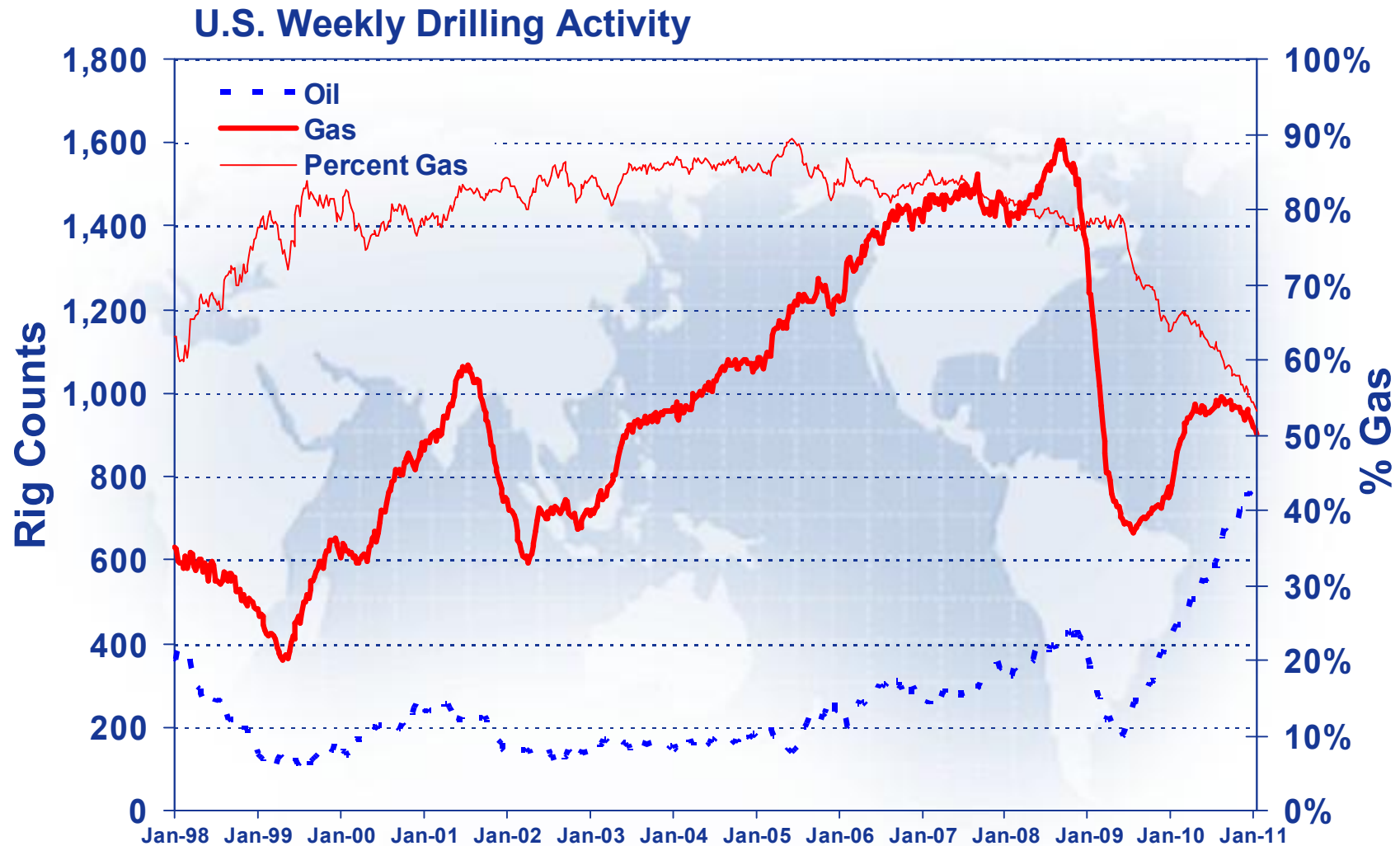
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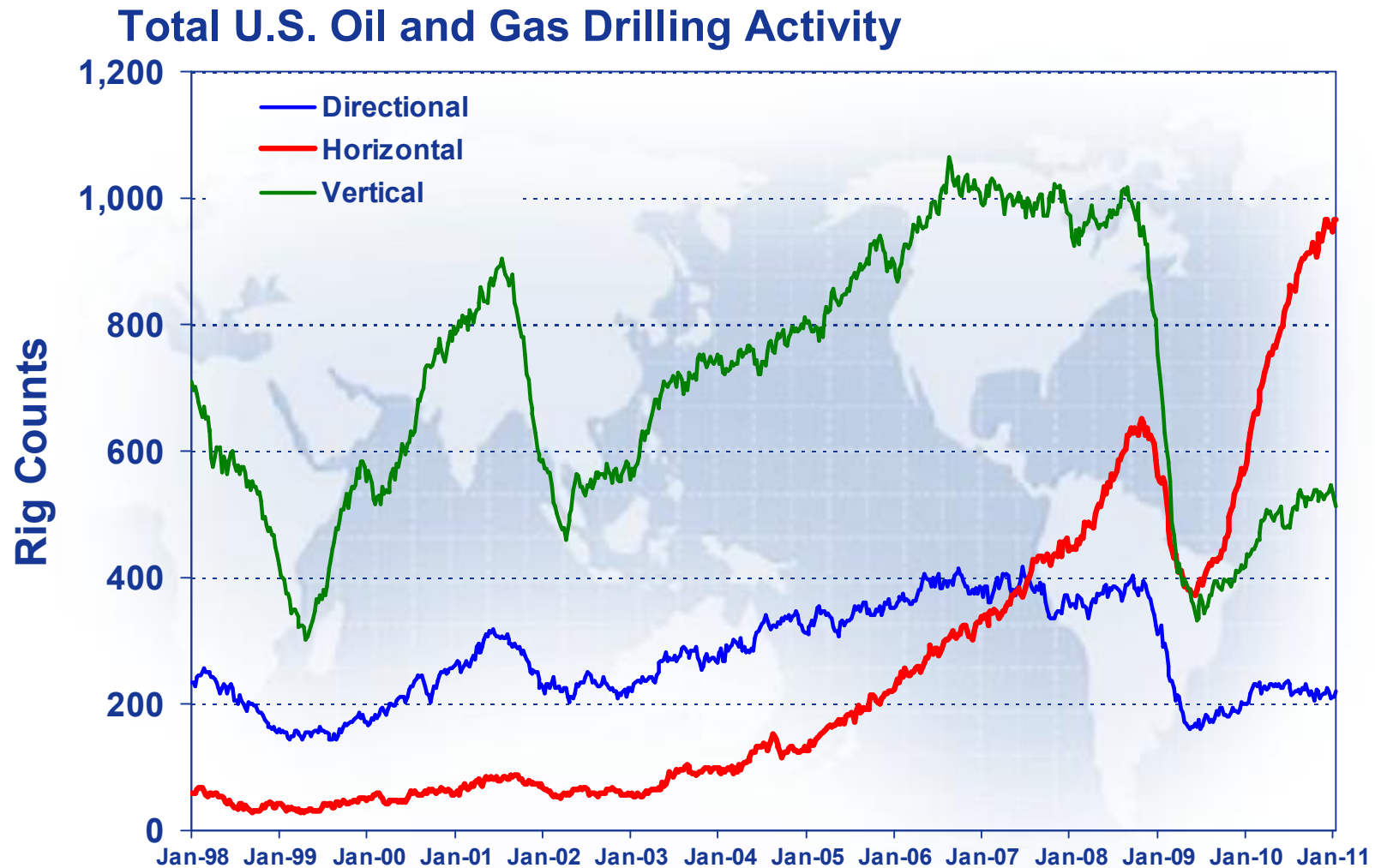




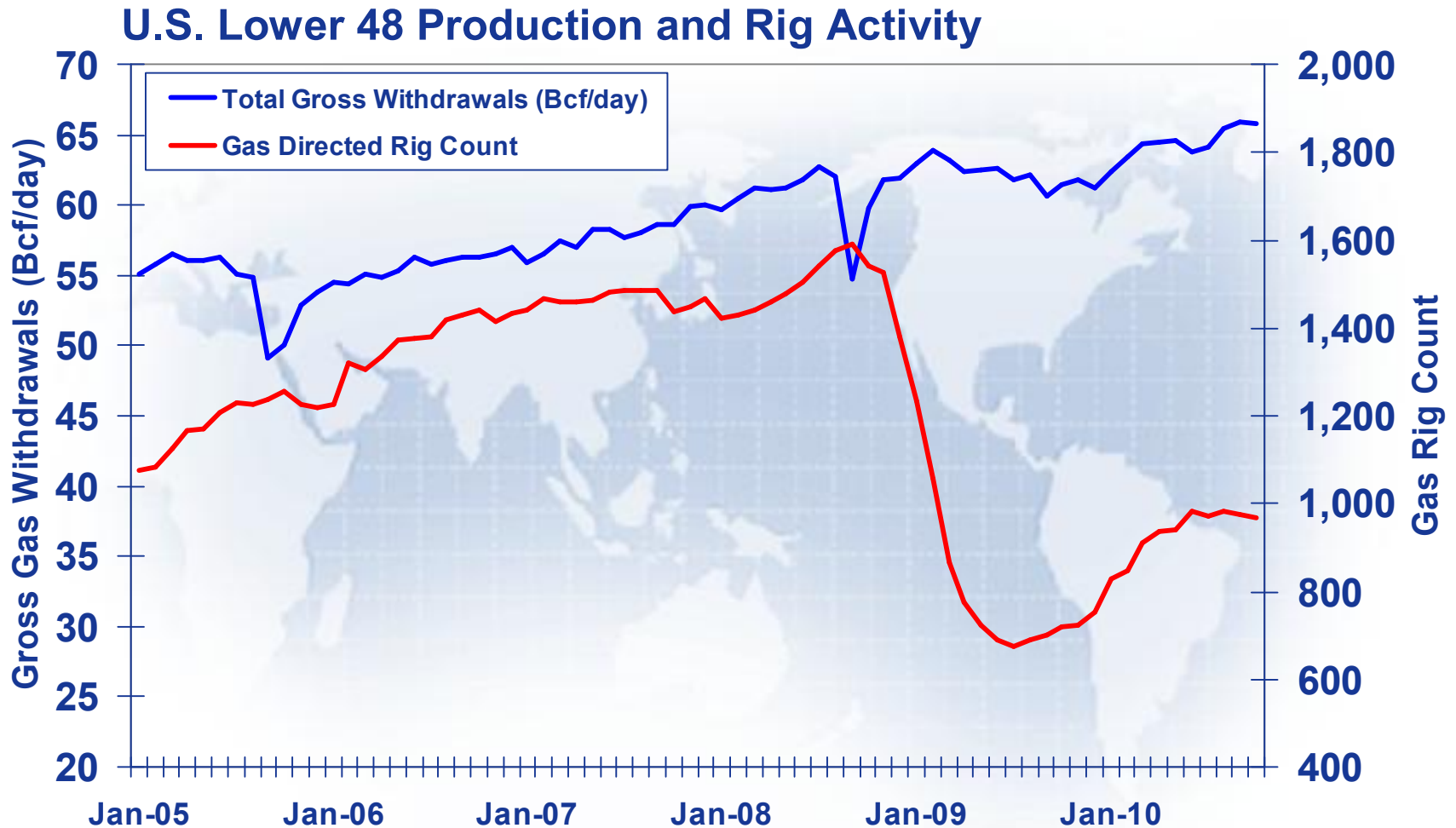
# Overall U.S. gas directed drilling activity has stabilized but and oil directed drilling activity continues to increase...



