

# Supply and Demand for Natural Gas

**Presentation to:**  
**Energy Summit**  
**Loveland, CO**

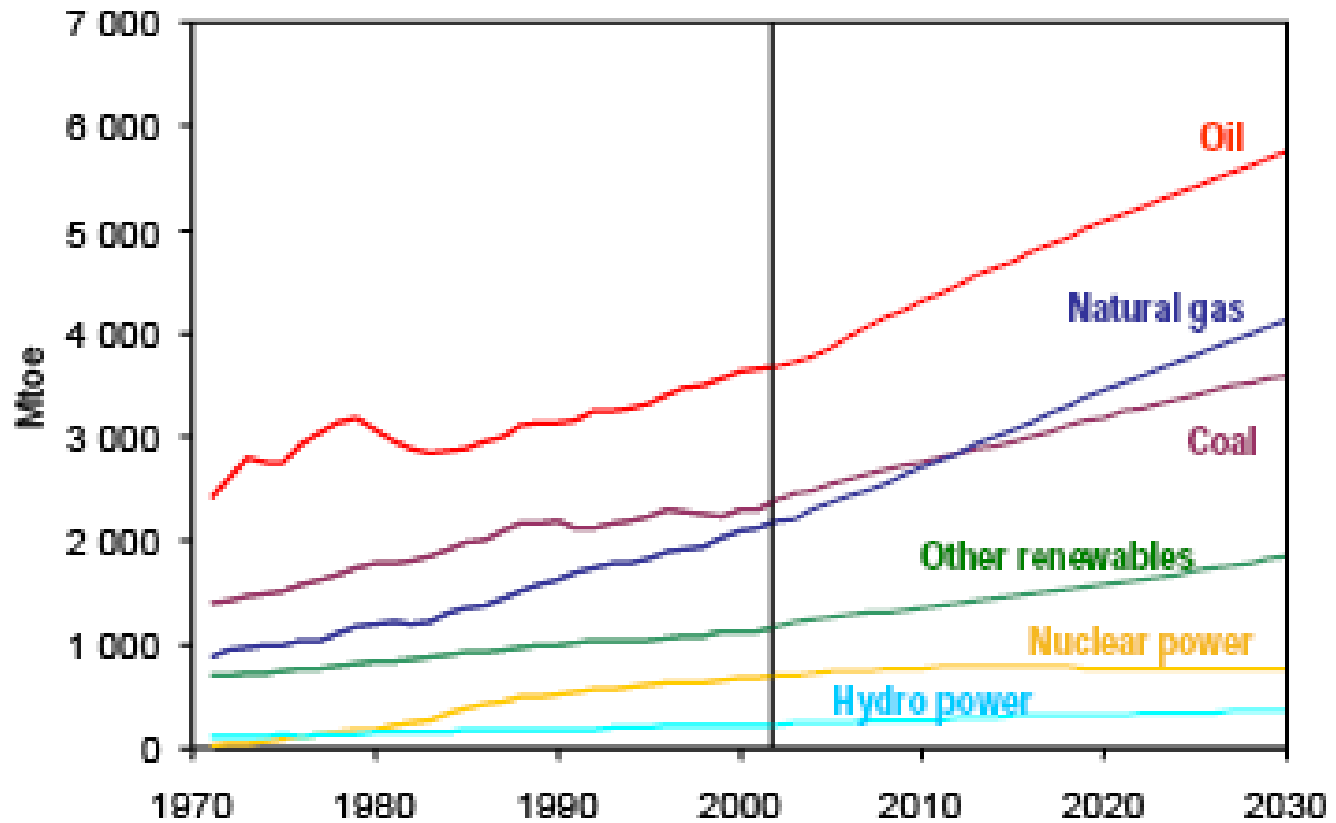
July 16, 2013

By:

