Natural Gas Pricing

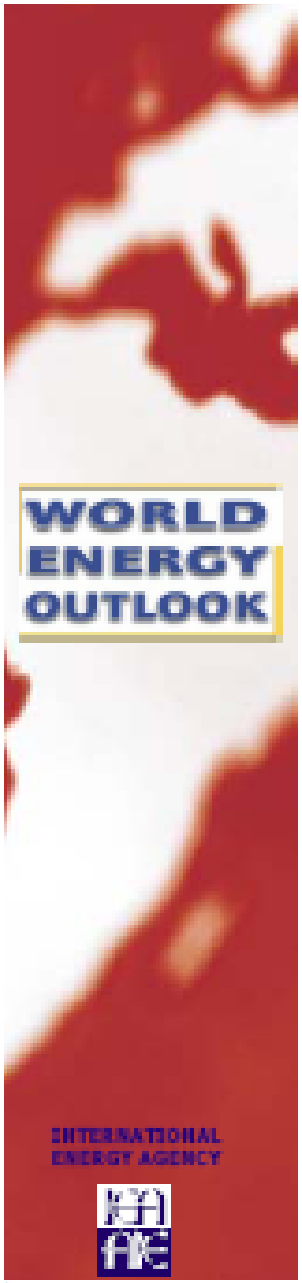
Presentation to:

NARO National Convention 2013

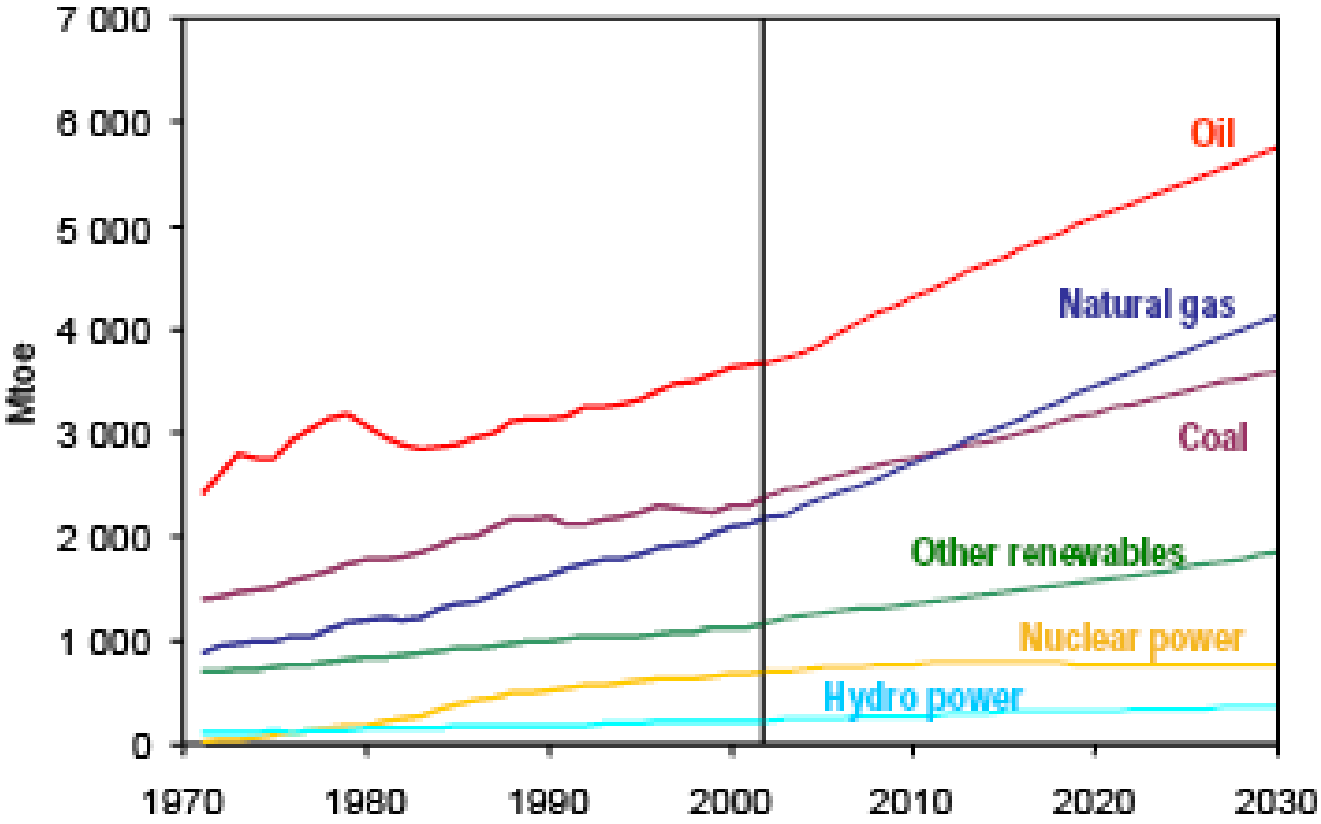
By:
John Harpole

Mercator Energy

November 1, 2013



World Primary Energy Demand



Fossil fuels account for almost 90% of the growth in energy demand between now and 2030

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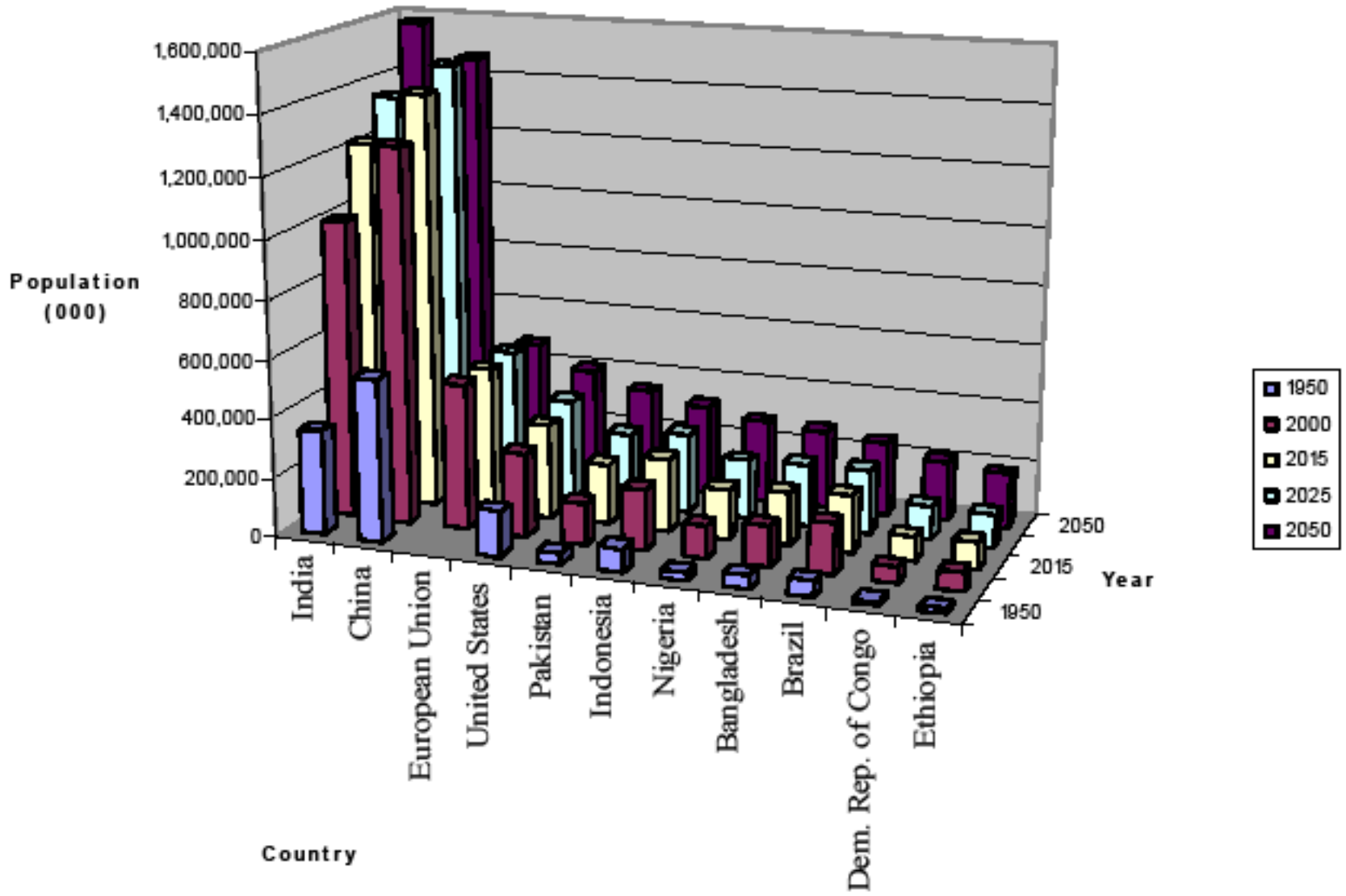
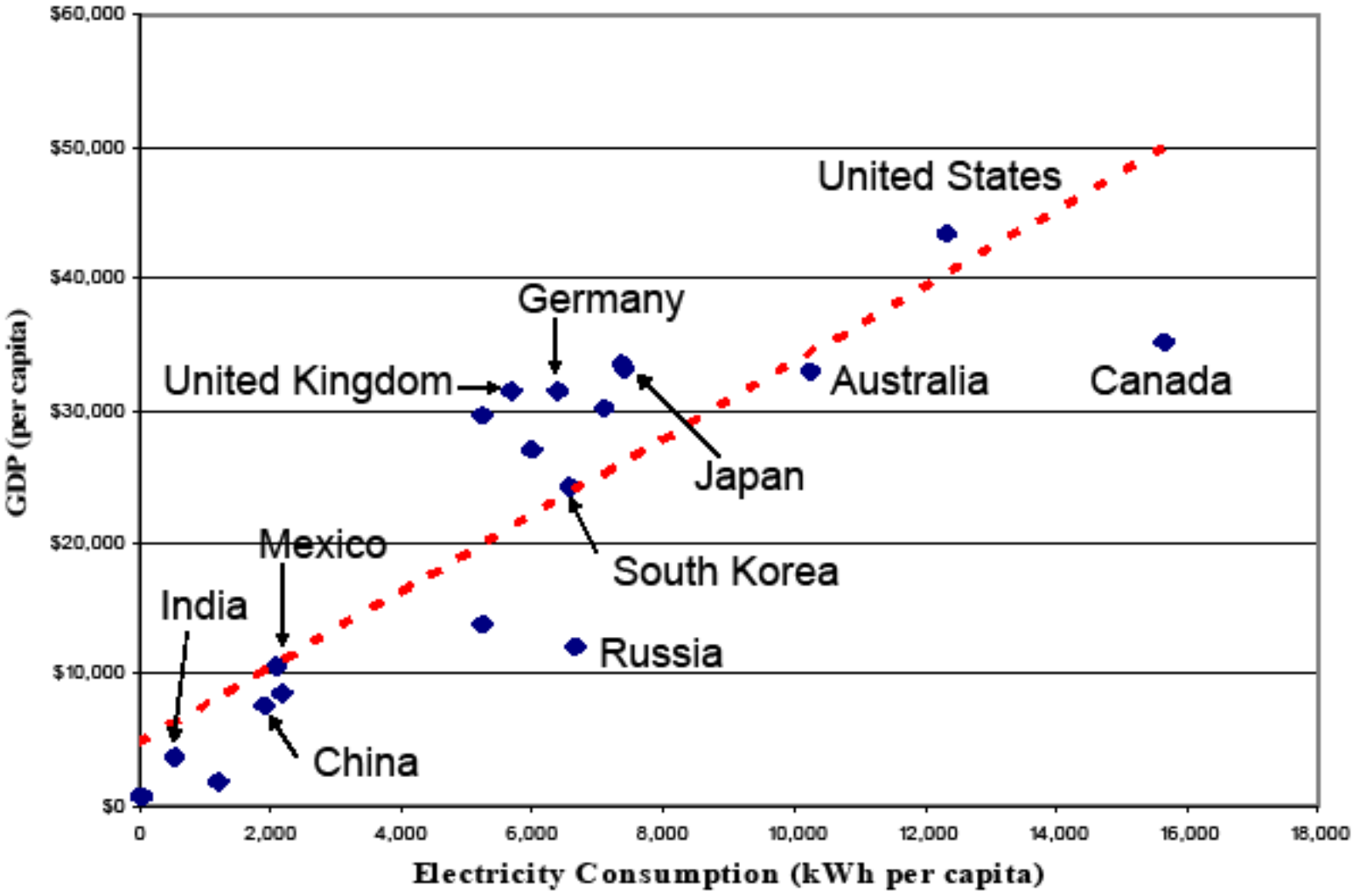
Population Growth from 1950-2050



Quality of Life is Strongly Correlated with Electricity Consumption



Source: CIA World Factbook, 2007

Russia, Iran and Qatar Form Natural Gas Cartel

10/21/2008 in Tehran, Iran

Qatar's Deputy Premier and Minister of Energy and Industry, Abdullah bin Hamad Al-Attiya

Iranian Oil Minister, Gholam Hossein Nozari

Alexei Miller, Chief of Russia's state gas monopoly - Gazprom

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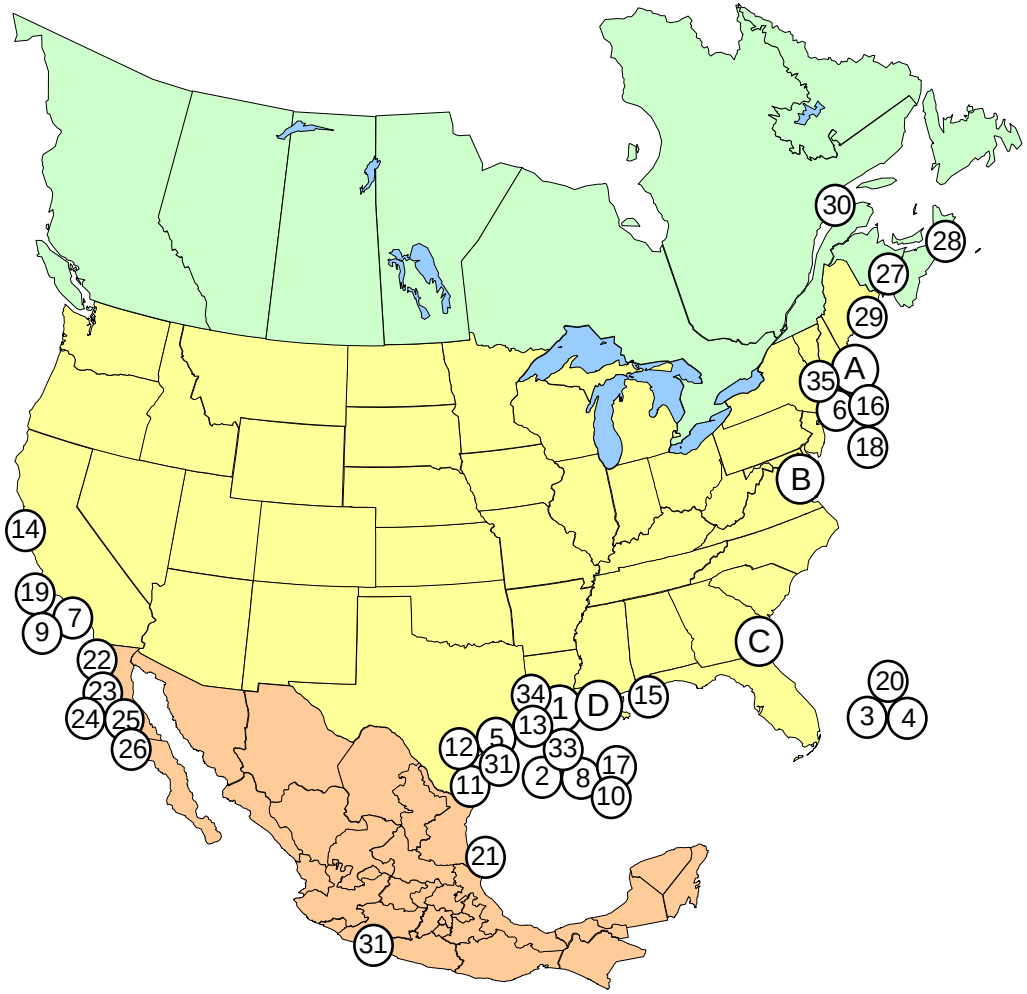
FERC