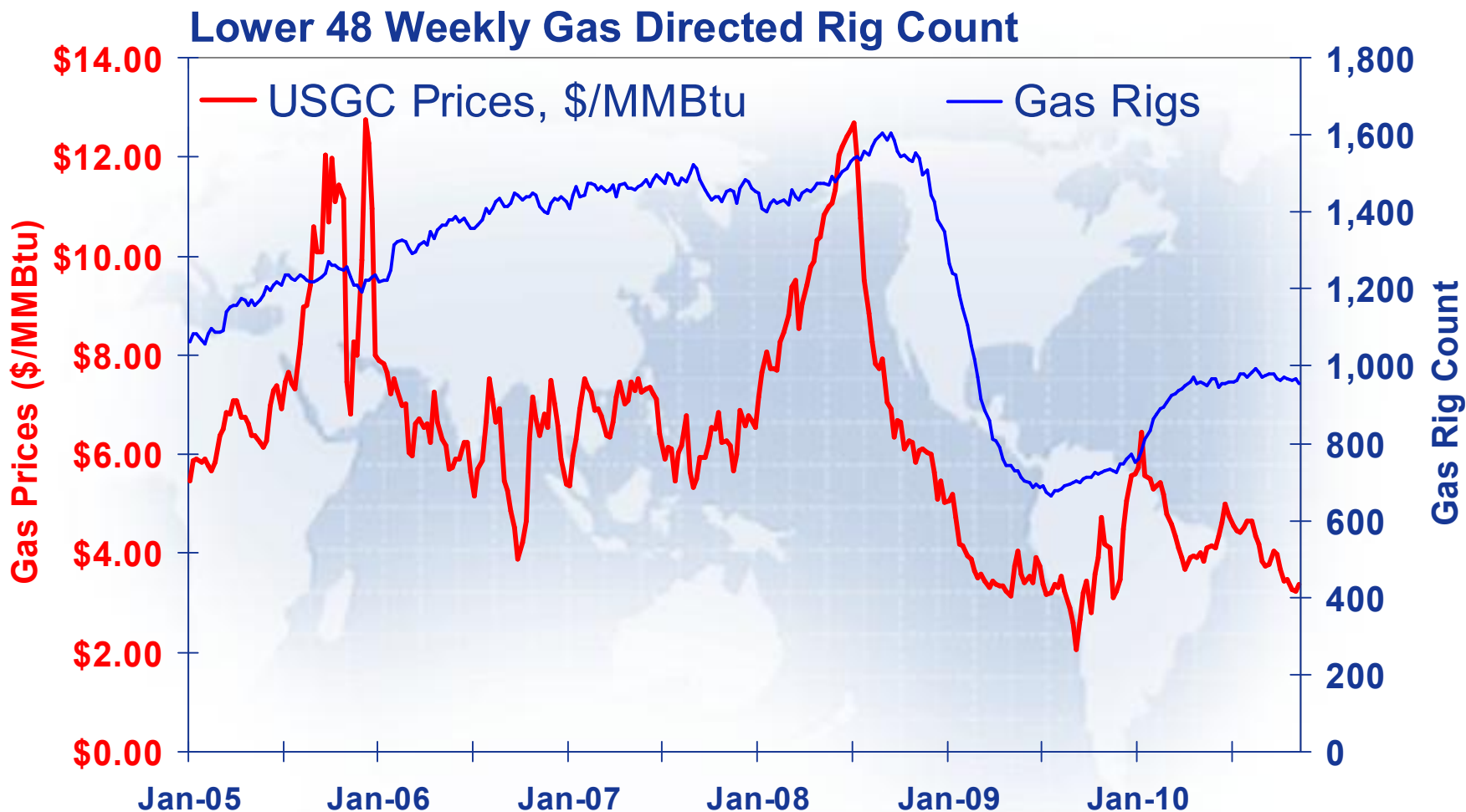
The number of horizontal oil and gas drilling rigs has recovered and has resumed to its pre-recessionary rate



# Gas production has continued to increase in spite of falling and (now) stabilized overall gas directed drilling activity