John Harpole



# World Primary Energy Demand



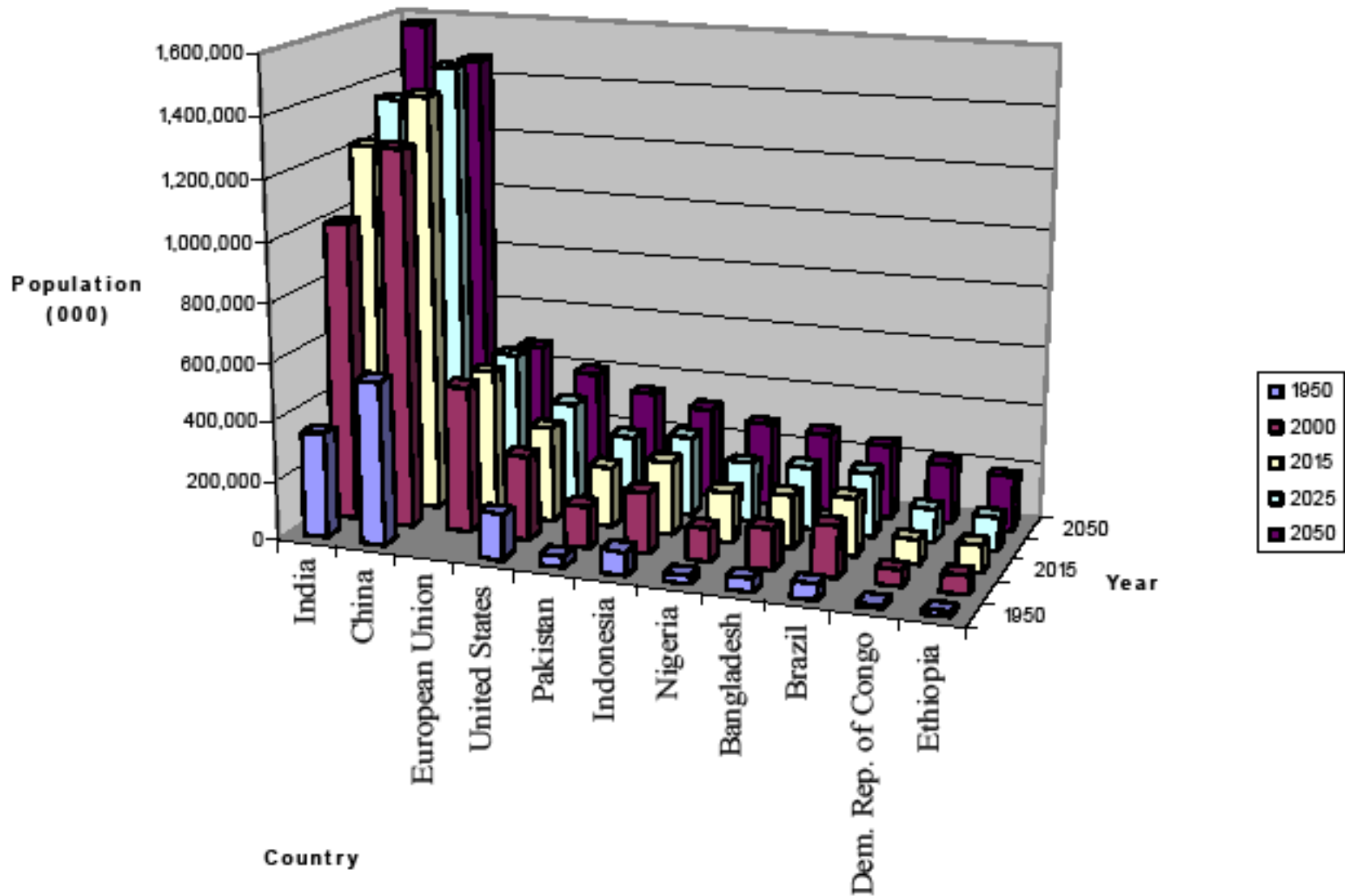
*Fossil fuels account for almost 90% of the growth in energy demand between now and 2030*