Existing and Proposed Lower-48 LNG Terminals



December 2003

Source: Pat Wood, Federal Energy Regulatory Commission, LNG Ministerial Conference Presentation

Existing Terminals with Expansions

A. Everett, MA : 1.035 Bcfd (Tractebel)
B. Cove Point, MD : 1.0 Bcfd (Dominion)
C. Elba Island, GA : 1.2 Bcfd (El Paso)
D. Lake Charles, LA : 1.2 Bcfd (Southern Union)

Approved Terminals

1. Hackberry, LA : 1.5 Bcfd, (Sempra Energy)
2. Port Pelican: 1.0 Bcfd, (Chevron Texaco)

Proposed Terminals – FERC

3. Bahamas : 0.84 Bcfd, (AES Ocean Express)
4. Bahamas : 0.83 Bcfd, (Calypso Tractebel)
5. Freeport, TX : 1.5 Bcfd, (Cheniere / Freeport LNG Dev.)
6. Fall River, MA : 0.4 Bcfd, (Weaver's Cove Energy)
7. Long Beach, CA : 0.7 Bcfd, (SES/Mitsubishi)

Proposed Terminals – Coast Guard

8. Gulf of Mexico: 0.5 Bcfd, (El Paso Global)
9. California Offshore: 1.5 Bcfd, (BHP Billiton)
10. Louisiana Offshore : 1.0 Bcfd (Gulf Landing – Shell)

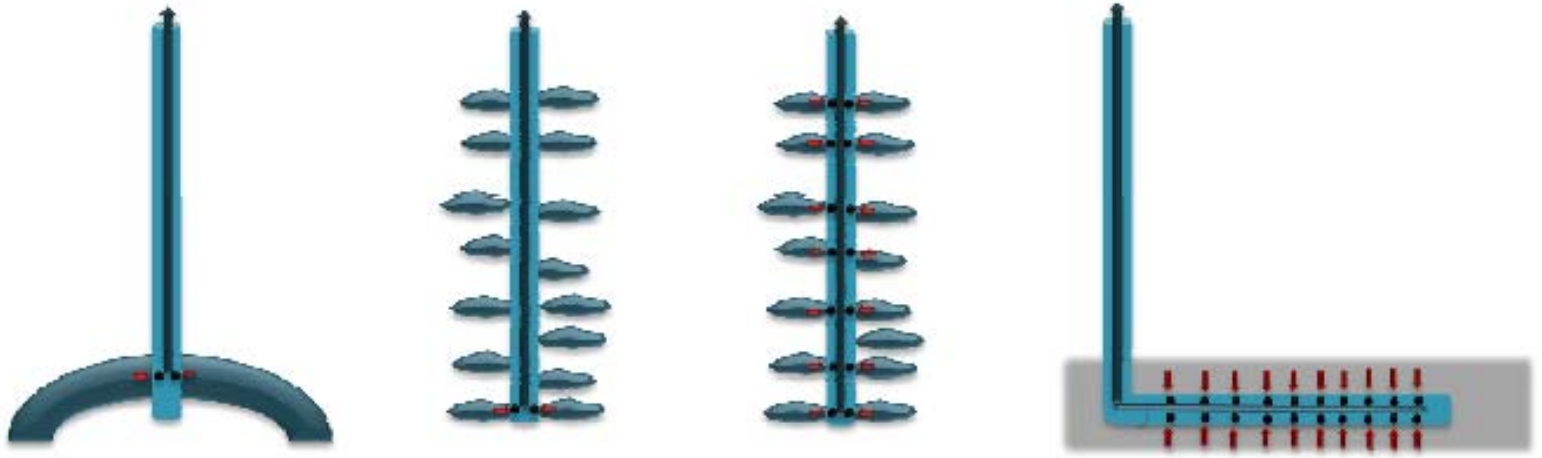
Planned Terminals

11. Brownsville, TX : n/a, (Cheniere LNG Partners)
12. Corpus Christi, TX : 2.7 Bcfd, (Cheniere LNG Partners)
13. Sabine, LA : 2.7 Bcfd (Cheniere LNG)
14. Humboldt Bay, CA : 0.5 Bcfd, (Calpine)
15. Mobile Bay, AL: 1.0 Bcfd, (ExxonMobil)
16. Somerset, MA : 0.65 Bcfd (Somerset LNG)
17. Louisiana Offshore : 1.0 Bcfd (McMoRan Exp.)
18. Belmar, NJ Offshore : n/a (El Paso Global)
19. So. California Offshore : 0.5 Bcfd, (Crystal Energy)
20. Bahamas : 0.5 Bcfd, (El Paso Sea Fare)
21. Altamira, Tamulipas : 1.12 Bcfd, (Shell)
22. Baja California, MX : 1.3 Bcfd, (Sempra)
23. Baja California : 0.6 Bcfd (Conoco-Phillips)
24. Baja California - Offshore : 1.4 Bcfd, (Chevron Texaco)
25. Baja California : 0.85 Bcfd, (Marathon)
26. Baja California : 1.3 Bcfd, (Shell)
27. St. John, NB : 0.75 Bcfd, (Irving Oil & Chevron Canada)
28. Point Tupper, NS 0.75 Bcf/d (Access Northeast Energy)
29. Harpswell, ME : 0.5 Bcf/d (Fairwinds LNG – CP & TCPL)
30. St. Lawrence, QC : n/a (TCPL and/or Gaz Met)
31. Lázaro Cárdenas, MX : 0.5 Bcfd (Tractebel)
32. Corpus Christi, TX : 1.0 Bcfd (ExxonMobil)
33. Gulf of Mexico : 1.0 Bcfd (ExxonMobil)
34. Sabine, LA : 1.0 Bcfd (ExxonMobil)
35. Providence, RI ; 0.5 Bcfd (Keyspan & BG LNG)

AMERICA'S NATURAL GAS ALLIANCE

EVOLUTION IN GAS WELL COMPLETEION TECHNOLOGY - THE KEY TO TODAY'S NATURAL GAS REVOLUTION

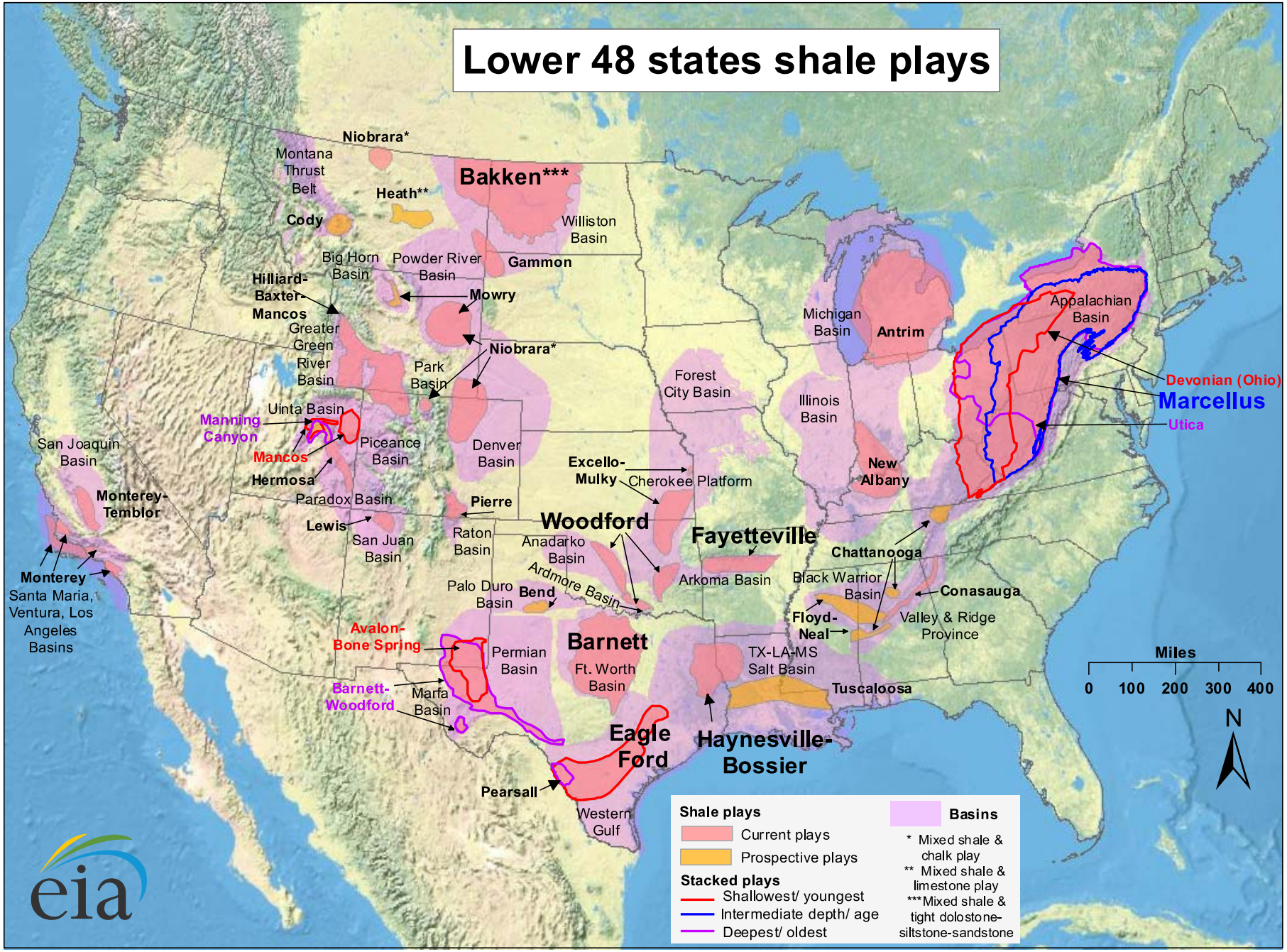
Conventional Reservoir	Tight Sands Single-stage HF	Tight Sands Multi-stage HF	Shale – horiz well + Multi-stage HF
1850's to present	1950's to 1990's	1990's to present	2000 to present



Multi-stage hydraulic fracture stimulation (HF) unlocks gas in unconventional reservoirs

Mercator Energy

Source: *America's New Natural Gas,* America's Natural Gas Alliance



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Wall Street Journal

Editorial Page

9/7/2013

Fracking and the Poor

By now even the Obama Administration has recognized that the natural gas drilling boom has led to more high-wage jobs, more secure energy supplies and lower manufacturing costs. But one of the biggest benefits from fracking and other new drilling technologies is often overlooked: the windfall to American consumers, especially the poor.

A new study by the Colorado-based energy broker Mercator Energy quantifies the multi-billion-dollar annual savings to American households through lower utility bills from the fall in natural gas prices.

From 2003-08, shortly before the fracking revolution took hold, the price of natural gas averaged about $7.20 per million BTUs. By 2012 after new drilling operations exploded across the U.S.—from West Texas to Pennsylvania to North Dakota—the increase in natural gas production had slashed the price to $2.80 per million BTUs.

Mercator examined Department of Energy data on natural gas usage to find out how this 61% price decline translated into lower home-heating and electricity bills. According to the federal Energy Information Administration, American households use about 7.4 billion MMBTUs for home heating and residential electricity each year.

Thanks to the lower price for natural gas, families saved roughly $32.5 billion in 2012. (That's 7.4 billion MMBTUs of residential use of natural gas times the $4.40 reduction in price.) The windfall to all U.S. natural gas consumers—industrial and residential—was closer to $110 billion. This is greater than the annual income of all of the residents in 14 states in 2011.

Mercator's most notable finding is that the income group helped the most by this bonanza is the poor because energy is a big component of their family budgets. Data from the annual report of the federal Low Income Home Energy Assistance Program (Liheap) show that poor households spend four times more of their income on home energy (10.4%) than do non-poor households (2.6%). That same report says that roughly 40 million households, or 36% of U.S. households, are eligible for Liheap. Though the poor on average spend less overall on heating and electricity, lower natural gas prices have still shaved about $10 billion a year from the utility bills of poor families.

> The natural gas boom may be America's best antipoverty program.

To put it another way, fracking is a much more effective antipoverty program than is Liheap. In 2012, Liheap provided roughly $3.5 billion to about nine million low-income households to subsidize their home-heating costs. New drilling technologies saved poor households almost three times more. Low gas prices benefit nearly all poor households, while Liheap helps fewer than one in four.

These energy savings are especially impressive compared to what residents of other industrialized nations are paying. The natural gas price this summer increased to about $3.70 per million BTUs, but that compares to the roughly $10 that consumers pay in Spain or $13 in China. According to the Mercator analysis, if natural gas prices were that high in the U.S., average home heating bills for millions of Americans would be almost 75% higher.

You'd think that good liberal egalitarians would welcome these financial savings to poor households. Yet most green groups, in particular the Sierra Club, continue to oppose fracking and are using lawsuits and political lobbying to stop it. Rich Hollywood types like Matt Damon propagandize against it. No one is doing more to increase income inequality in America than the affluent environmentalists who oppose natural gas drilling.

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Fox News Coverage One Month Ago

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Denver Business Journal 9/17/13

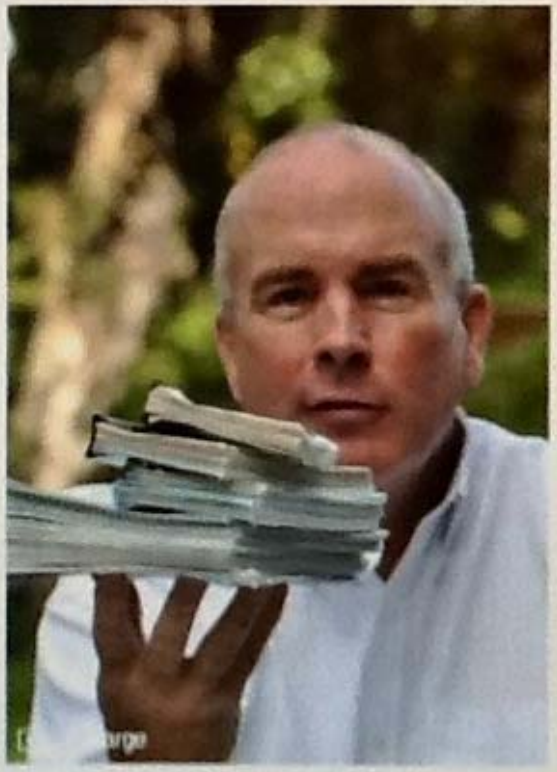
Fracking helps families, cuts heating, power bills by $32.6 billion, Colorado energy exec says

Cathy Proctor
Reporter-
Denver Business Journal
Email | Facebook | Twitter

The mother of John Harpole, a longtime Denver oil and gas executive, kept 35 years of monthly utility bills in a box — making notes in the margins about the weather "in hopes that she could guess what next month's bill might be," her son says.