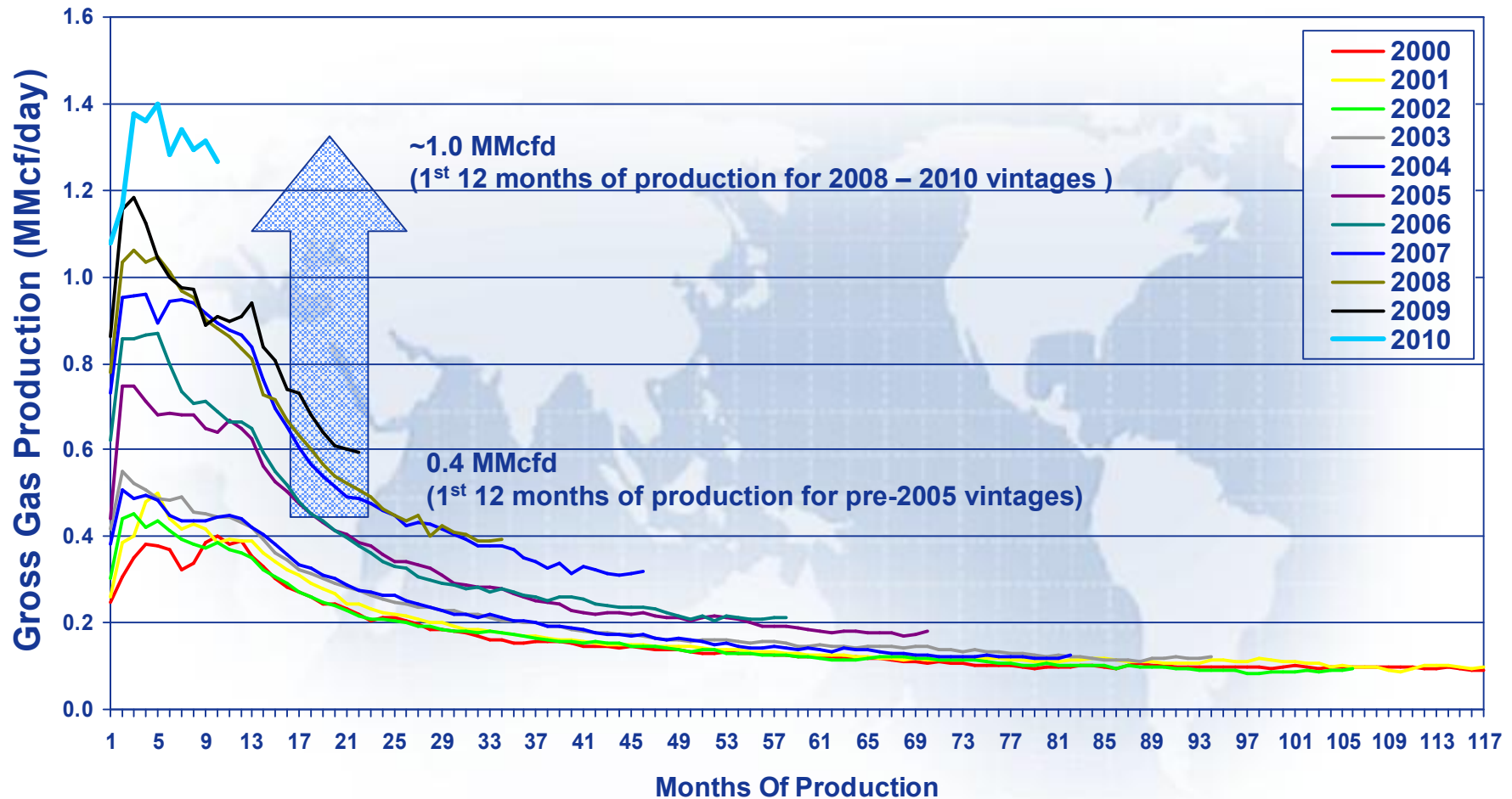


# A lower long term gas price track drives producers to focus on the technology and cash flow

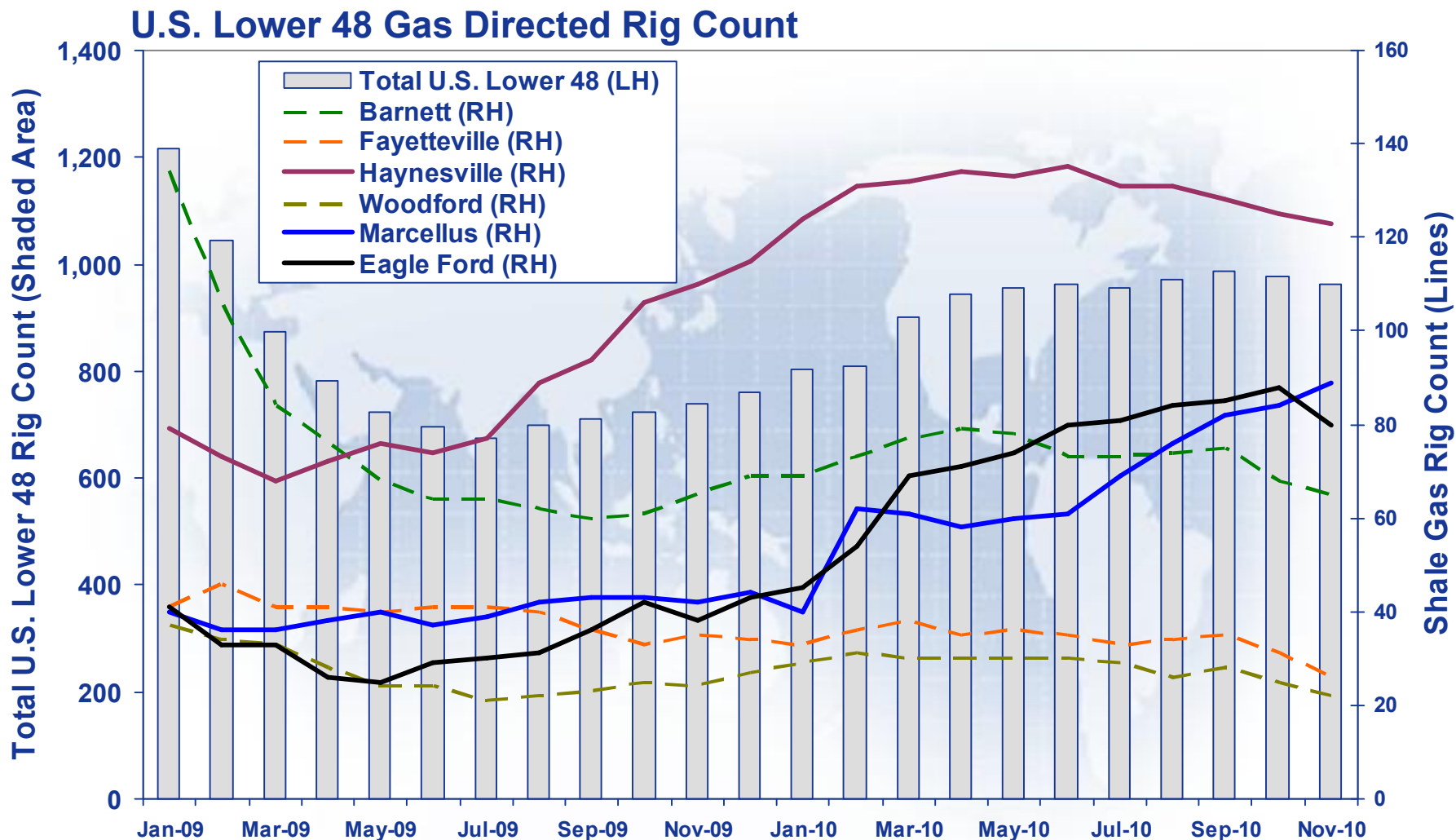


# Gas producers continue to move up the “hydraulic fracturing learning curve” increasing production and margins...

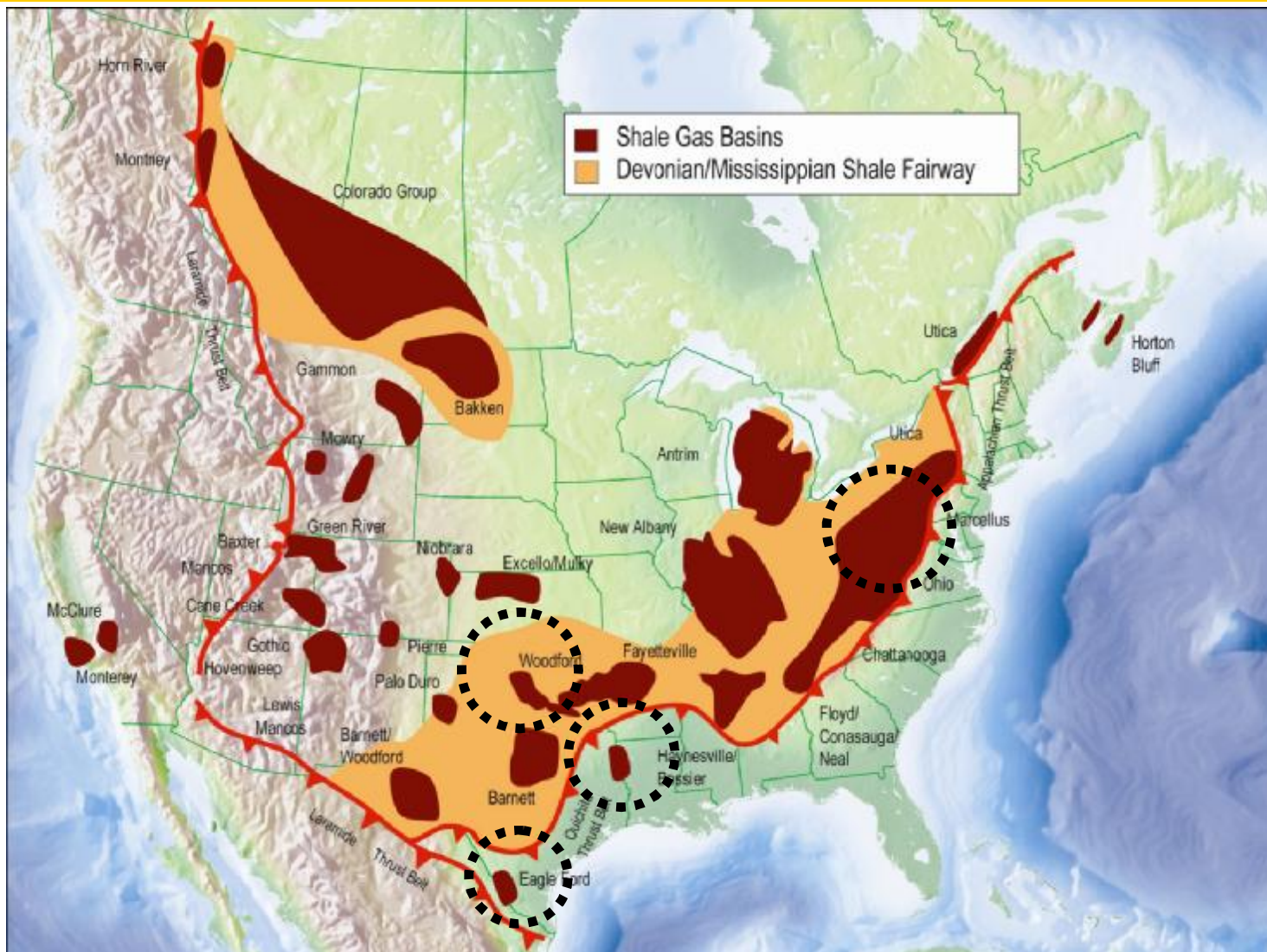
## Barnett Shale Gross Gas Production (Data Through Oct '10), MMcf/day