WORLD ENERGY OUTLOOK

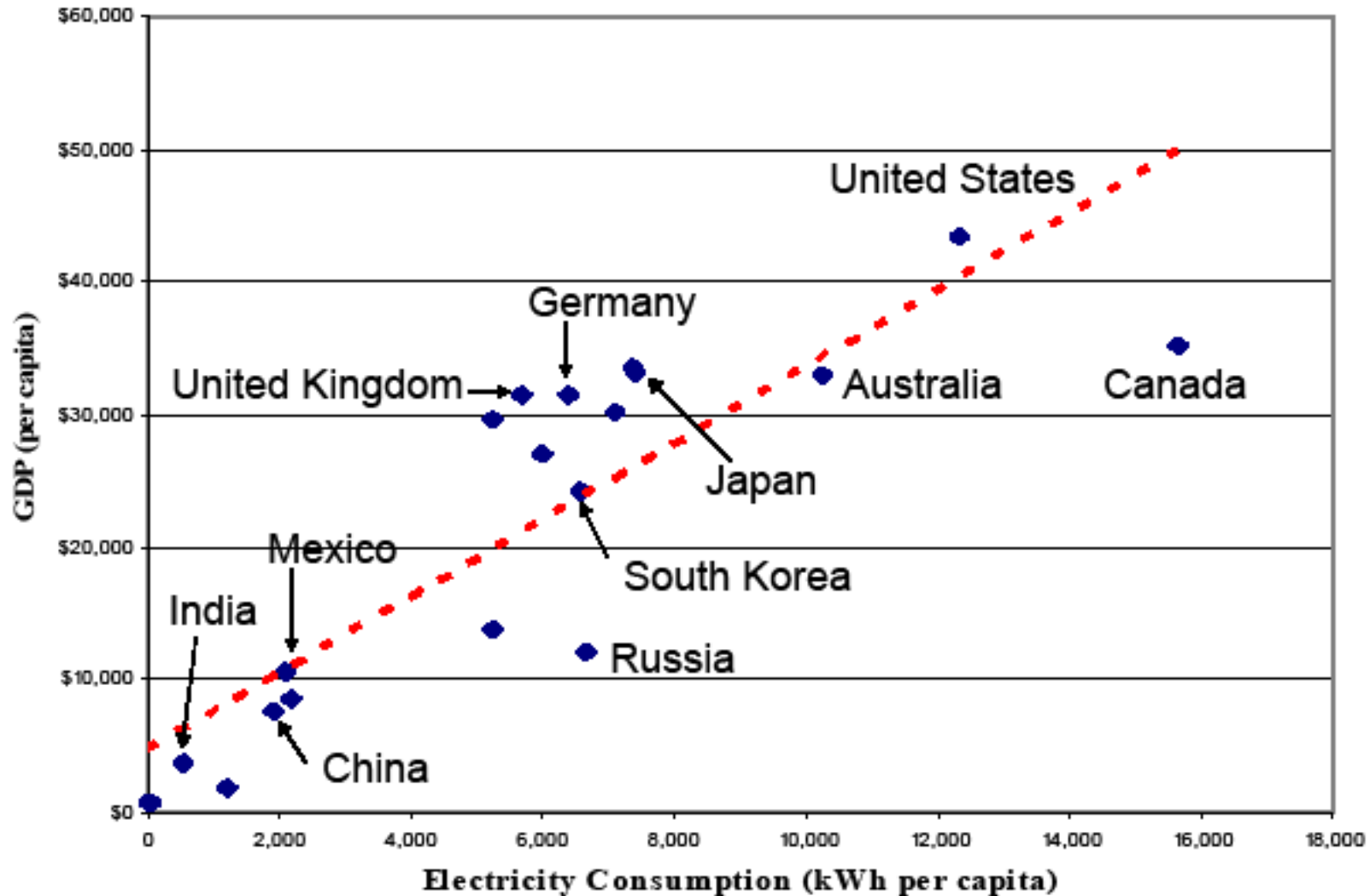
INTERNATIONAL ENERGY AGENCY



# Population Growth from 1950-2050

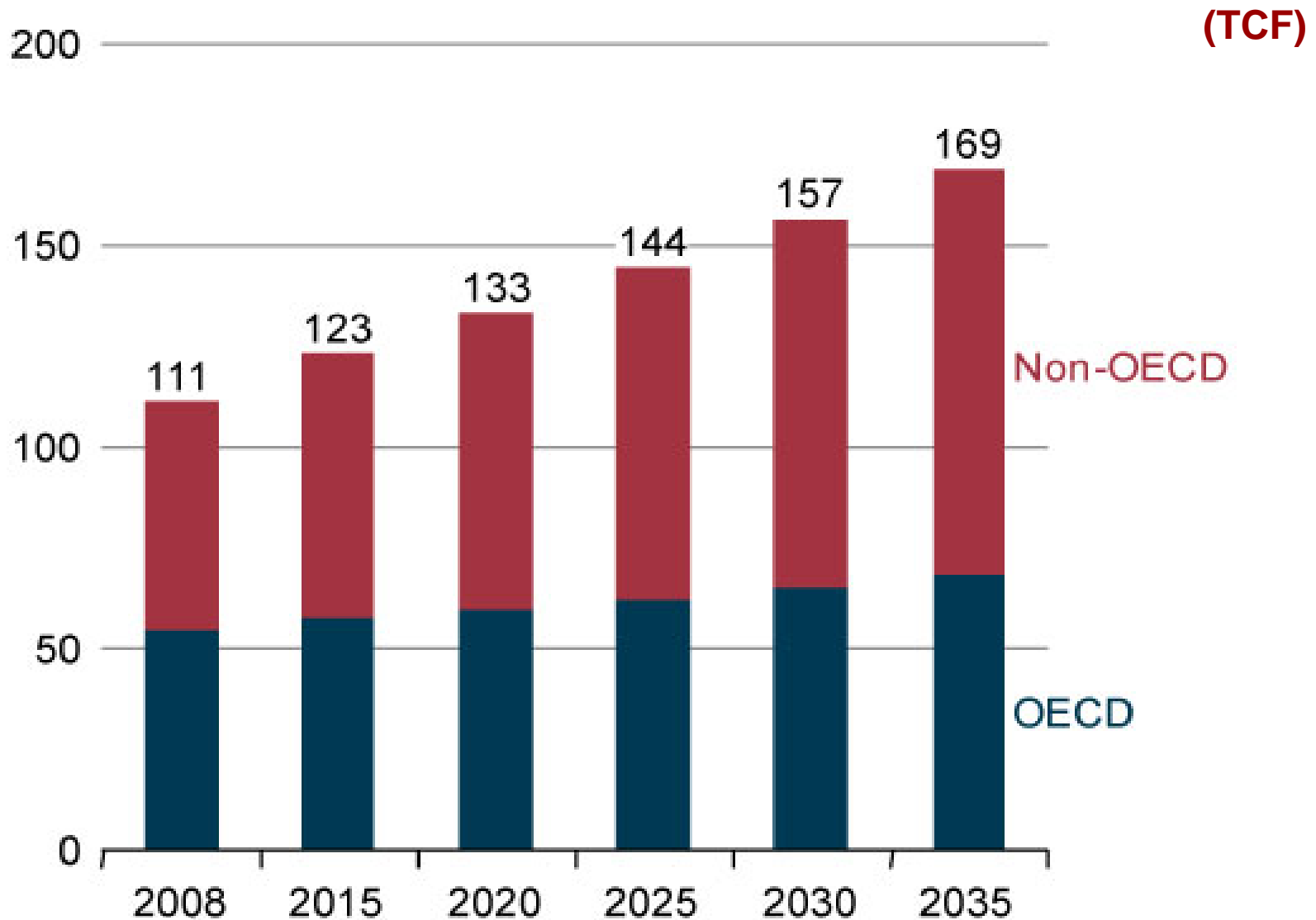


# Quality of Life is Strongly Correlated with Electricity Consumption



Source: CIA World Factbook, 2007