And it's people like his mother, Mary Harpole — who raised nine children in a home in Denver's Congress Park neighborhood after her husband died in 1966 — that John Harpole thinks of when he talks about how the oil and gas industry's use of hydraulic fracturing (or fracking) cut residential utility bills in the United States by $32.6 billion in 2012.

"There's not a bill in that pile [of utility bills] that is over $90 — maybe a really expensive lunch for some folks — but she



Kathleen Lavine / Denver Business

John Harpole, president of Mercator Energy LLC, a natural gas marketing and research company in Littleton with 35 years of utility bills his mother kept in a box.

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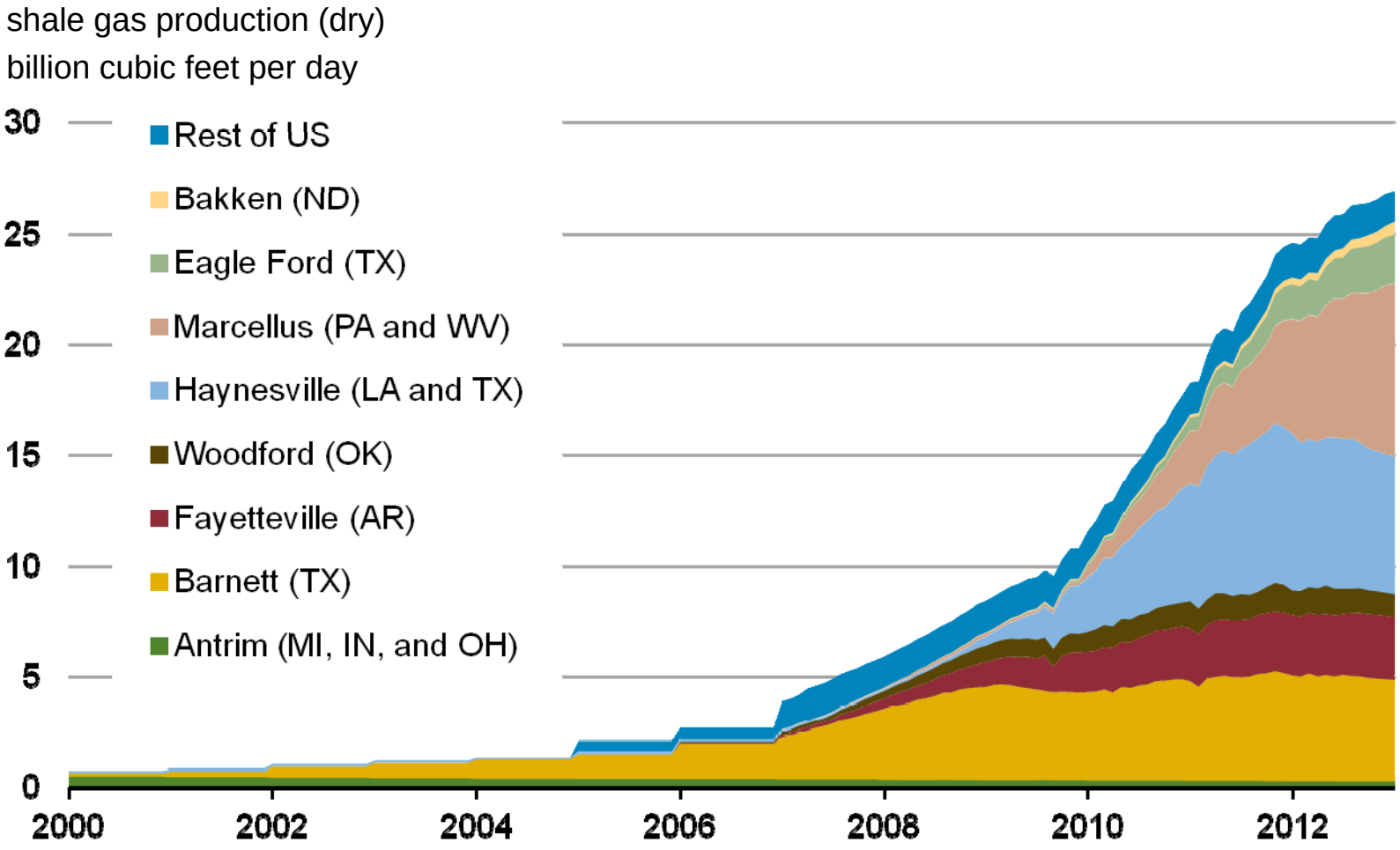
Domestic production of shale gas has grown dramatically over the past few years



Sources: LCI Energy Insight gross withdrawal estimates as of January 2013 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.

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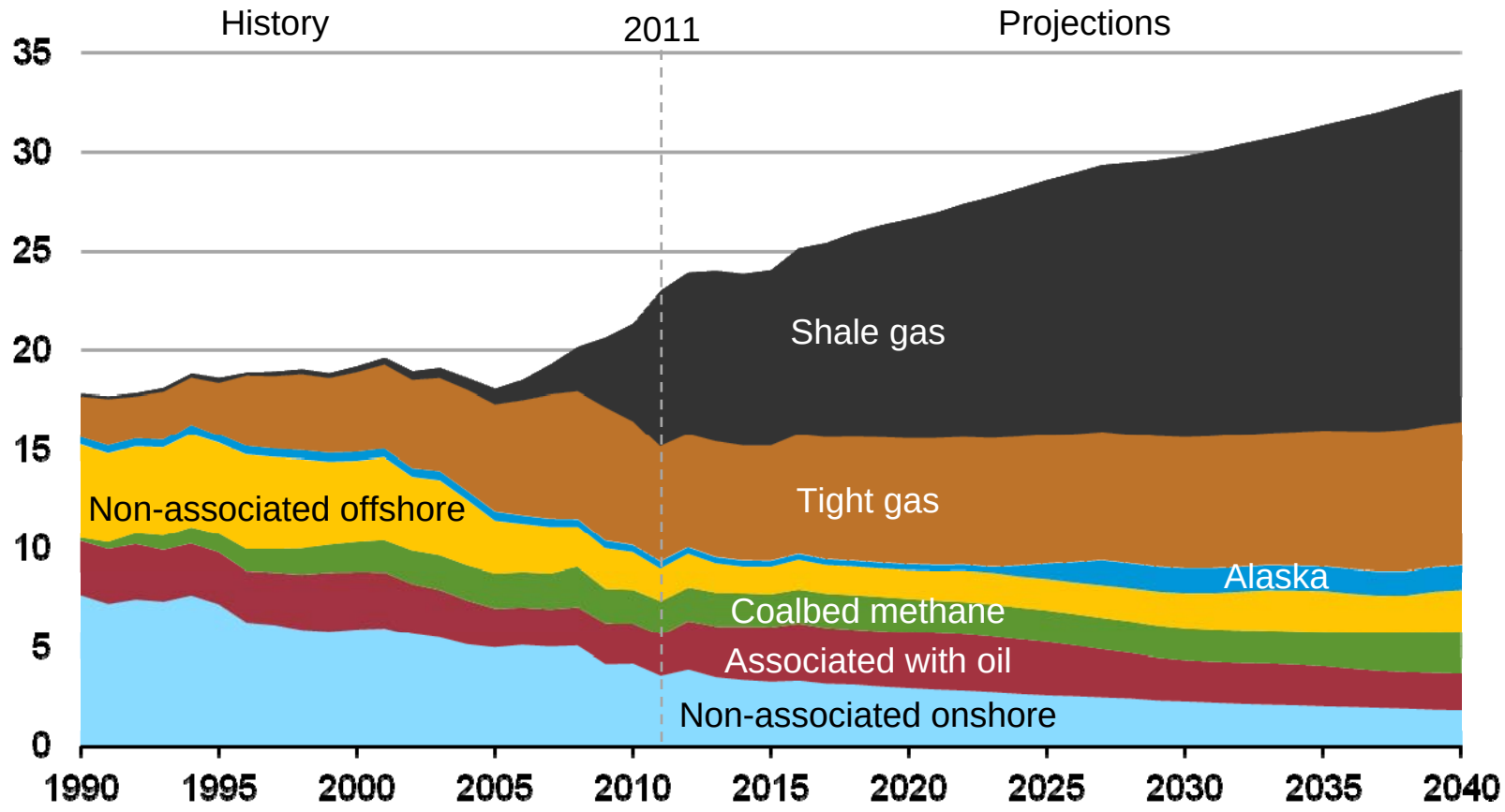
Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
trillion cubic feet



Source: EIA, Annual Energy Outlook 2013 Early Release

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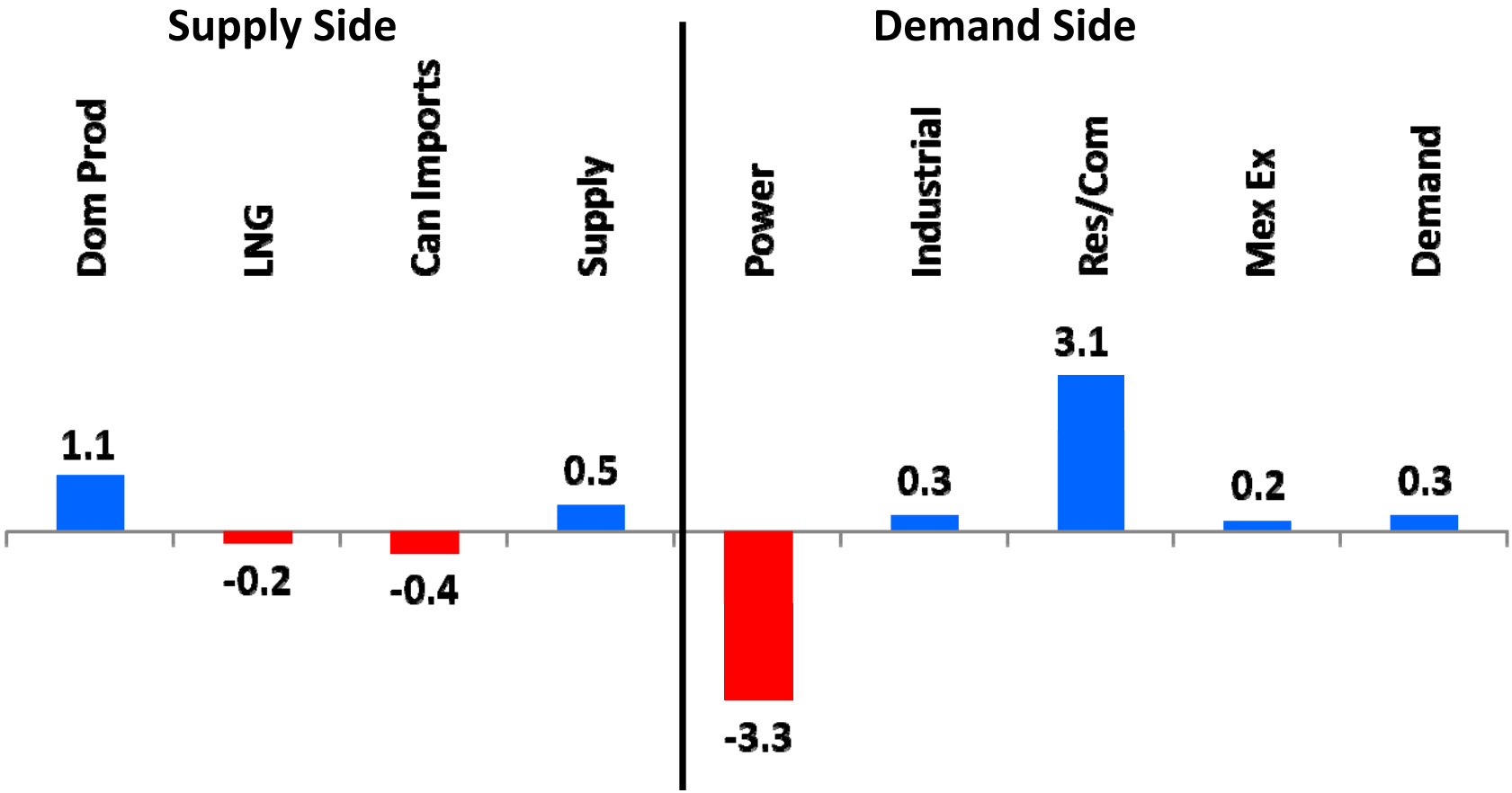
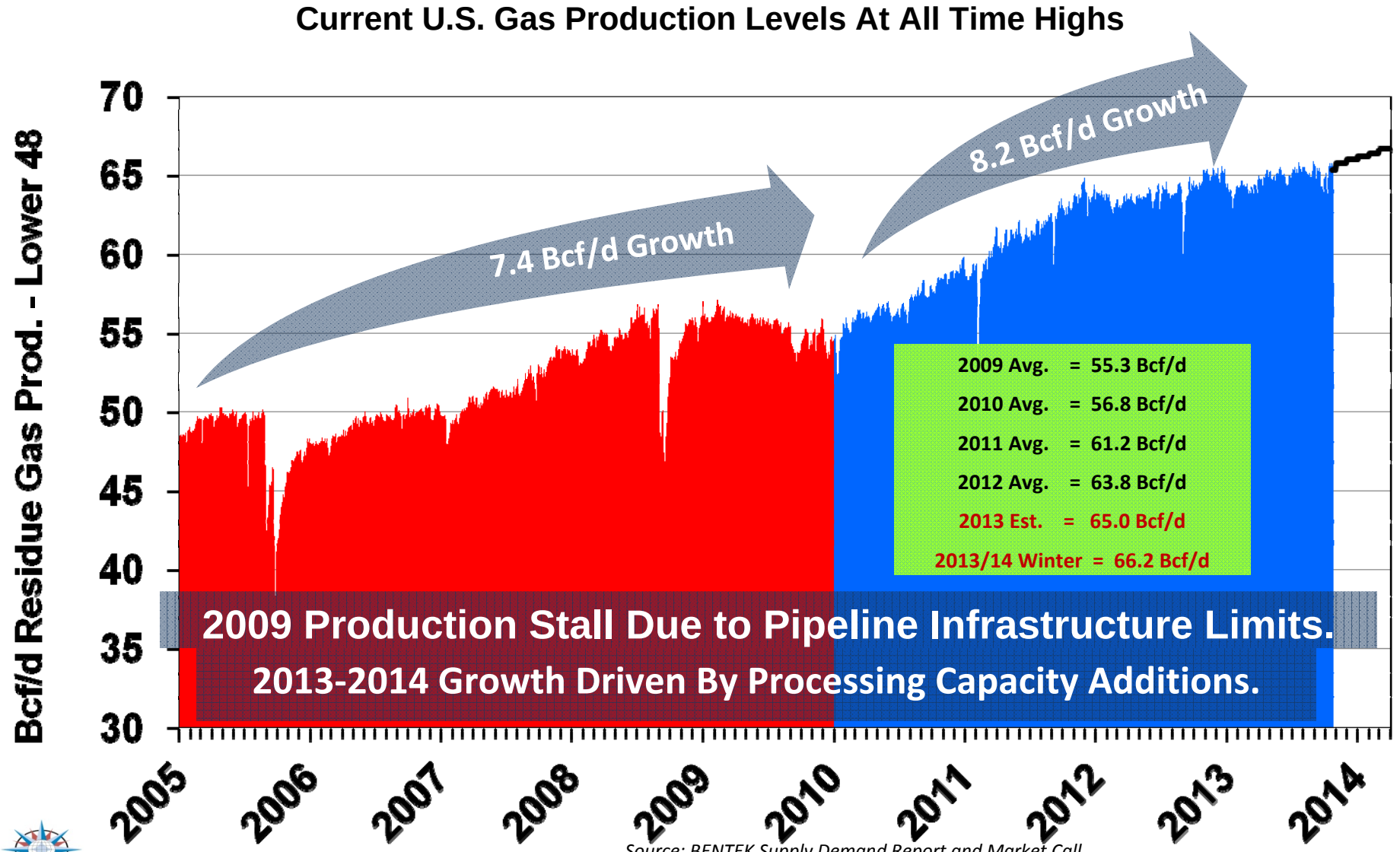
2013 vs. 2012 – Supply Com Back Story of the Year



Market is **now balanced** year on year – supply took 10 months but finally caught up yoy.