# Drilling activity has increased but not in every shale gas play...

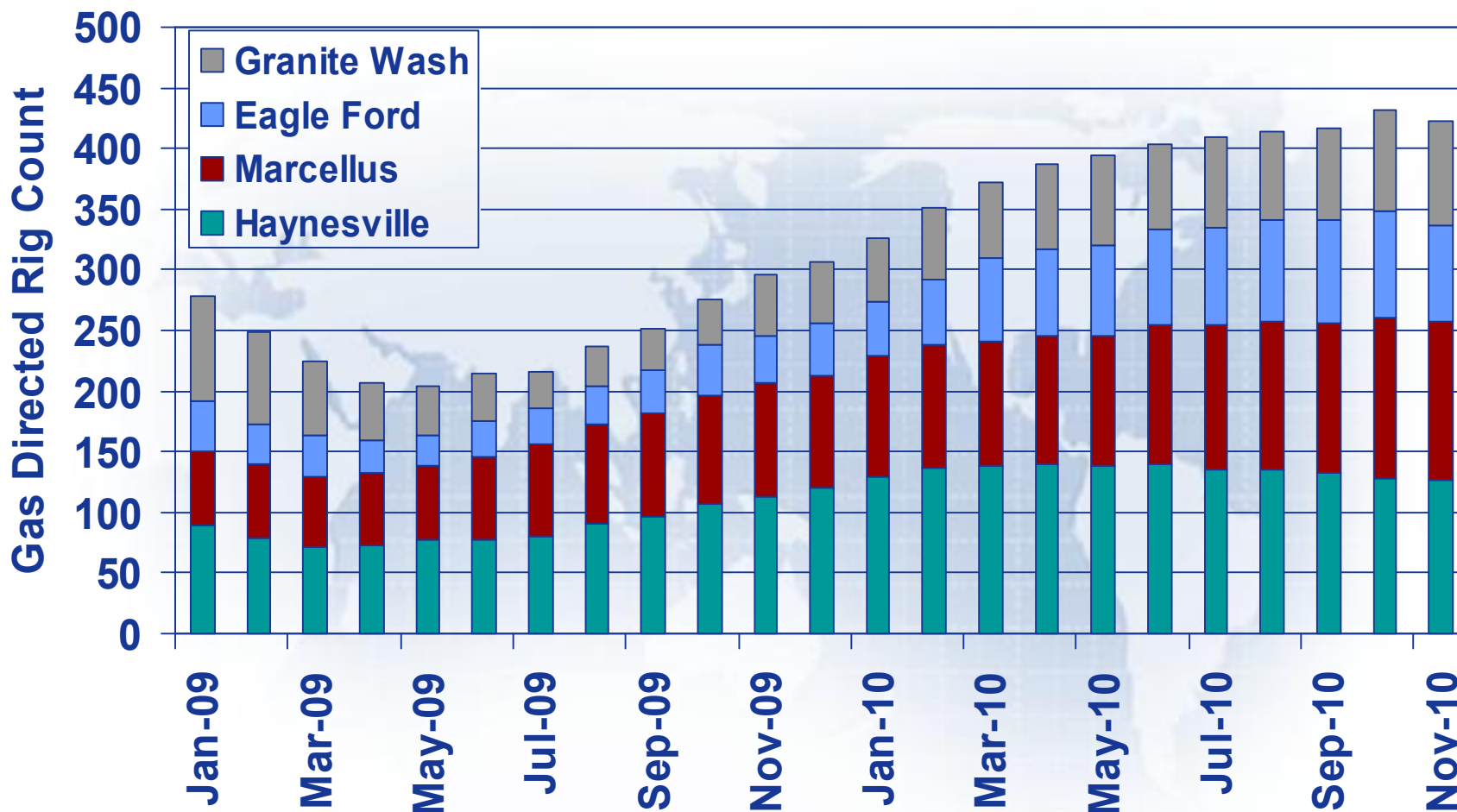


# Producers have turned their attention to high IPs, basin location and proximity to market, and liquids rich plays



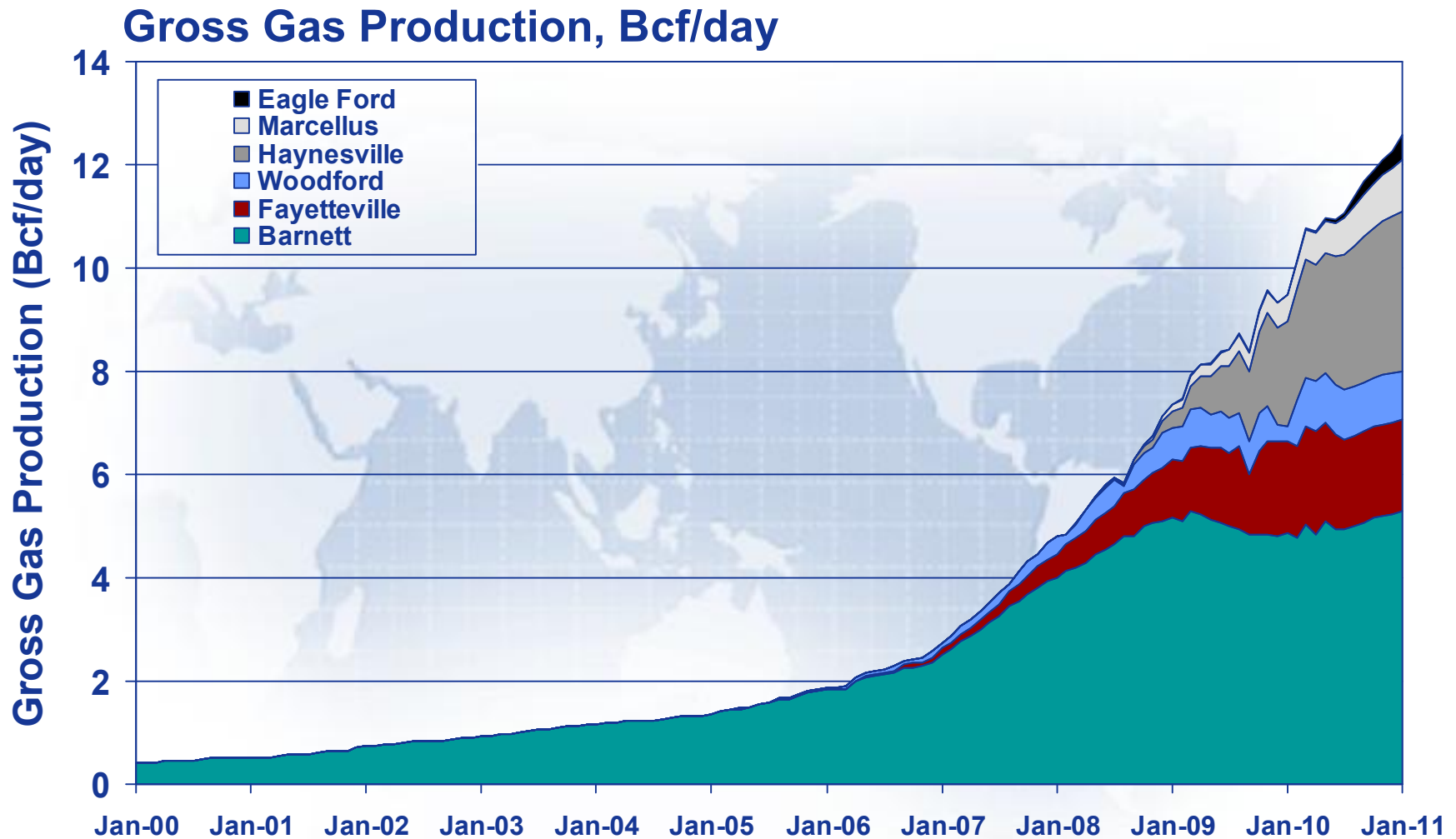
# Gas directed drilling in these value-enhancing shale plays and liquids rich gas plays has increased

## Gas Drilling in High IP, Close Proximity To Market, and Liquids Plays





The gas industry's ability to add productive capacity in a short amount of time has been remarkable



Source: PGI

## North American Shale Gas Break-Even Prices: Current (Forever Changing...)

Shale Play	Source					Average
	Company A	Company B	Company C	Company D	Company E	
	Marcellus	<b>\$3.30</b>		<b>\$4.14</b>	<b>\$3.16</b>	
Horn River	\$4.50		<b>\$4.86</b>			\$4.68
Eagle Ford	\$4.10		\$4.71		<b>\$3.62</b>	\$4.14
Fayetteville	\$3.95	\$4.51	\$4.22	\$3.60	\$4.97	\$4.25
Barnett	\$4.10	\$3.62	\$4.14	\$4.03	<b>\$5.04</b>	\$4.19
Haynesville	\$4.40	<b>\$3.44</b>	\$4.57	\$3.26	\$4.07	\$3.95
Woodford	<b>\$5.00</b>	<b>\$5.53</b>	\$4.71	<b>\$4.55</b>	\$4.84	<b>\$4.93</b>

### Notes:

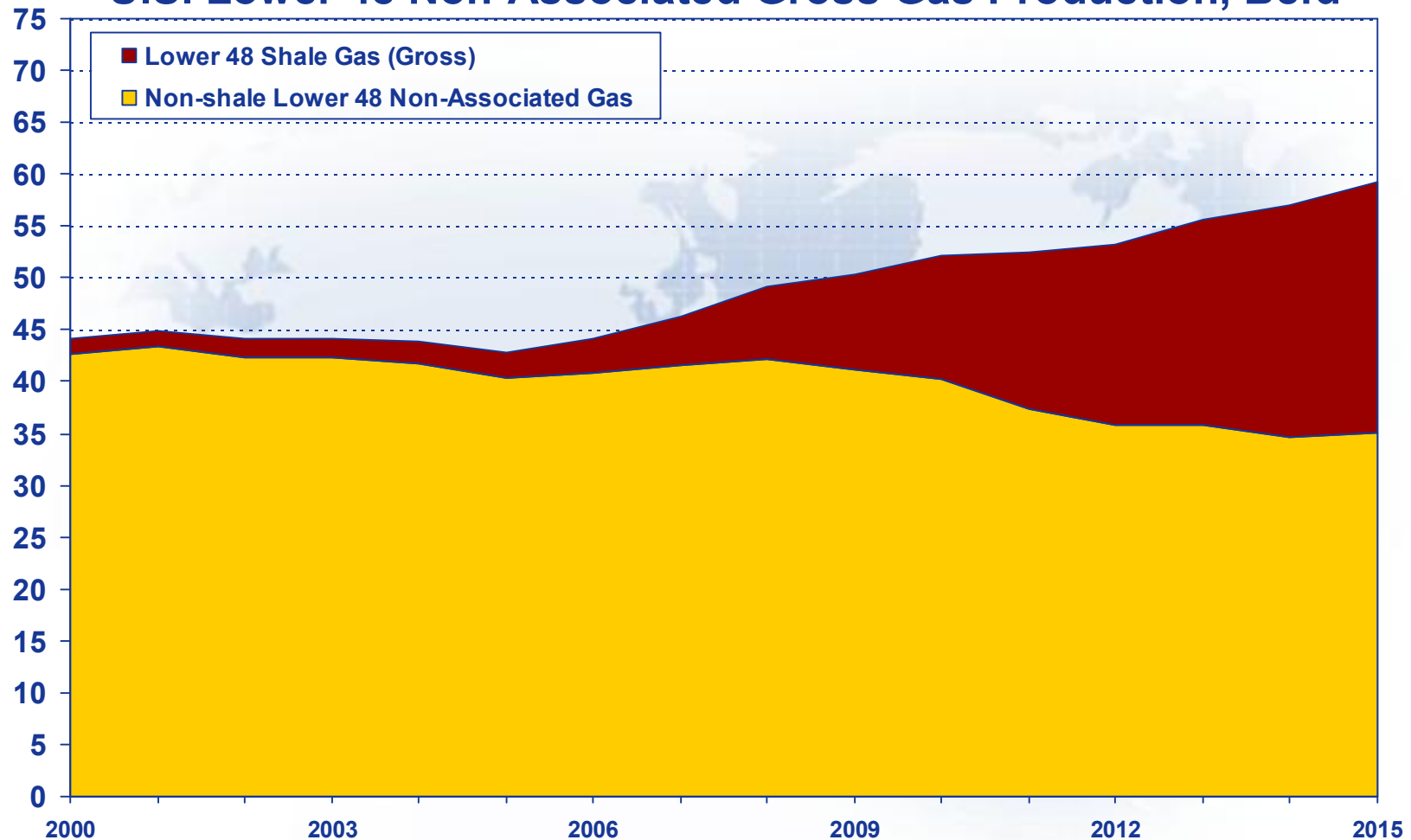
**Green** denotes "most economic"

**Red** denotes "least economic"

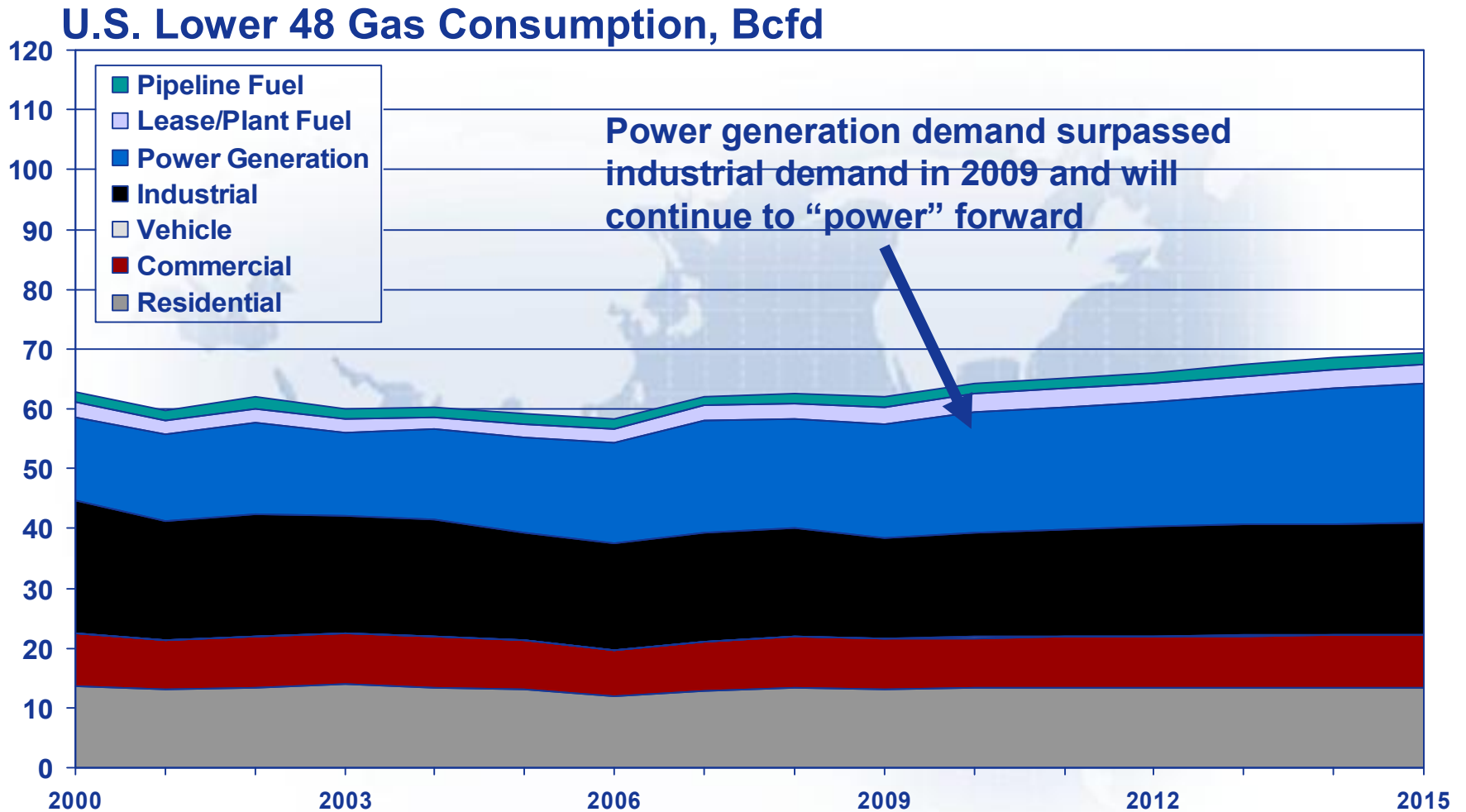
- Ø Break-even price calculations vary depending on assumptions
- Ø Well economics and the economics of each play will improve (or fall) going forward as well costs decrease (or increase) and well performance increases (or decreases) as producers move into (or out of) the core or most prolific areas of each shale gas play.