# World Natural Gas Consumption, 1990-2035



# Russia, Iran and Qatar Form Natural Gas Cartel

10/21/2008 in Tehran, Iran

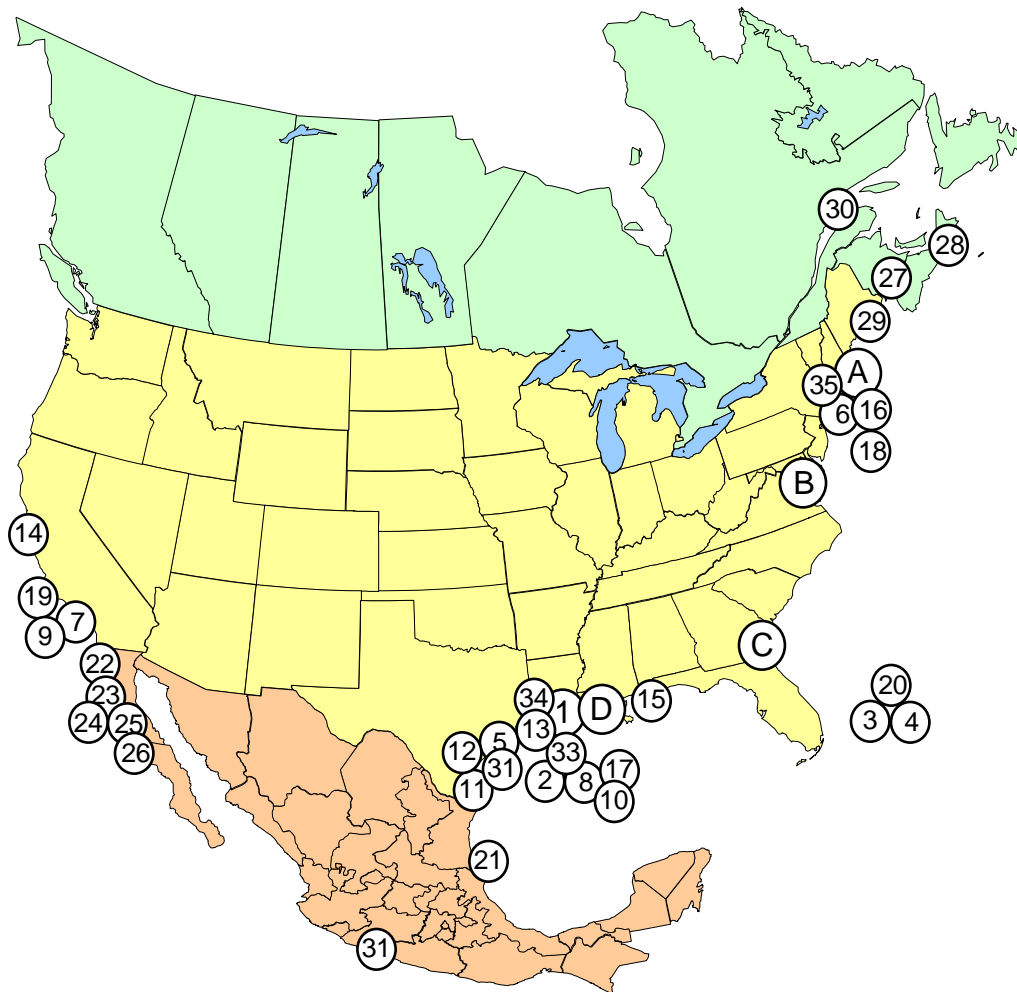


Qatar's Deputy Premier and Minister of Energy and Industry, Abdullah bin Hamad Al-Attiya

Iranian Oil Minister, Gholam Hossein Nozari

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