Source: BENTEK Supply & Demand Report

Growth Spurts in U.S. Natural Gas Production



Source: BENTEK Supply Demand Report and Market Call

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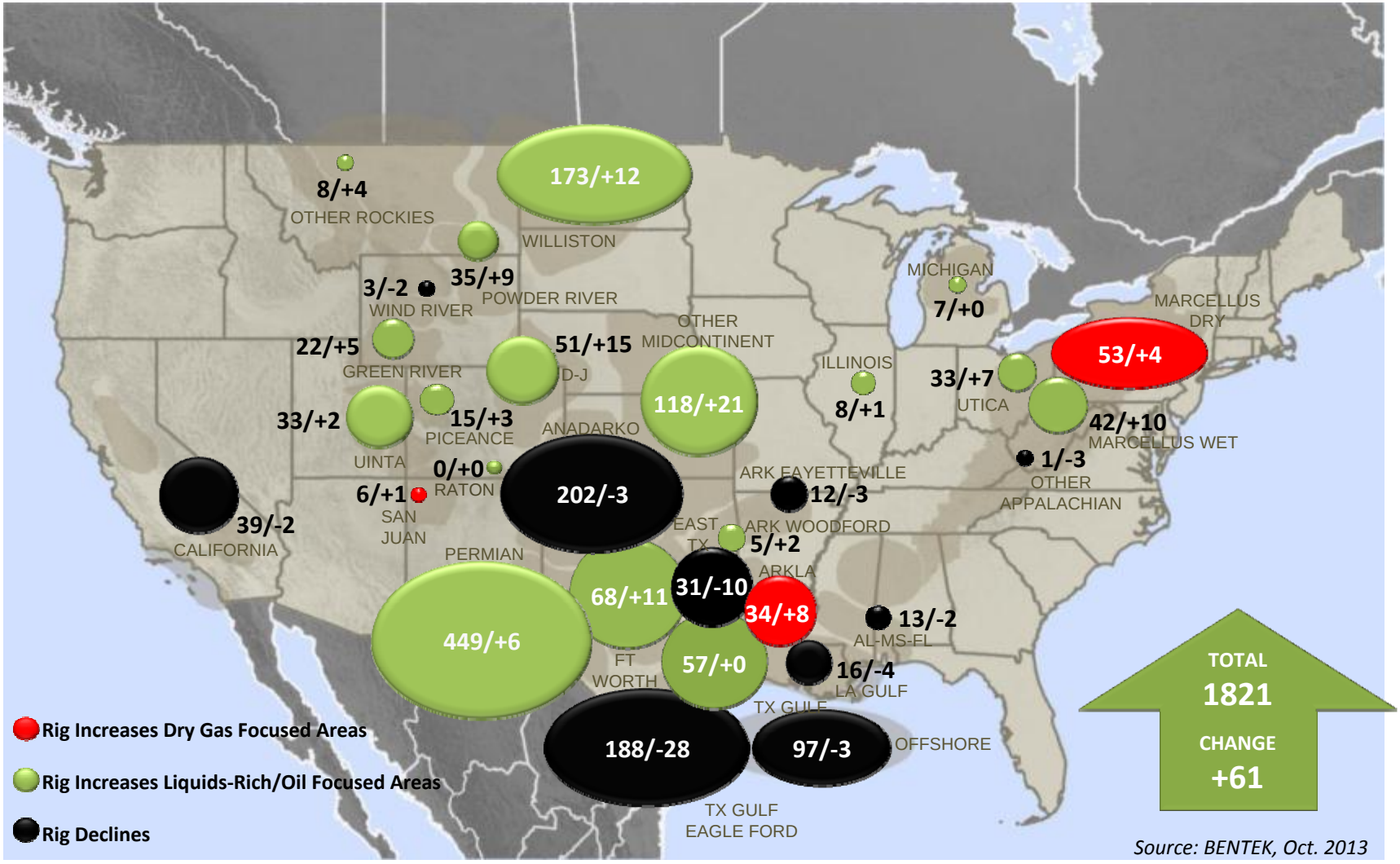
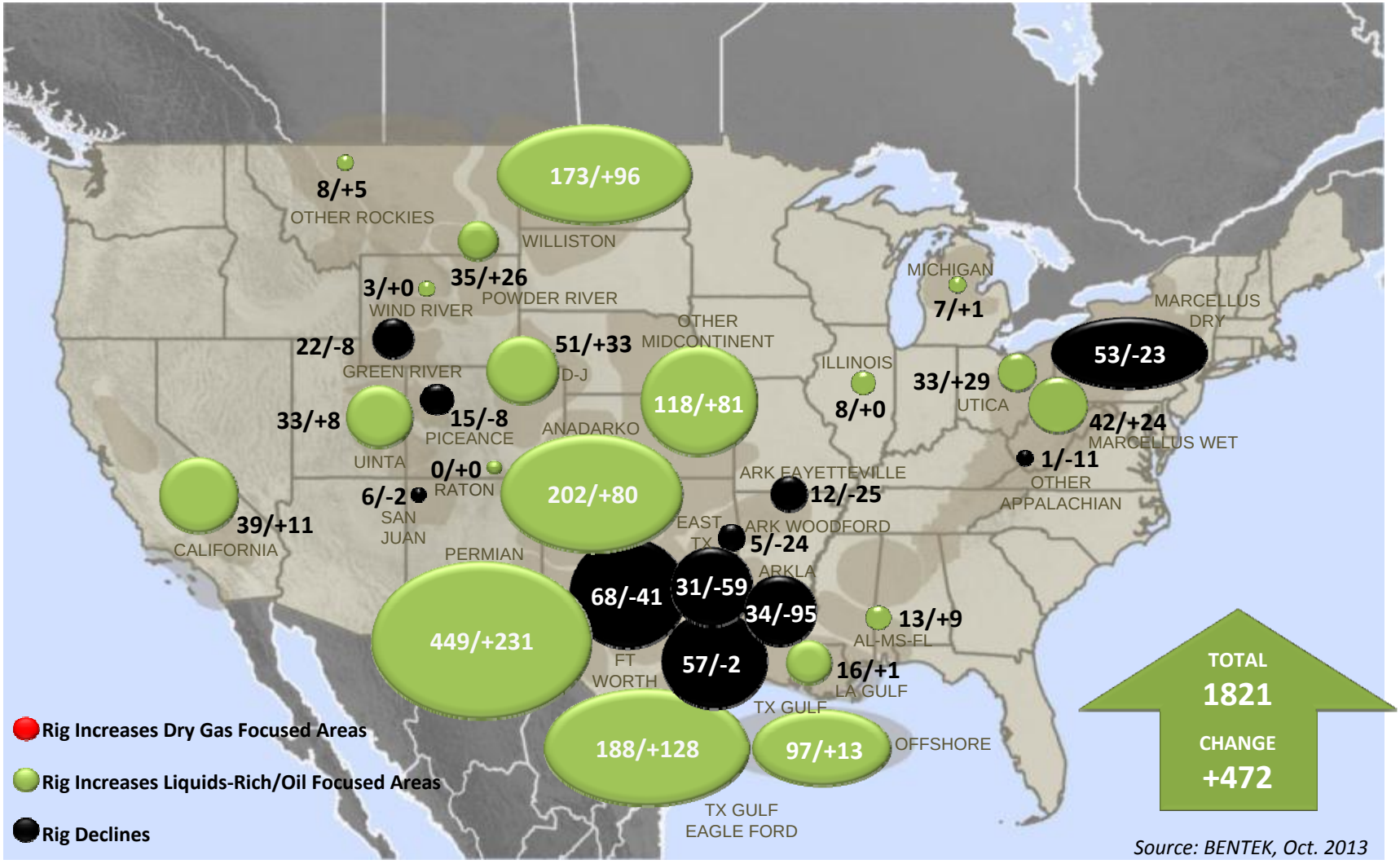
Plays With High Returns Attract Drilling Rigs



Active rig count: Oct. 4, 2013 / Change in rig count from Jan. 4, 2013

Source: Bentek

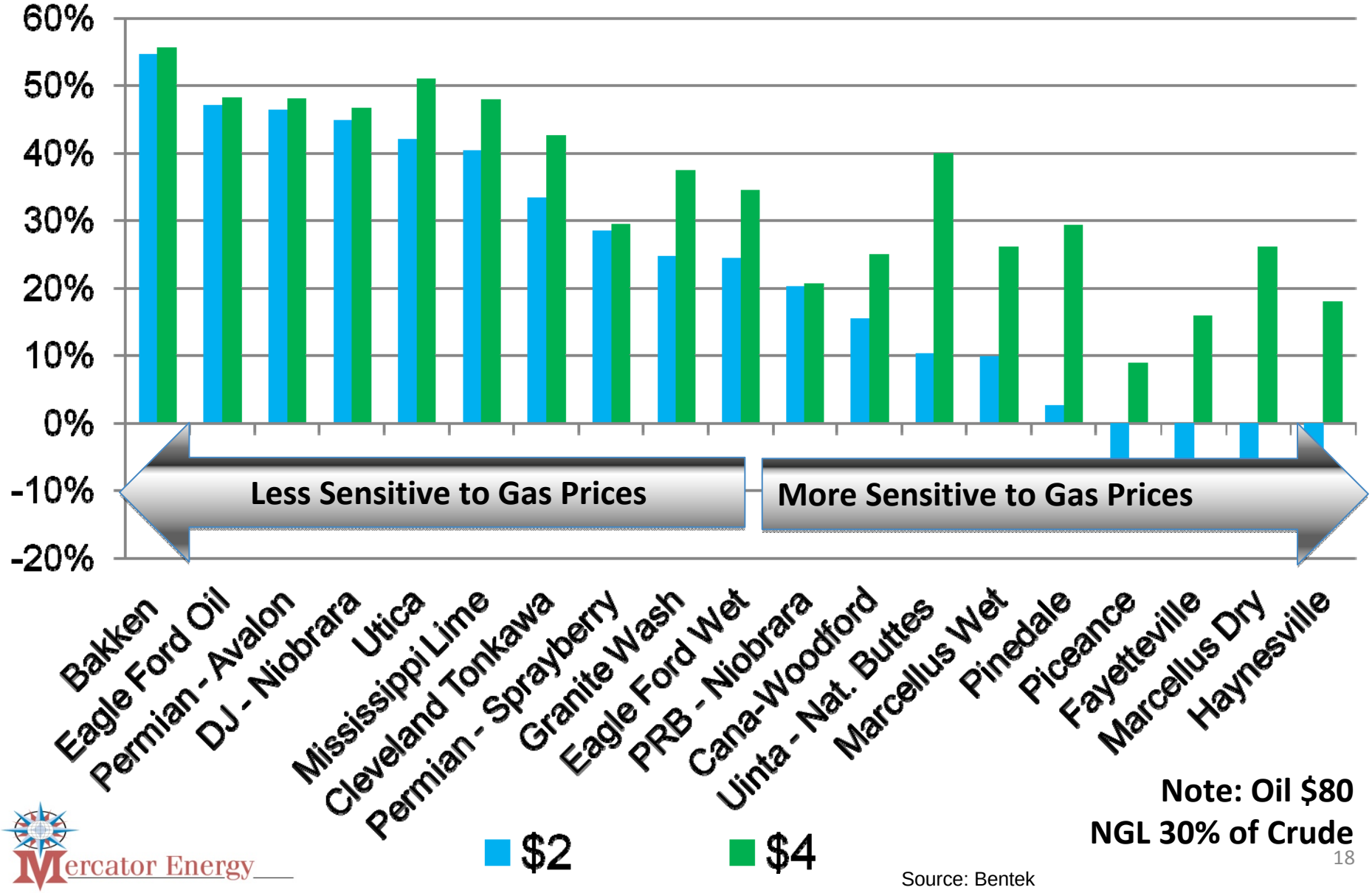
Plays With High Returns Attract Drilling Rigs