# Non-associated gas production from U.S. shales will continue to expand while conventional gas declines

## U.S. Lower 48 Non-Associated Gross Gas Production, Bcfd

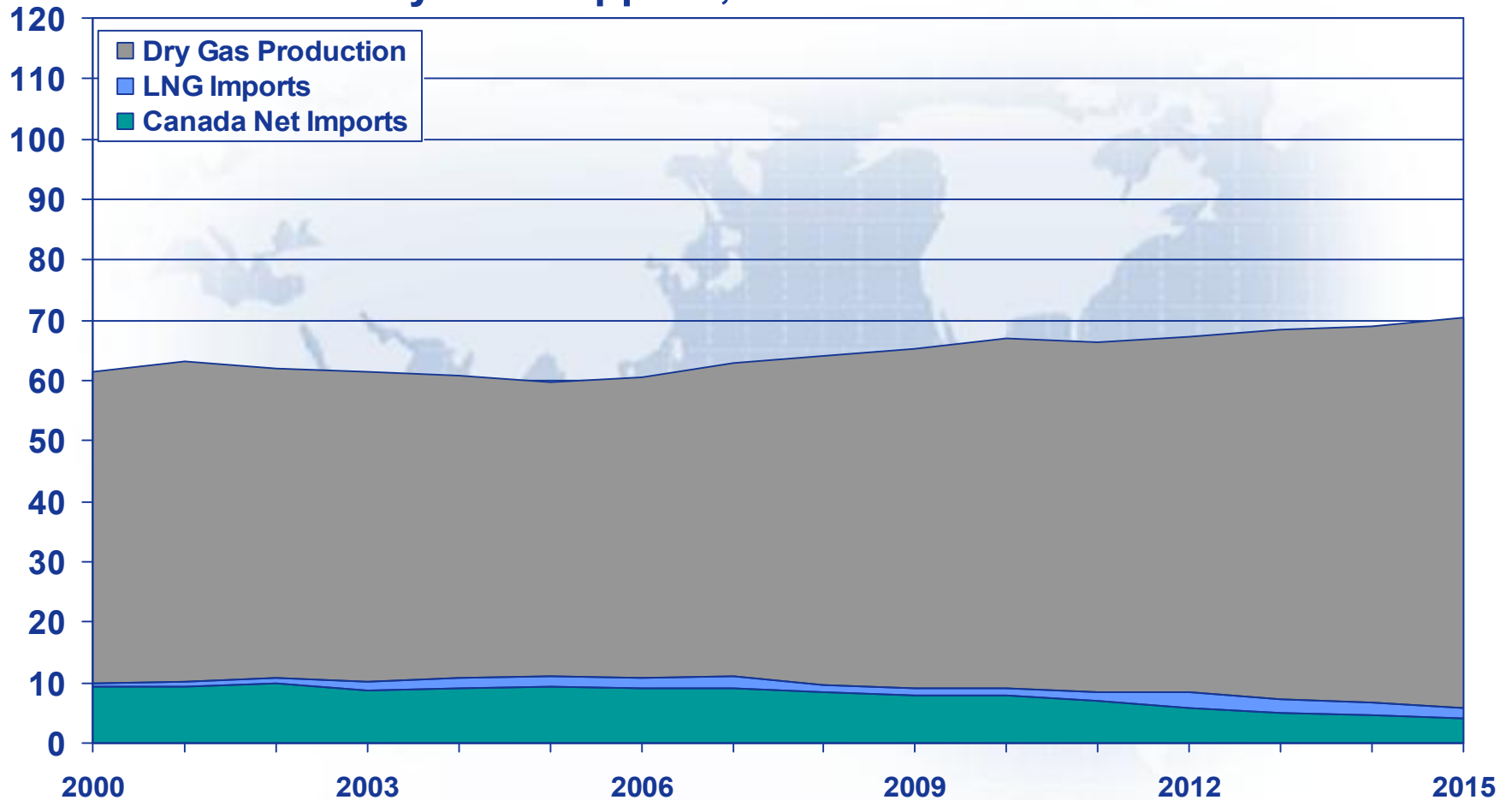


# U.S. Lower 48 Gas Demand by gas end-use sector will grow from 64 Bcfd in '10 to almost 70 Bcfd in '15



U.S. Lower 48 supply stack growth will be limited by demand and is expected to grow an average of 1% per year...

U.S. Lower 48 Dry Gas Supplies, Bcfd

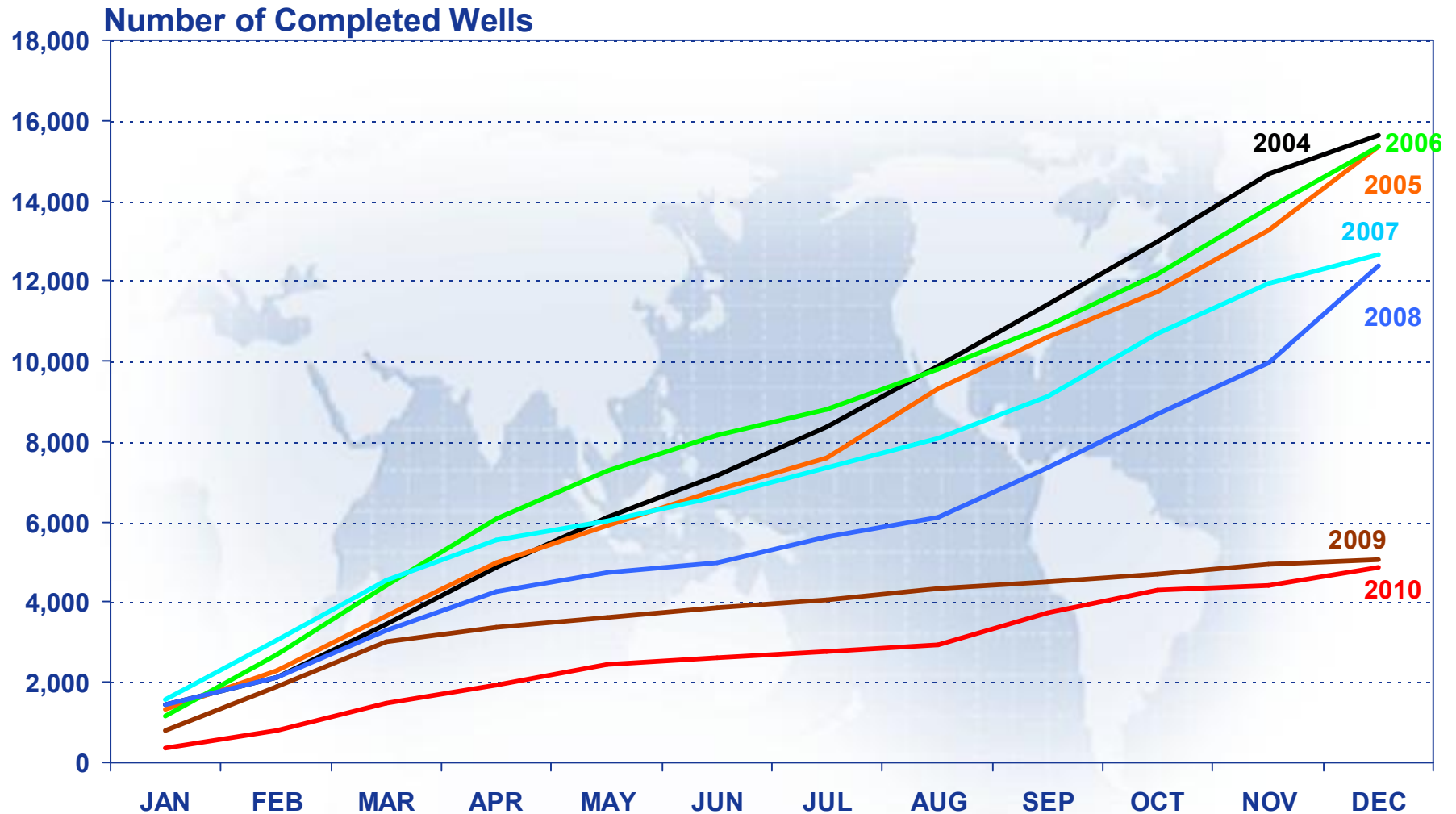


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# Canadian gas production is in structural decline and well completions continue to fall (year-over-year basis)