Active rig count: Oct. 4, 2013 / Change in rig count from Jan. 1, 2010

Source: Bentek

Diverse Hydrocarbon Mix Maintains Gas Production



Note: Oil $80
NGL 30% of Crude

Source: Bentek

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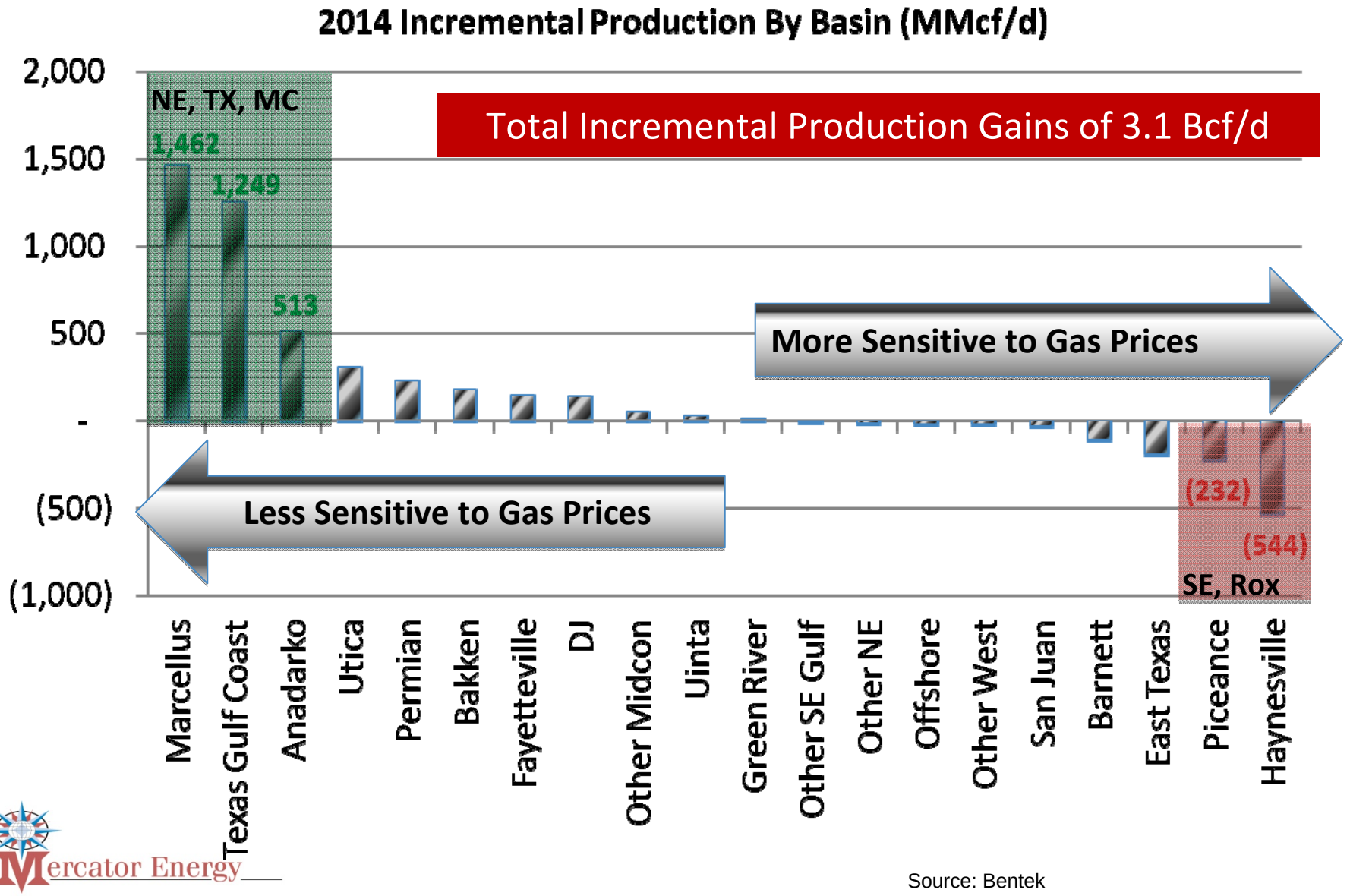
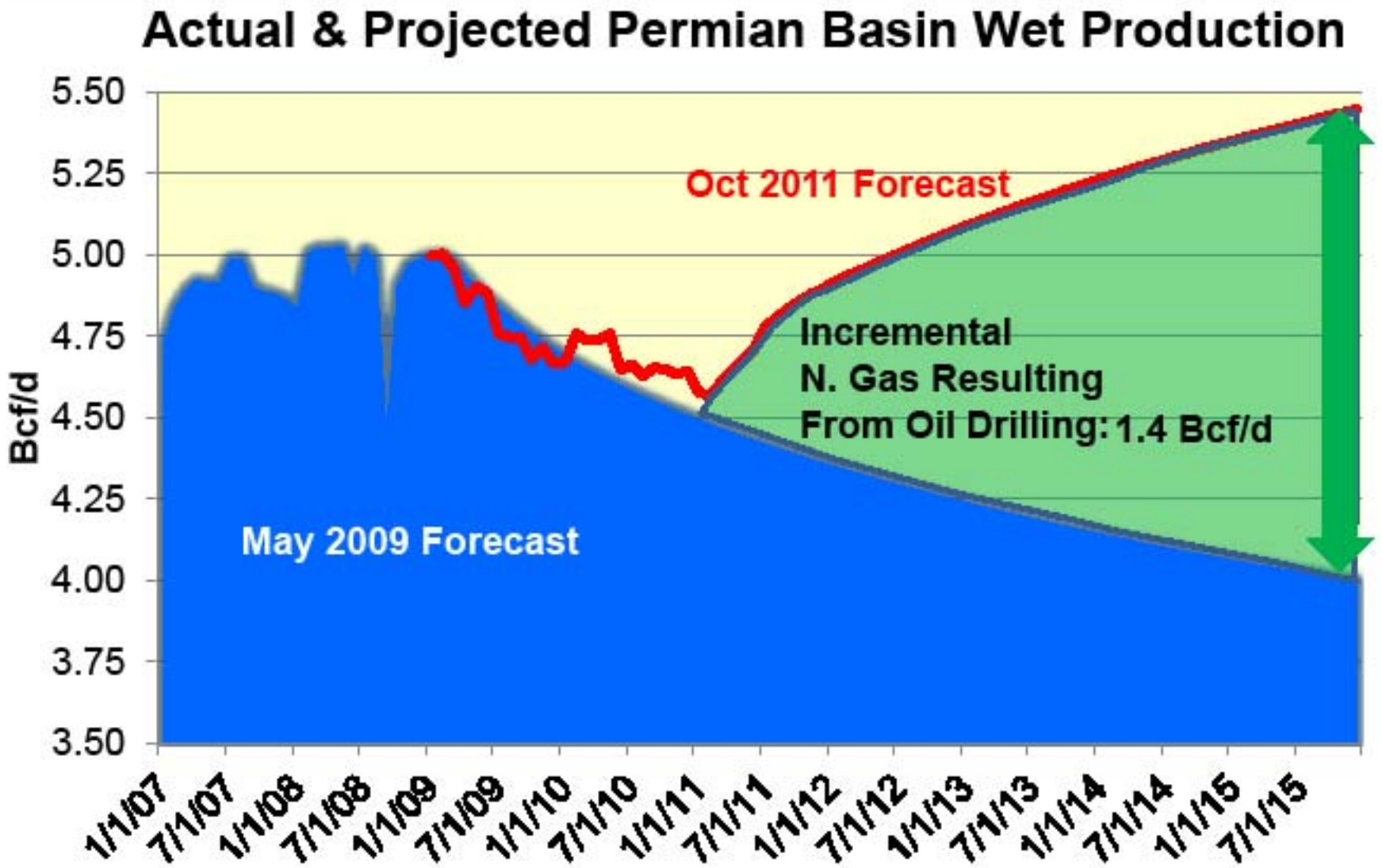
Diverse Hydrocarbon Mix Maintains Gas Production