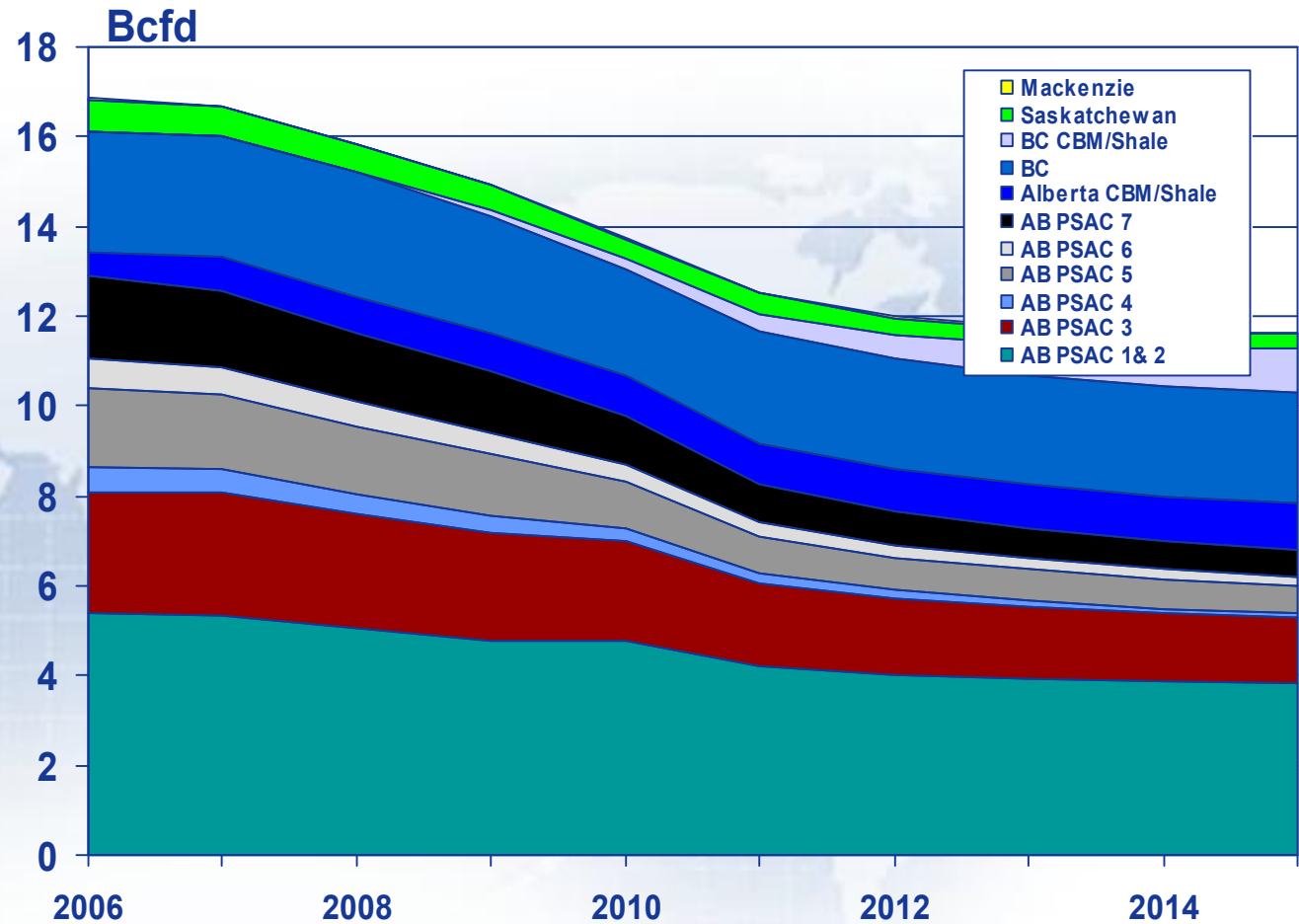


# Western Canadian natural gas producers have been plagued by an unfavorable royalty system, increasing costs and low gas prices

∅ Conventional gas production is in decline

∅ Unconventional gas production will slow overall decline

∅ Arctic gas may not happen





## Canadian natural gas issues summarized...



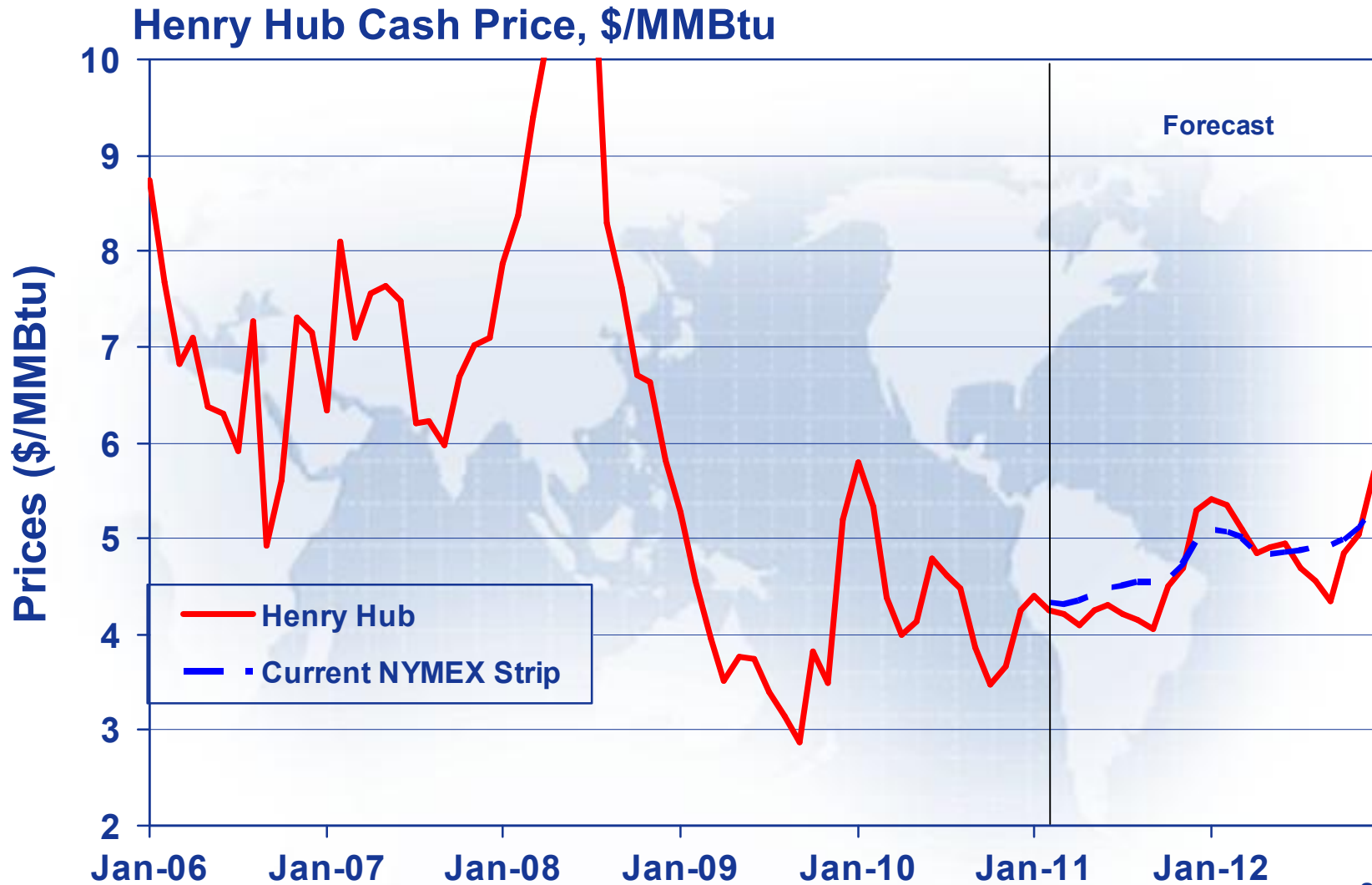
- Ø Canadian gas drilling has declined sharply
- Ø Long-term impact must be lower production
- Ø Shale gas development will probably be slow
- Ø Domestic demand is increasing
- Ø Declining supply and increased domestic demand will reduce exports
- Ø Drilling shifting to rich gas plays
- Ø Excess capacity will be a dominant issue

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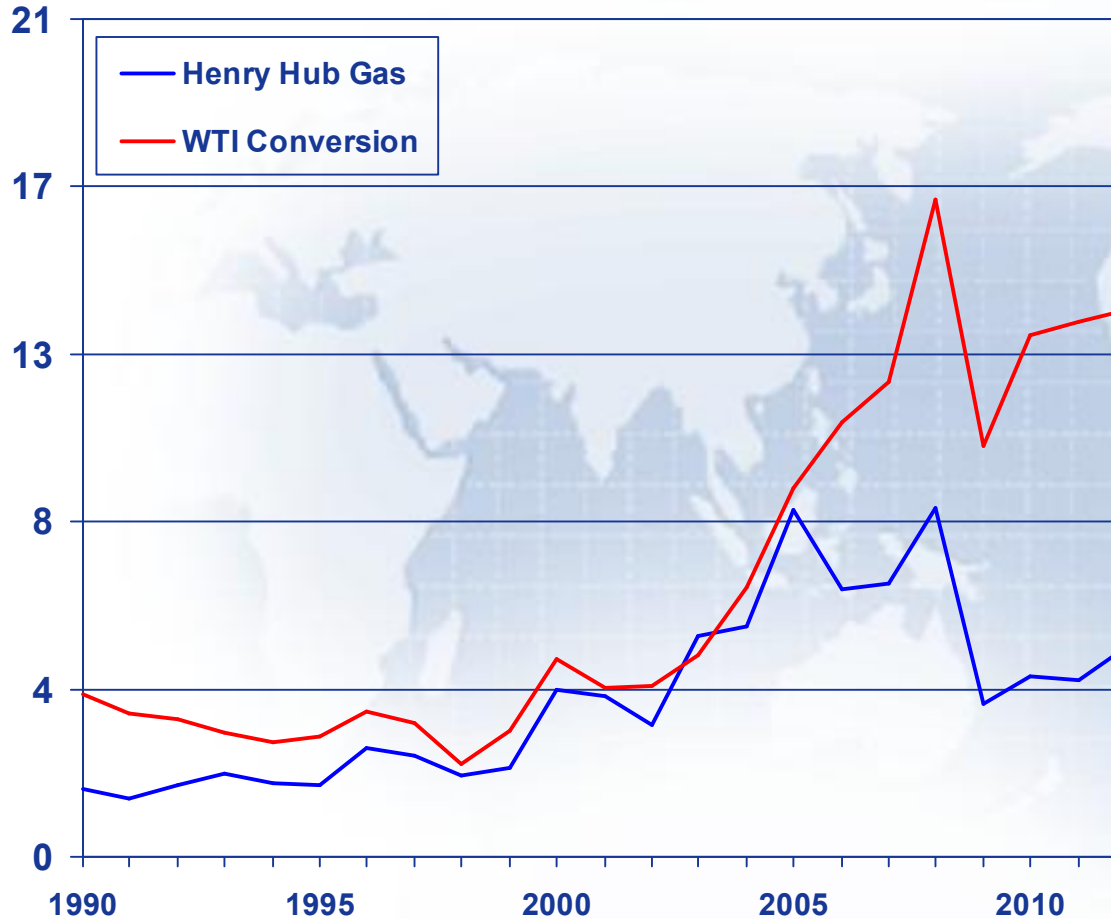
Our outlook for the Henry Hub cash price for 2011 and 2012 is below the current NYMEX Henry Hub forward price strip...