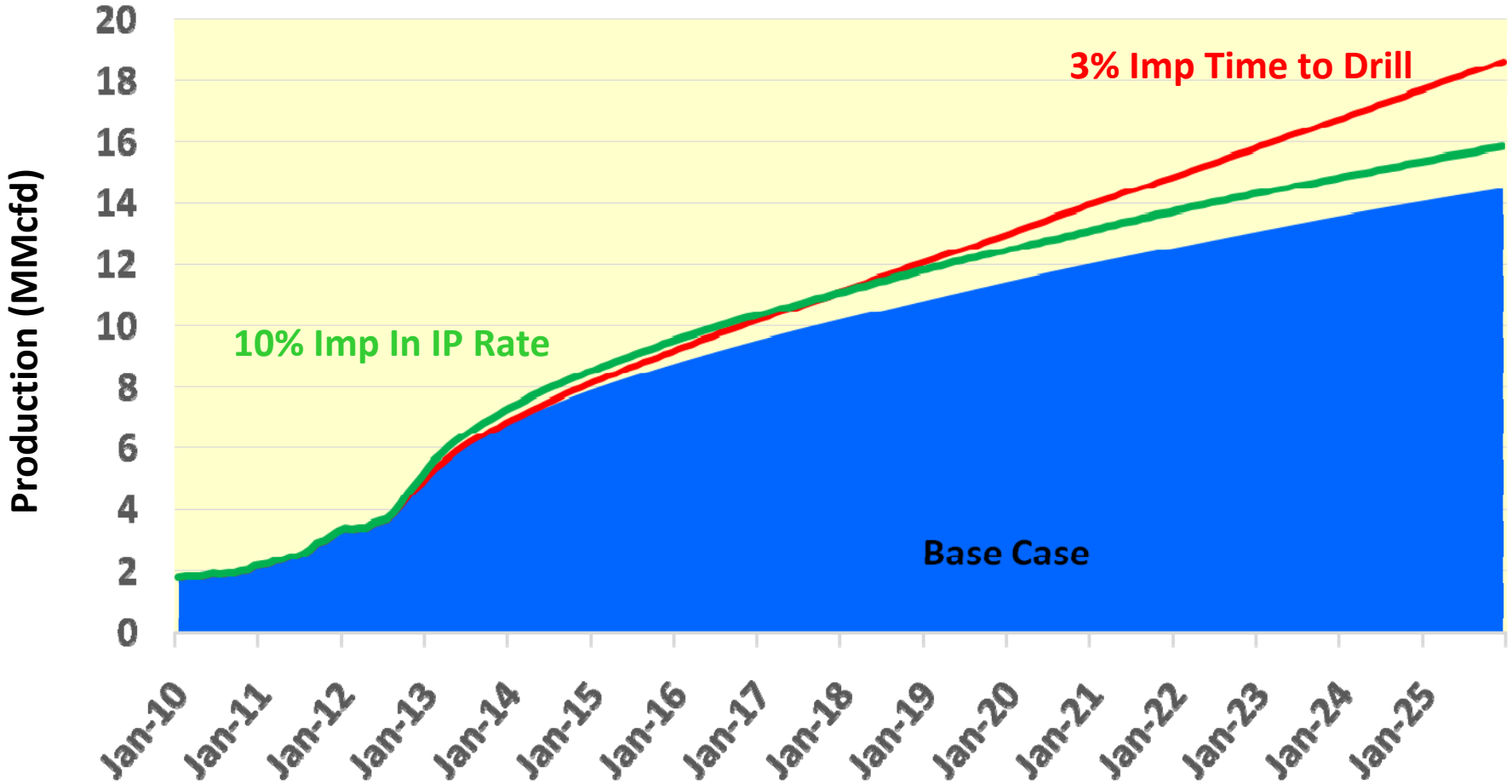


Source: Bentek

Ironically, Oil & Liquids Exploration Drives Gas Production

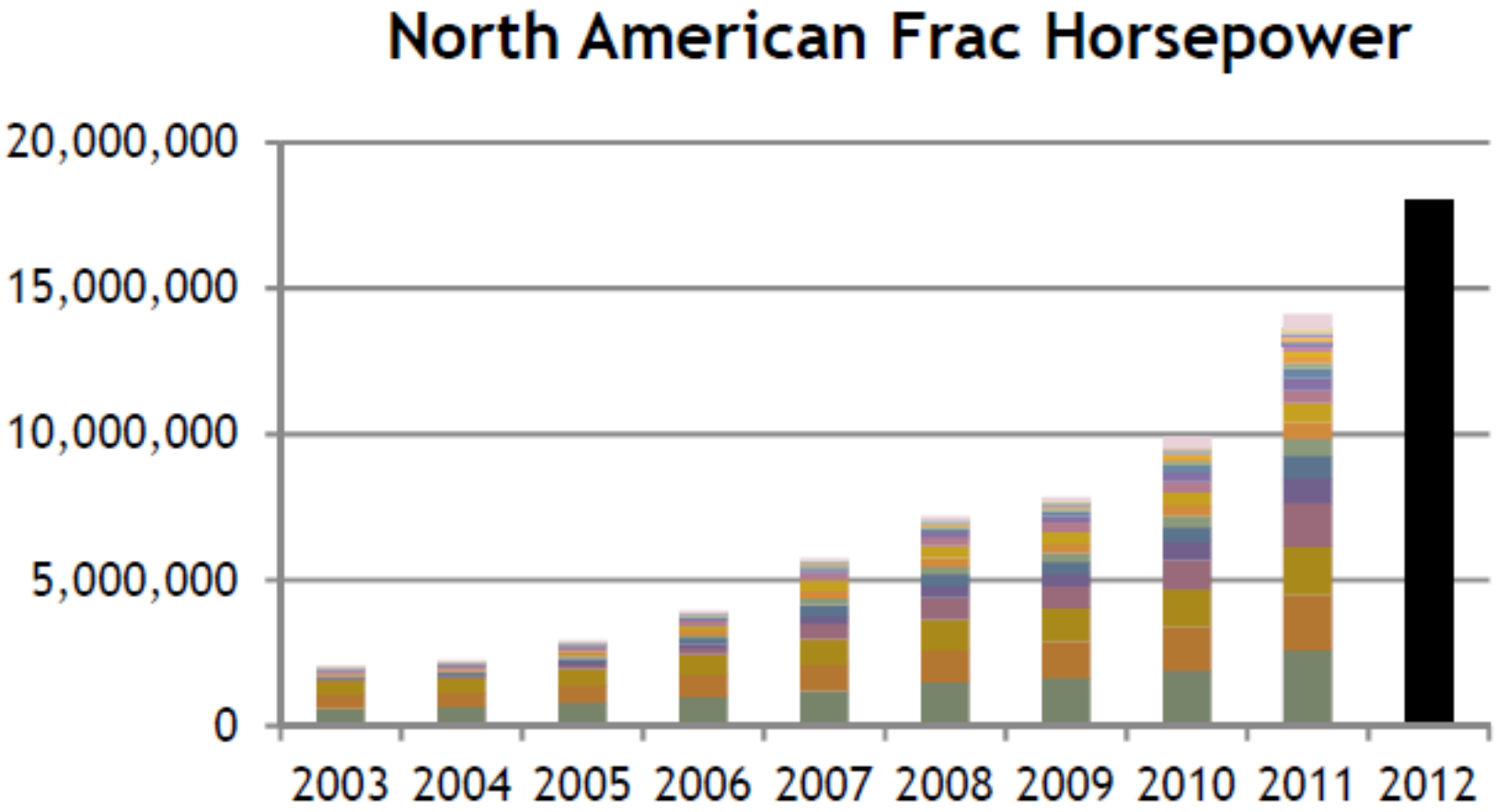


Faster Drilling Times Yield More Wells, More Production



Source: Ponderosa Advisors LLC

Fracturing Application Exploded



Source: Chris Wright, Liberty Resources Tuesday Lunch Club Presentation, 3/5/13

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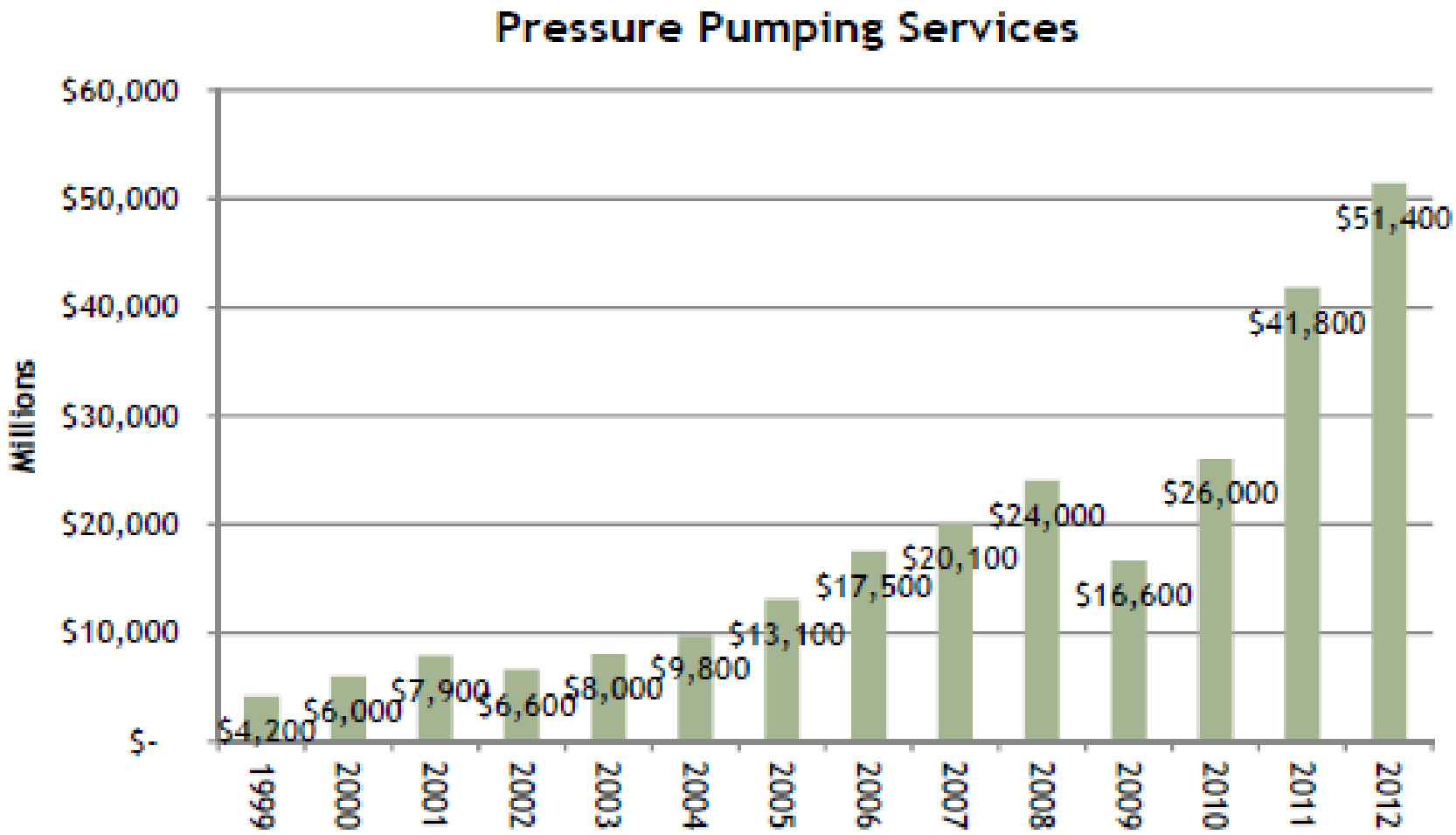
10-fold growth in 10 years



Source: Chris Wright, Liberty Resources Tuesday Lunch Club Presentation, 3/5/13

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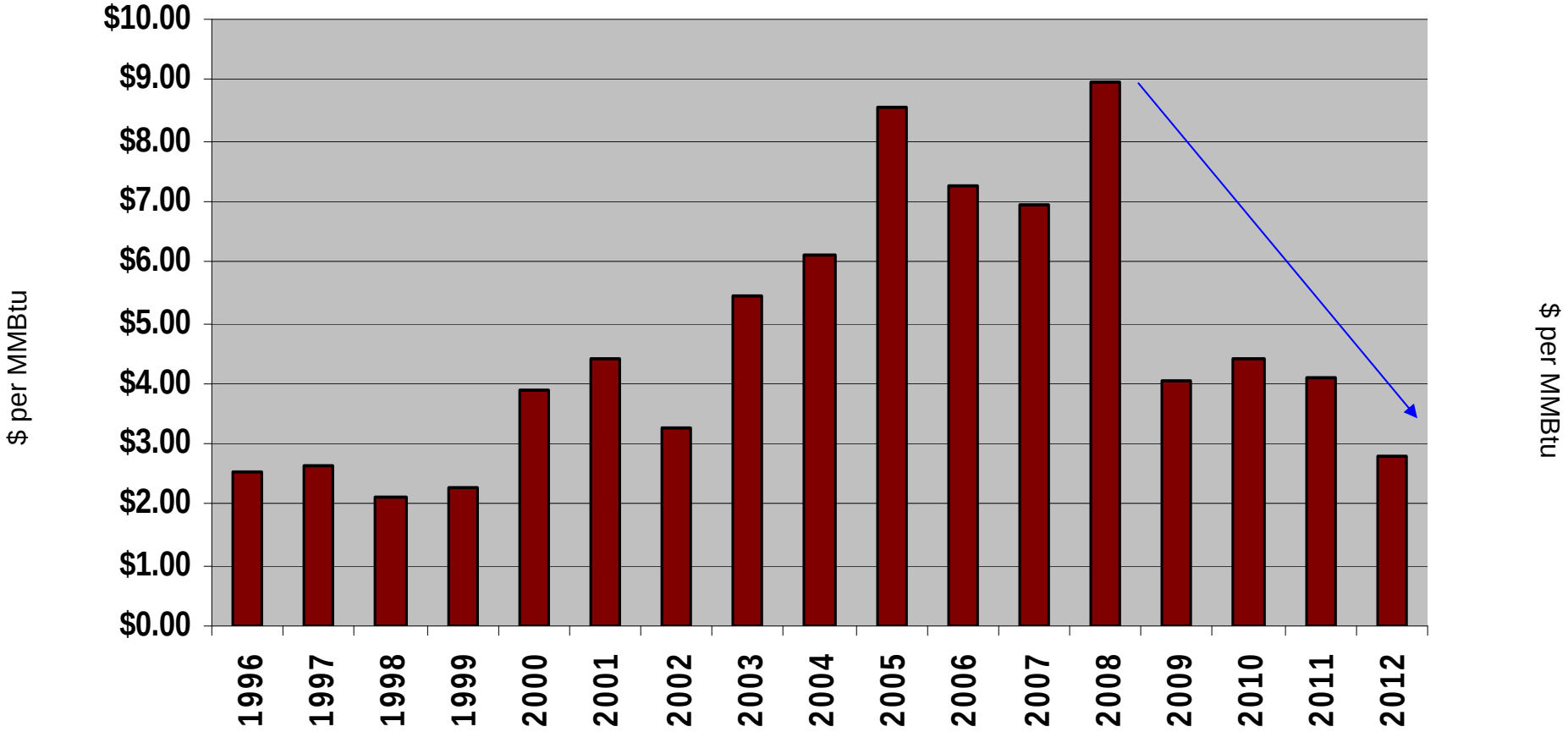
NYMEX Henry Hub Natural Gas Price*
1996 - 2012 Actual



Source: *Average of last three days of trading as published in the Platts Gas Daily Report

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Forecasts for Shale Gas Resource?

- 2008 - **347 TCF** - Energy Information Administration (EIA)
- 2008 - **840 TCF** - Navigant for Clean Skies Foundation
- 2009 - **616 TCF** - Potential Gas Committee (PGC)
- 2011 - **827 TCF** - Energy Information Administration (EIA)
- 2013 – **1,073 TCF** - Potential Gas Committee (PGC)

Source: Various resource estimates

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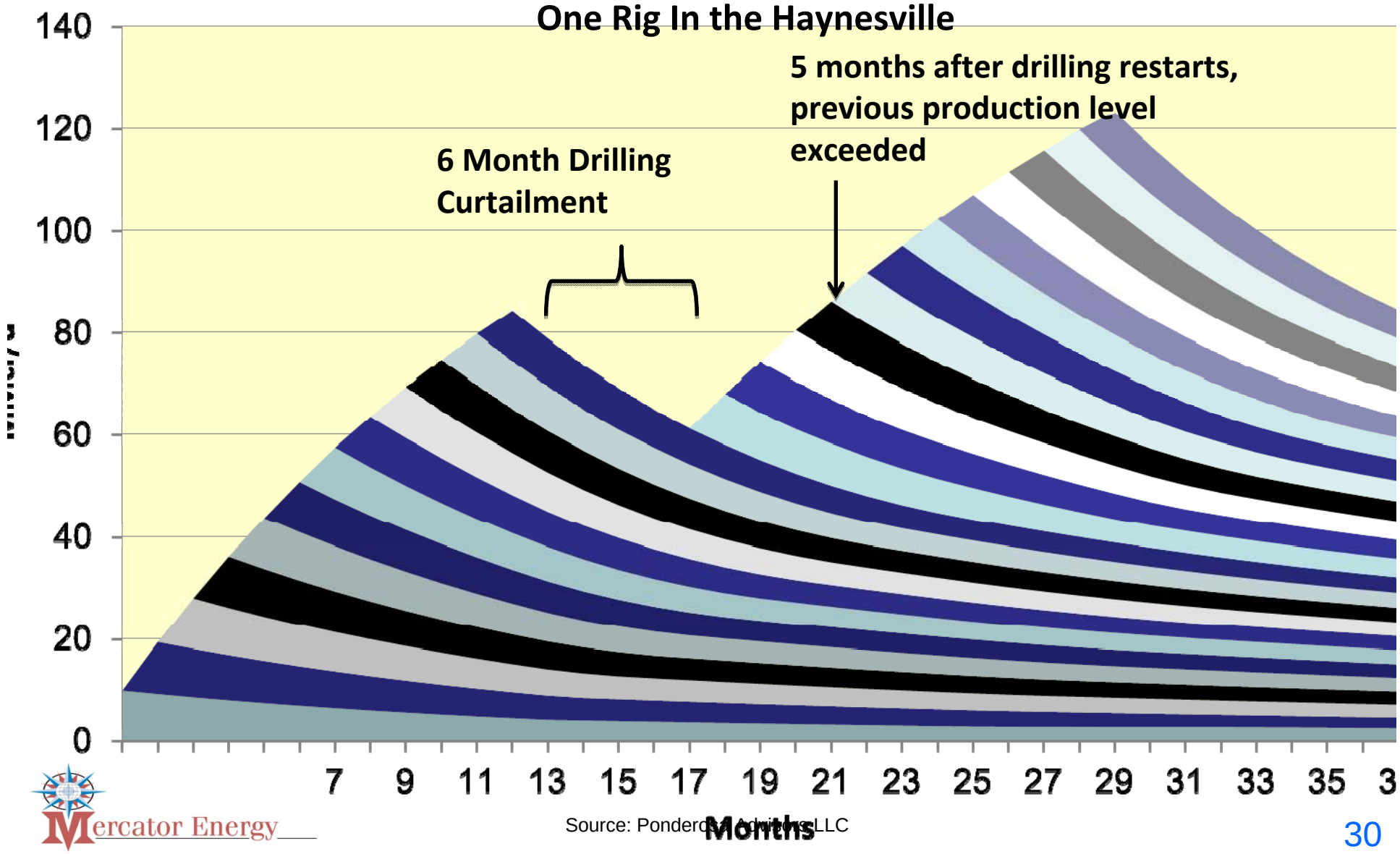
THE SUPPLY CURVE HAS MOVED

According to the Potential Gas Committee, during the last two years, the future gas supply estimate for the US rose nearly 25% to a 48-year record of **2,688 TCF**.

The "Ferrari" Affect Substantially Reduces The Likelihood Of Price Spikes



Source: Ponderosa Advisors LLC

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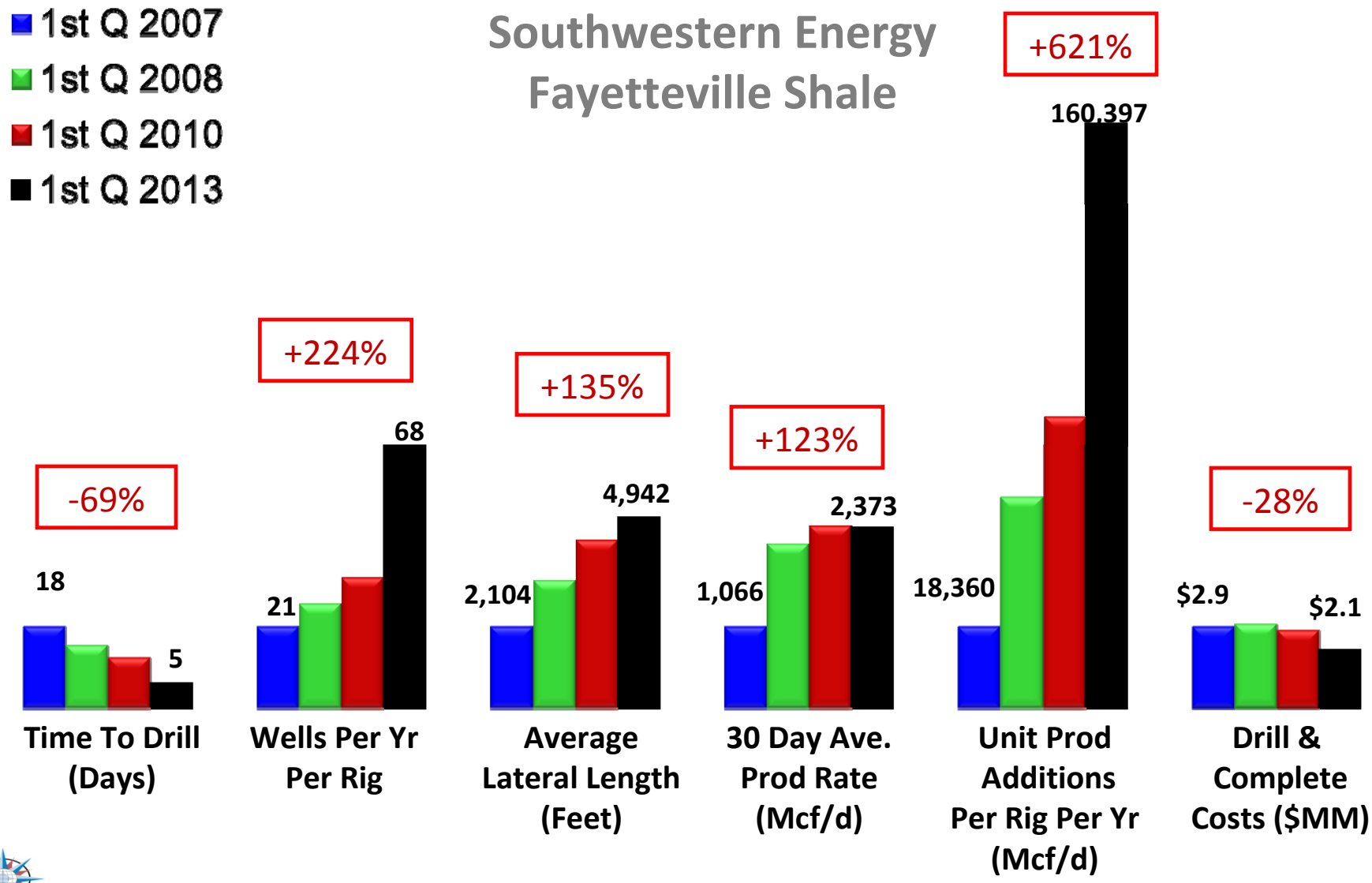
Drilling Rig Productivity Continues To Improve



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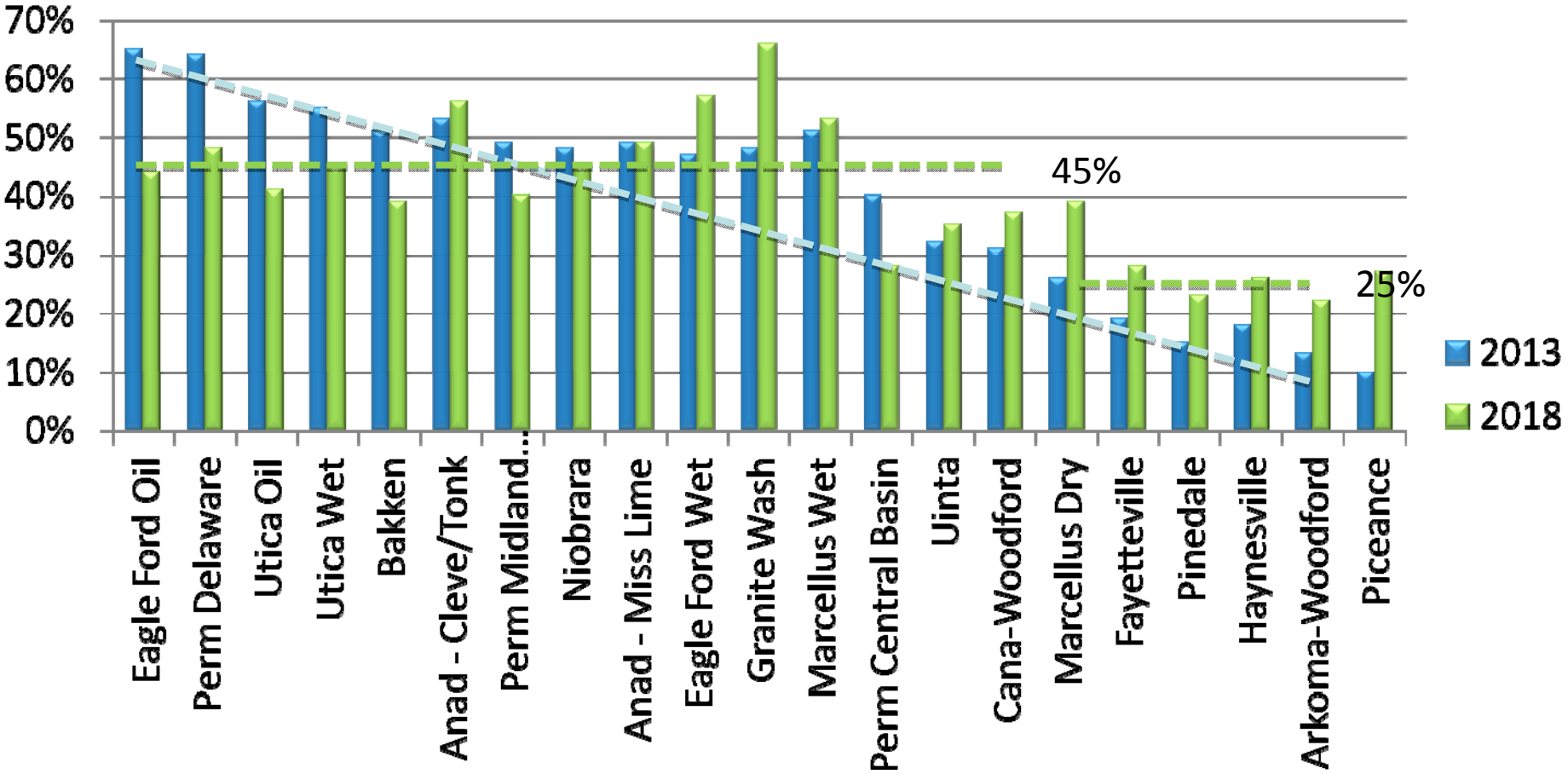
Source: Southwestern Energy Financials

2018 IRRs Support Lean and Rich Gas Production

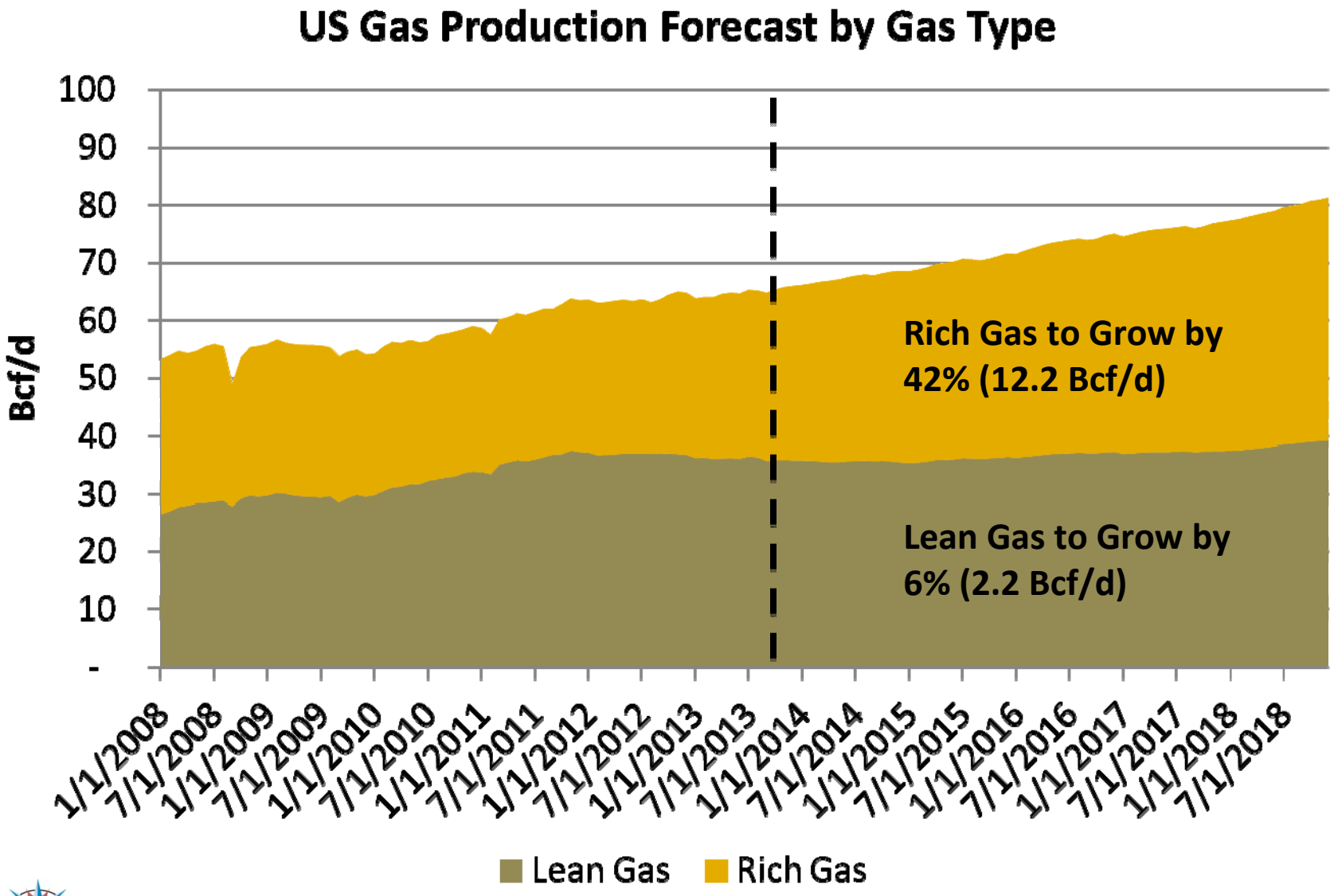


2013 Price Assumptions: *Gas = 12 month forward average curve for each regional pricing point (range $4.03-$4.28/Mcf)*
Oil = 12 month forward average WTI +/- differential (range $79-$96/barrel)
NGLs = weighted average $/barrel , 12-mo forward average Mt. Belvieu prices (range $25-$51/barrel)

2018 Forward Curve Price Assumptions: *Gas = $4.91/Mcf, NGLs = $44/barrel, Oil = $77/barrel)*

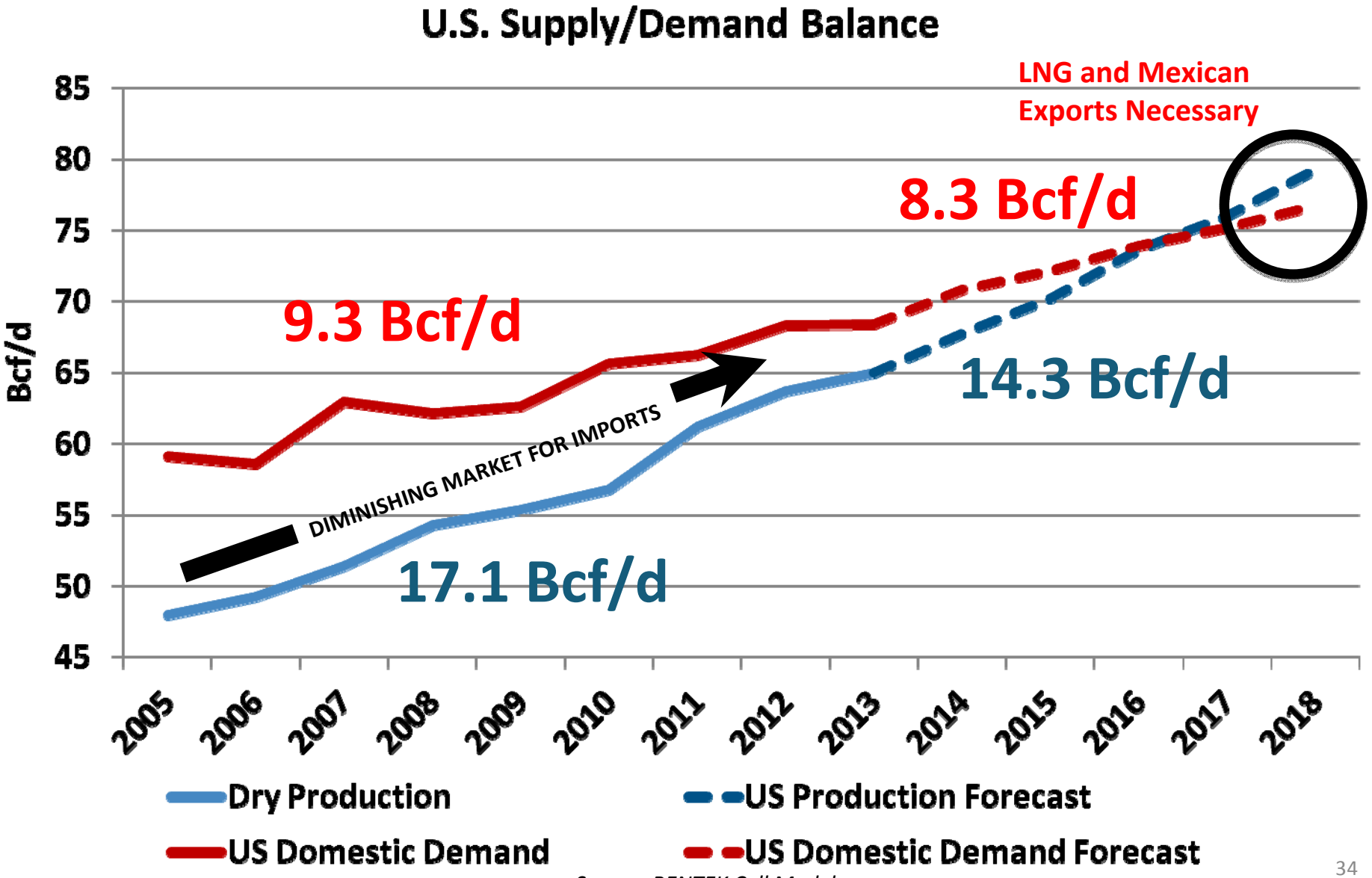
Source: Bentek

Rich Gas Production Leading Growth Expectations



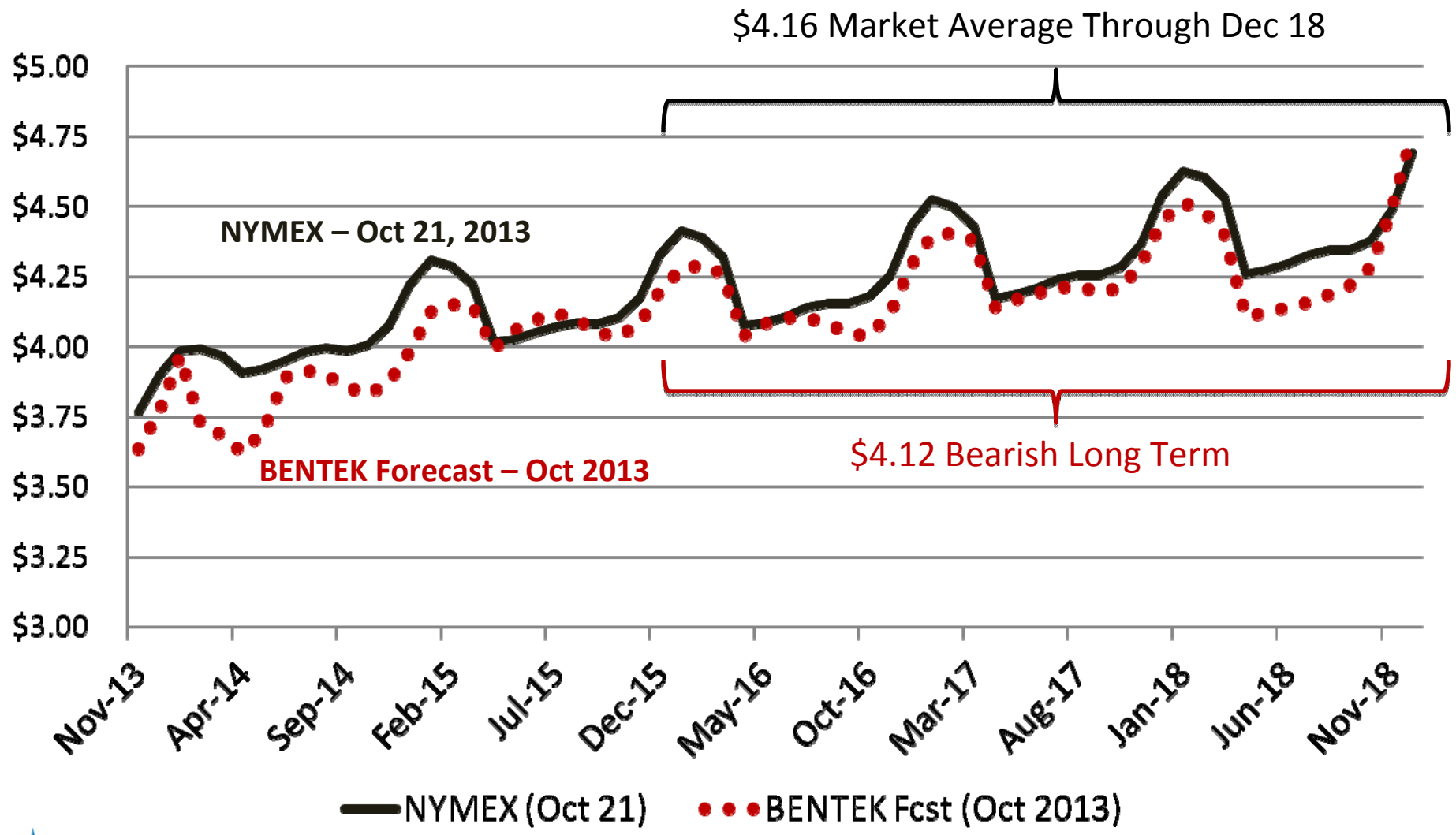
Source: Bentek

Growth in Domestic Demand Not Enough: Exports Needed



Source: BENTEK Cell Model

NYMEX Forward Curve Expectations



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Source: BENTEK Market Call Long Term, NYMEX