Source: PGI

# Natural gas and crude oil prices have very different drivers

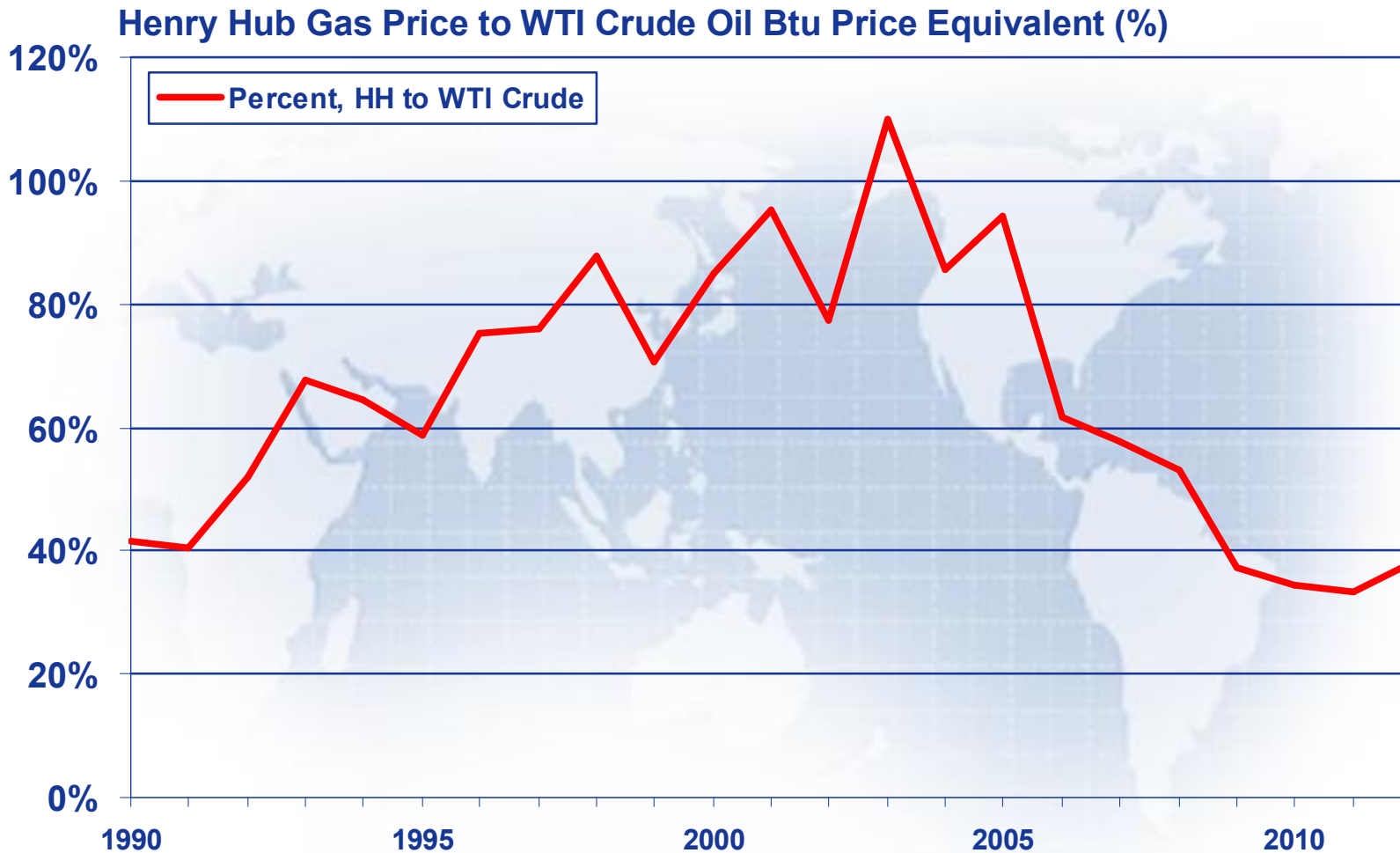
Energy Price Comparison, US\$ per MMBtu



- Ø Natural gas was weak relative to crude oil during most of the 1990s
- Ø The late 1990s/early 2000s ushered in a new era of expensive gas/moderate crude oil prices
- Ø Oil & gas markets have changed dramatically
- Ø Limited global crude oil supply prospects & demand growth in developing countries will keep oil prices high
- Ø Abundant new sources of gas in North America will keep gas prices fairly low

Source: PGI

# Natural gas prices will start to recover relative to crude oil over the next few years



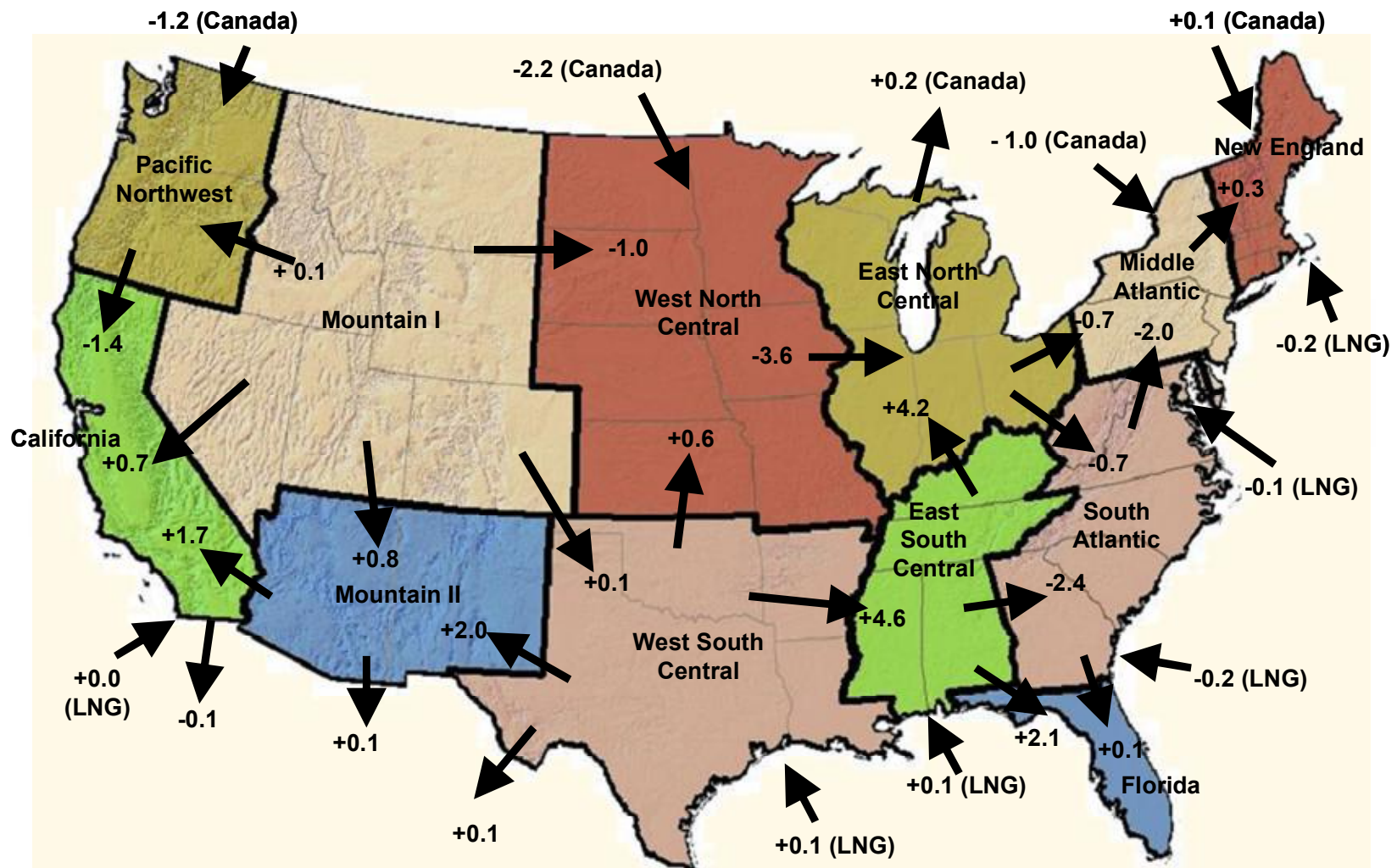
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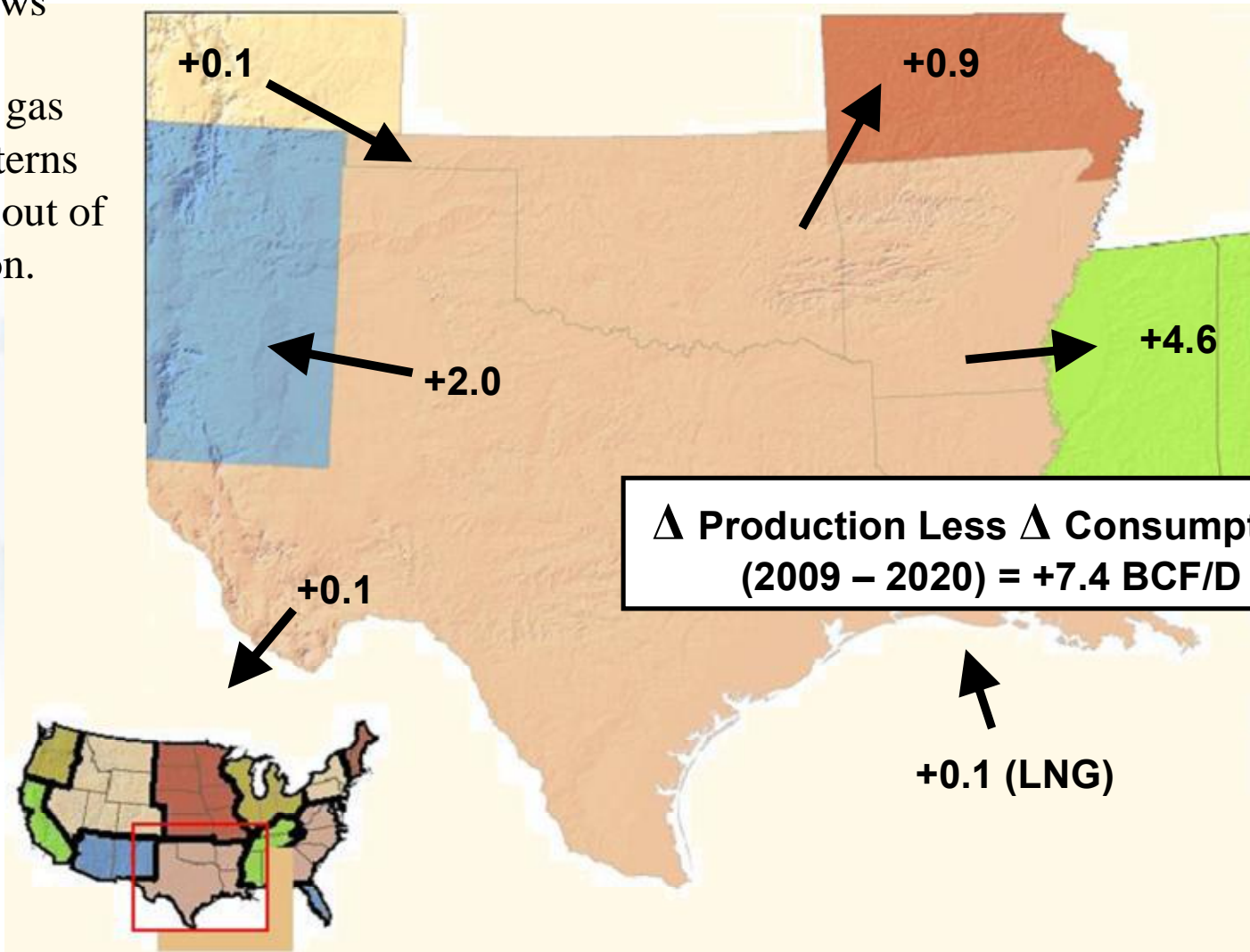