World LNG Estimated June 2013 Landed Prices

Source: *Waterborne Energy, Inc.* Data in $US/MMBtu

Updated Mayl 23, 2013

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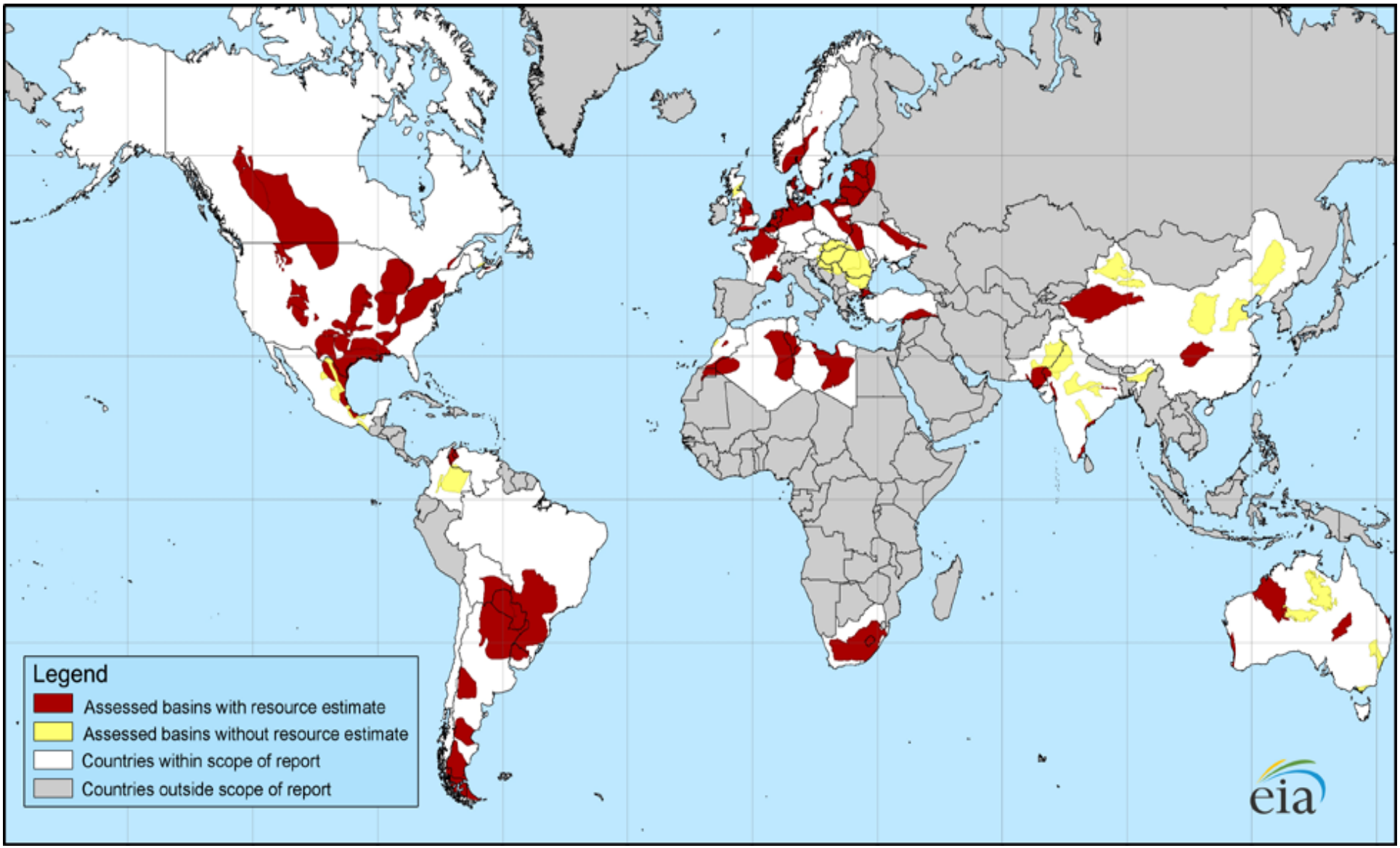
Global Shale Reserves



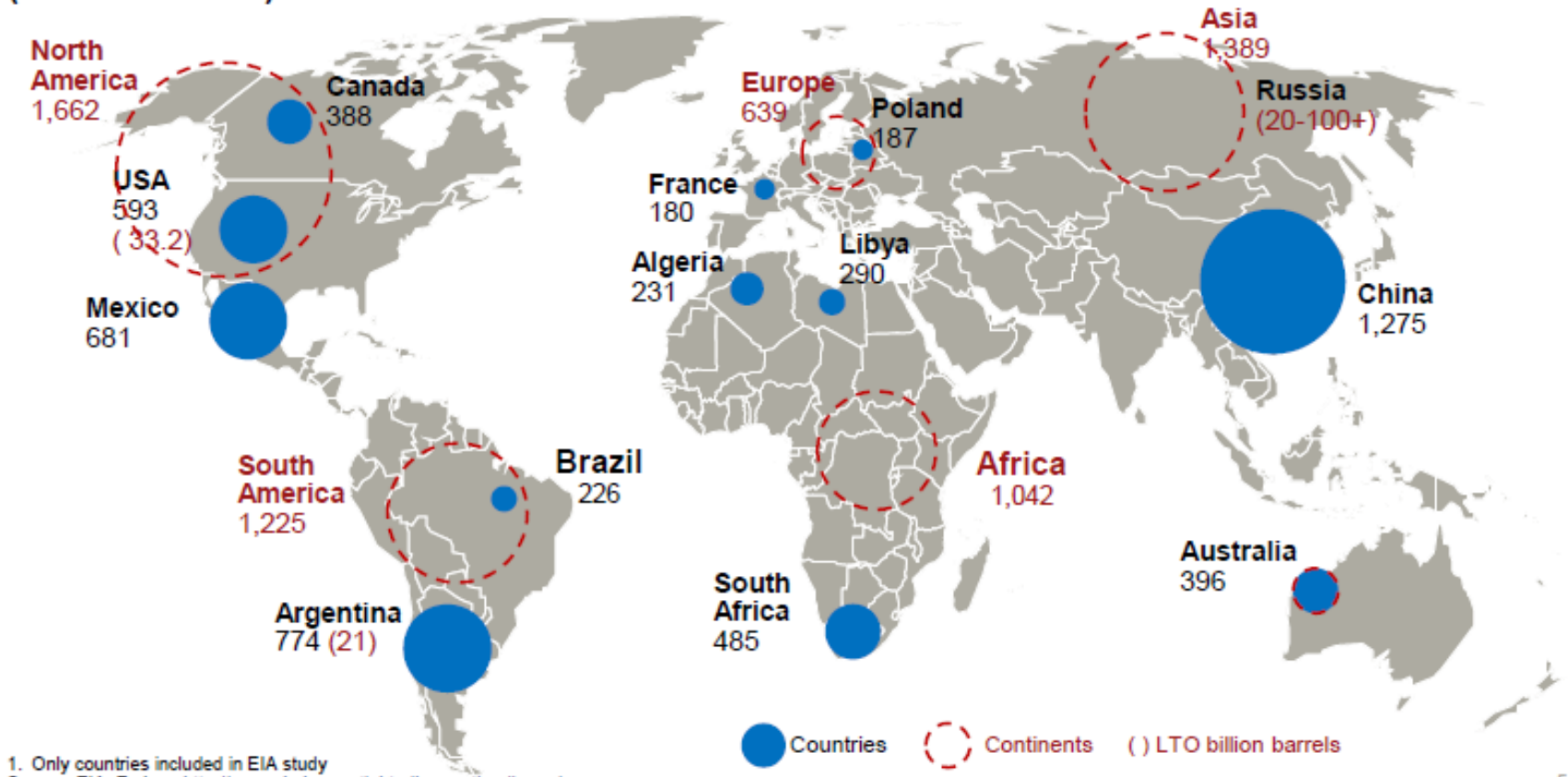
Source: EIA; Dr. Jim Duncan, ConocoPhillips, *Decoding the Relevance of Abundant Supply,* 2011 COGA Presentation

ATKearney

Resource potential in North America is massive – with the Rockies accounting for a significant fraction

Major global shale gas and LTO opportunities[1]

Technically recoverable shale gas (trillion cubic feet) and LTO (Billion barrels) resources



1. Only countries included in EIA study
Source: EIA, Forbes, http://www.shale-gas-tight-oil-argentina-ii.com/

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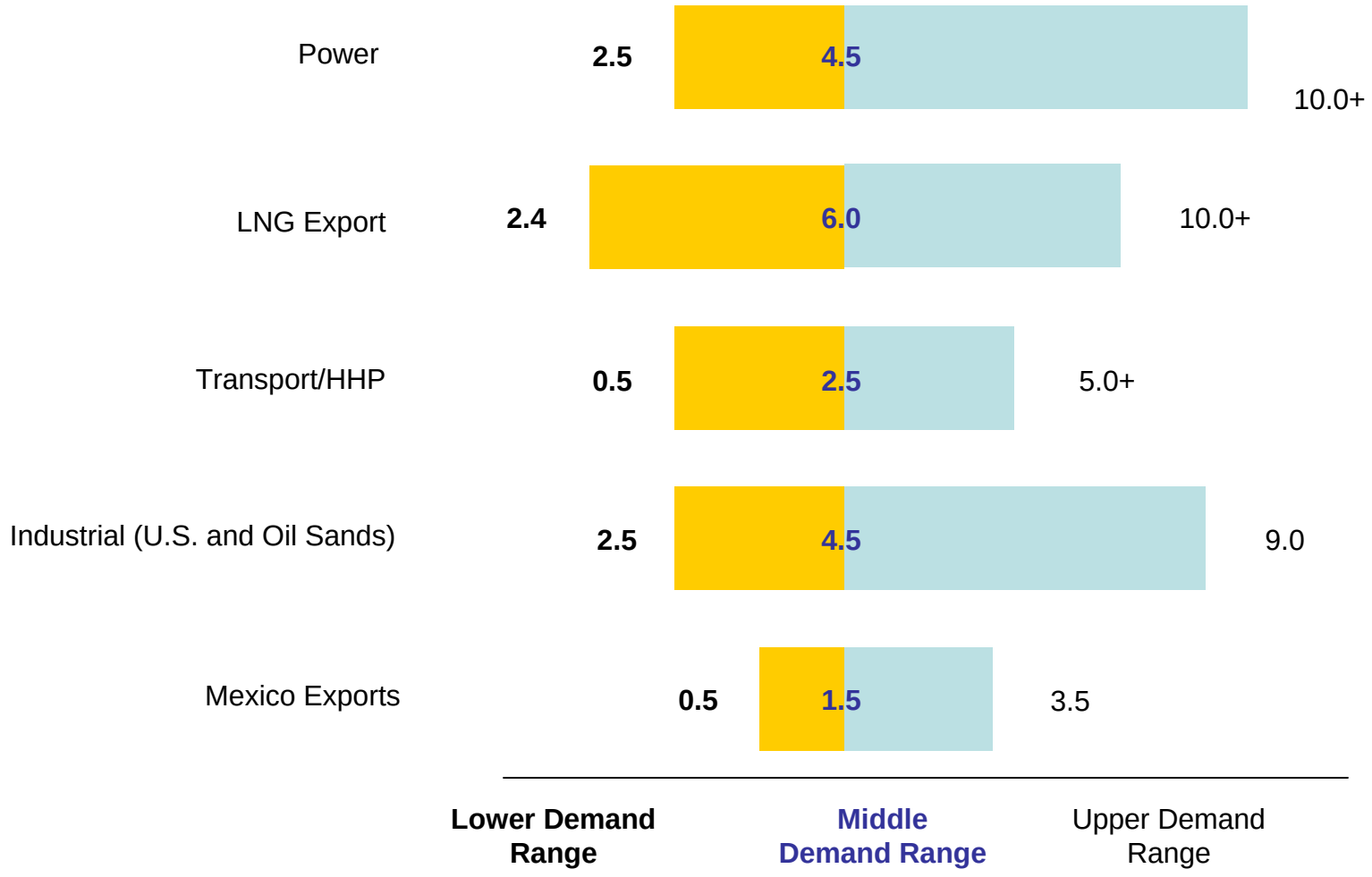
North American Natural Gas
Demand Ranges by Selected Sector

Significant demand growth is possible in the LNG, transportation/HHP and power sectors through 2020.



Source: Encana Corporate Presentation, August 2013; Industrial Energy Consumers of America; Bentek Energy; Raymond James; Michael Smith, Chairman & CEO Freeport LNG, Industry Sources

Conclusions

- U.S. continues to produce more gas, shale gas revolution was too successful, end-users will benefit
- During the next 3 years, supply will likely exceed demand
- Prices will remain in the $3.50 to $4.75 range, with short period above and below that band during adjustments
- Long term prices depend on demand growth. Without demand growth, supply will continue to be long and prices relatively low.
- A significant demand response can't occur for at least 3-5 years

Conclusions (cont'd)

- Infrastructure investment in the 4 areas of potential new demand (CNG/NGV, coal to gas, industrial demand growth, LNG exports) could take 5-8 years to be meaningful
- Natural gas liquids will continue to be the driving force in drilling
- BTU value disparity between natural gas and crude oil will continue for many years
- Beware of entities that are "talking their own book" (ie – chemical and manufacturing trade associations, LNG developers, NGV advocates, etc.)
- Exports must become a greater part of the demand equation, with obvious political implications.

Contact Information

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Citations for Report

All of the information utilized for this report is a compilation of information pulled from the following data sources:

Ponderosa Advisors LLC
Blue, Johnson Associates, Inc.
Chris Wright, Liberty Resources
Office of Fossil Energy
Office of Oil Gas Global Security Supply
U.S. Department of Energy
Raymond James and Associates, Inc.
Charif Souki, Cheniere Energy Inc.; Cheniere Research
U.S. Federal Energy Regulatory Commission
Institute for Energy Research (IER)
Energy Information Administration (EIA)
Bernstein Research
Western Energy Alliance
Sutherland LNG Blog
Platts Gas Daily Report, A McGraw Hill Publication
Colorado Oil and Gas Association