# U.S. Lower 48 Gas Flow Patterns: Change From 2009 To 2020 (Bcfd)



# West South Central Gas Flows: Change from 2009 to 2020 (Bcfd)

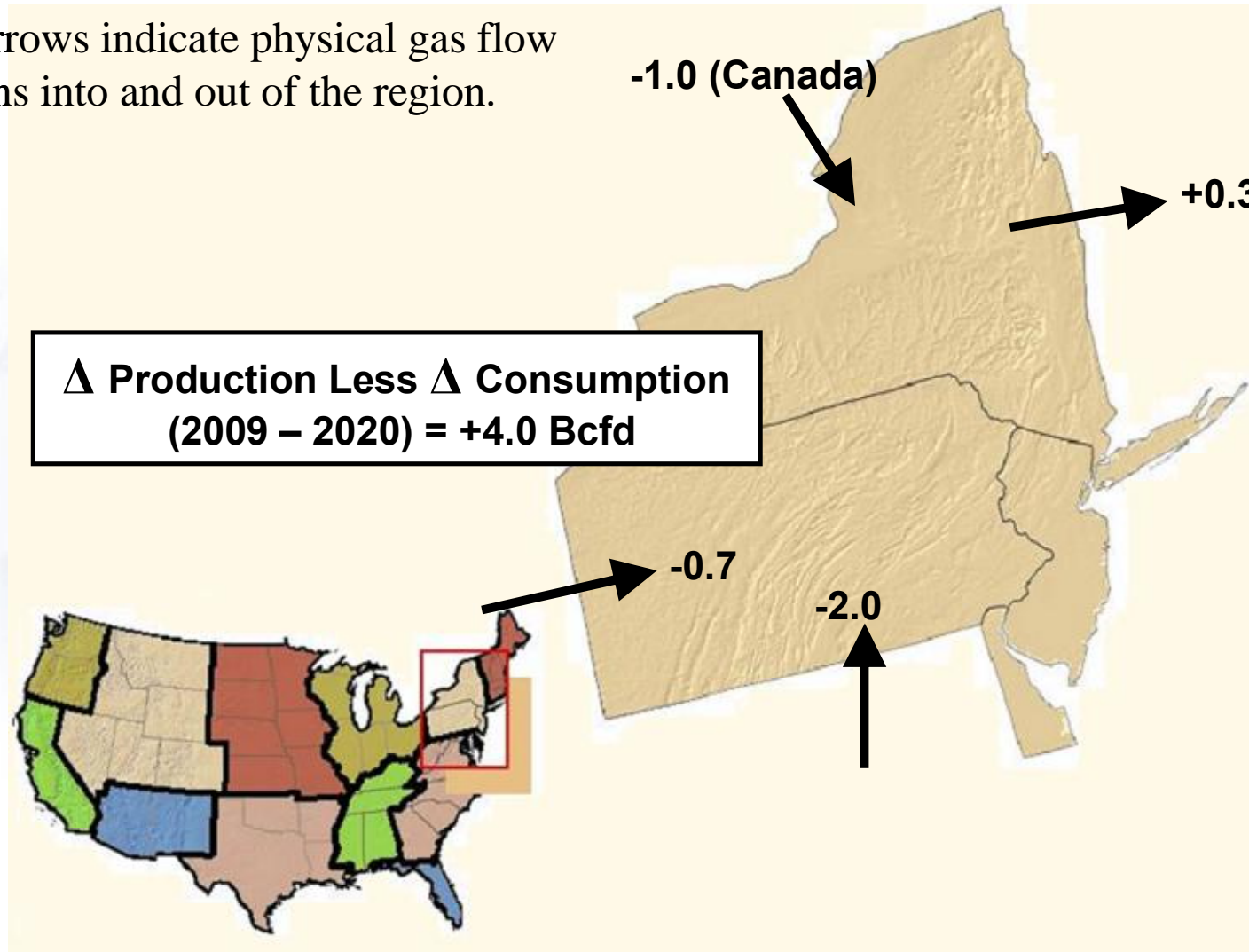
The arrows indicate physical gas flow patterns into and out of the region.





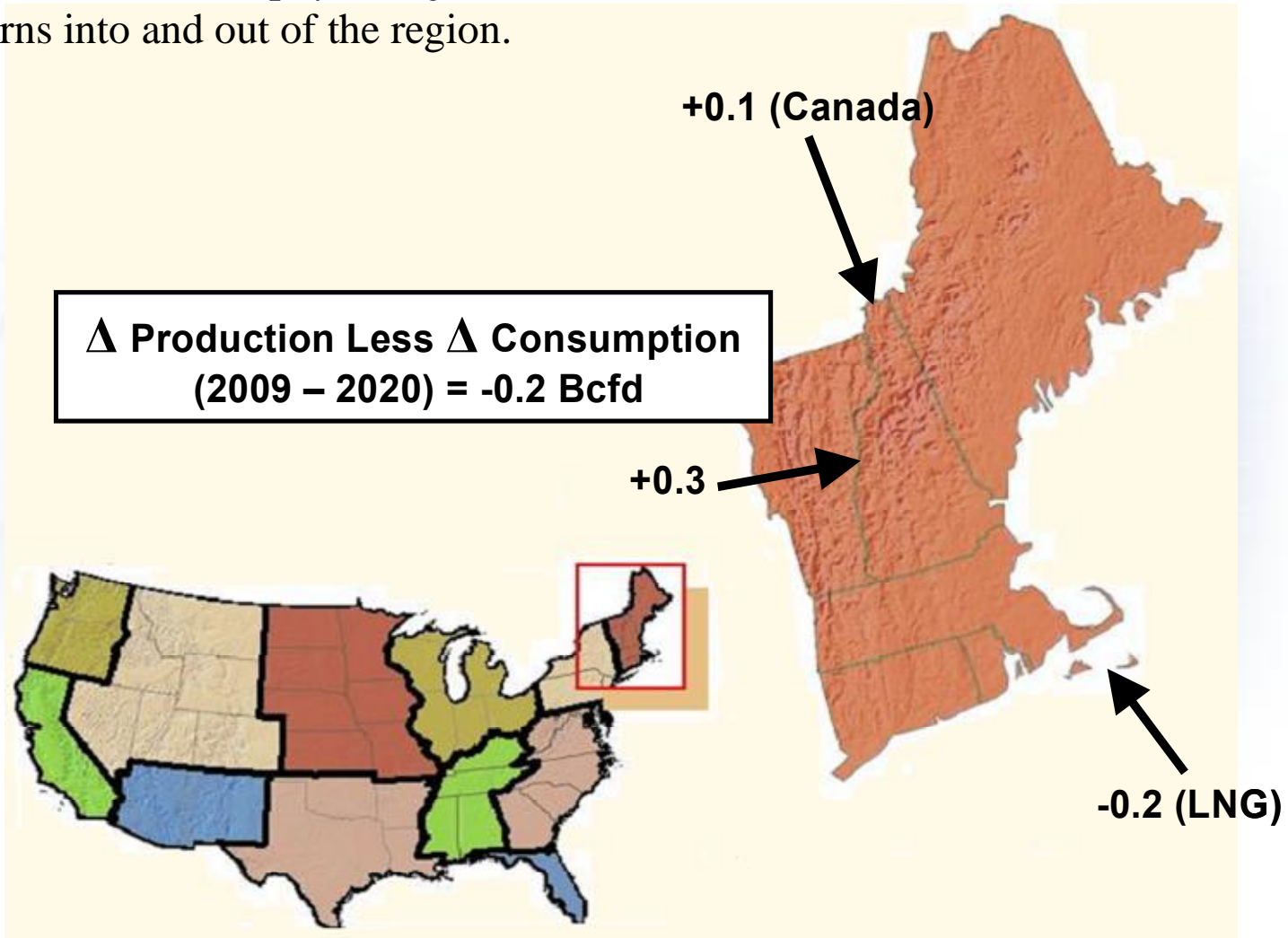
## Middle Atlantic Gas Flows: Change from 2009 to 2020 (Bcfd)

The arrows indicate physical gas flow patterns into and out of the region.



## New England Gas Flows: Change from 2009 to 2020 (Bcfd)

The arrows indicate physical gas flow patterns into and out of the region.



# Conclusions

- Ø Strong domestic production with unconventional gas momentum
- Ø Prolonging low gas prices will influence producers' behaviors
- Ø U.S. working inventory level overhang exists
- Ø U.S. Lower 48 gas demand has recovered
- Ø Uncertainty related to GHG legislation exists
- Ø Canadian gas supply is in structural decline
- Ø Changes in the amount of gas supplies within the traditional and new supply basins will likely result in pipeline utilization rate issues and opportunities in Canada and the U.S. Lower 48
  - § The midstream business will be in a state-of-flux (+ and -)
- Ø Gas prices will continue to be heavily discounted to crude oil
  - § Each commodity market has different fundamental drivers
  - § Risk and rewards will be evident within the North American NGL industry
- Ø Global gas demand is increasing
  - § Global liquefaction capacity is long
  - § Cargoes are being diverted away from the U.S.
  - § U.S. Gulf Coast LNG receiving terminals are working the hub and storage "circuit"



**THANK YOU**

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