# 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)

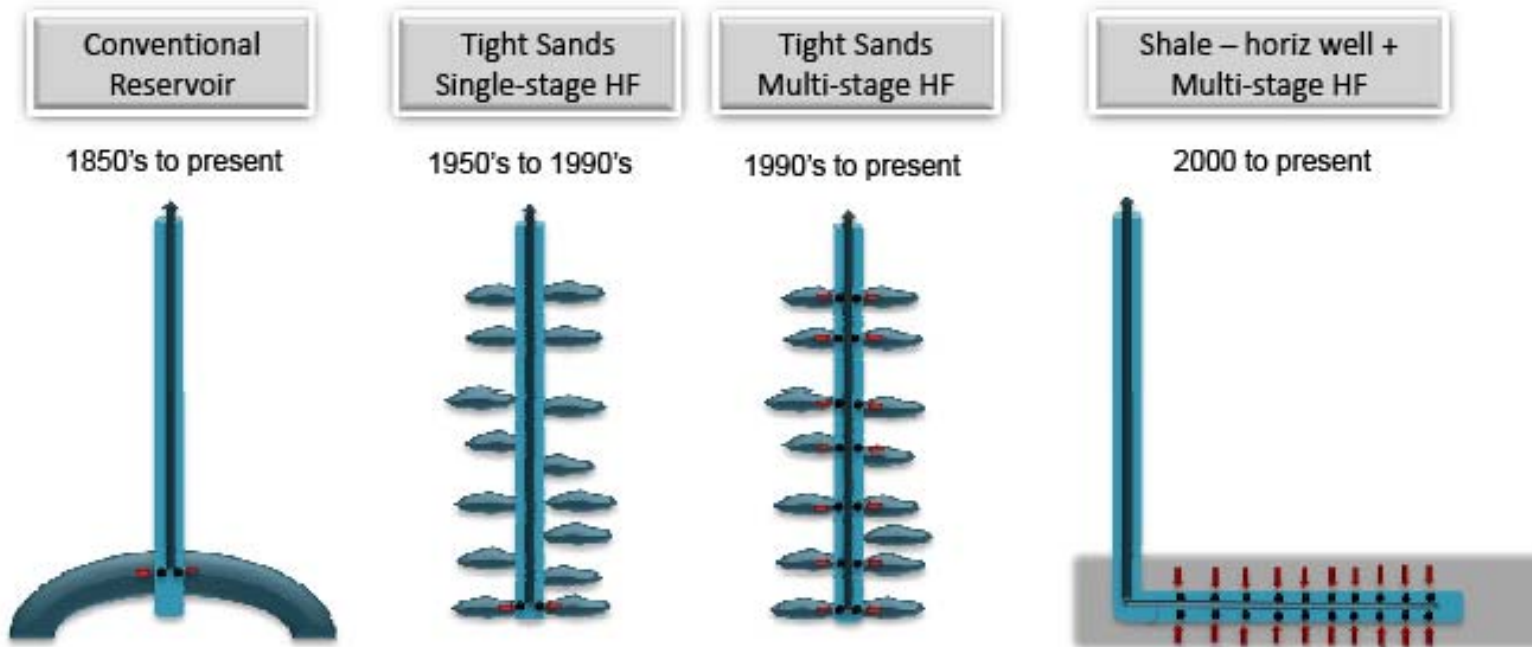
## Proposed Terminals – Coast Guard

- 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 Bcfd (Access Northeast Energy)
- 29. Harpswell, ME : 0.5 Bcfd (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)

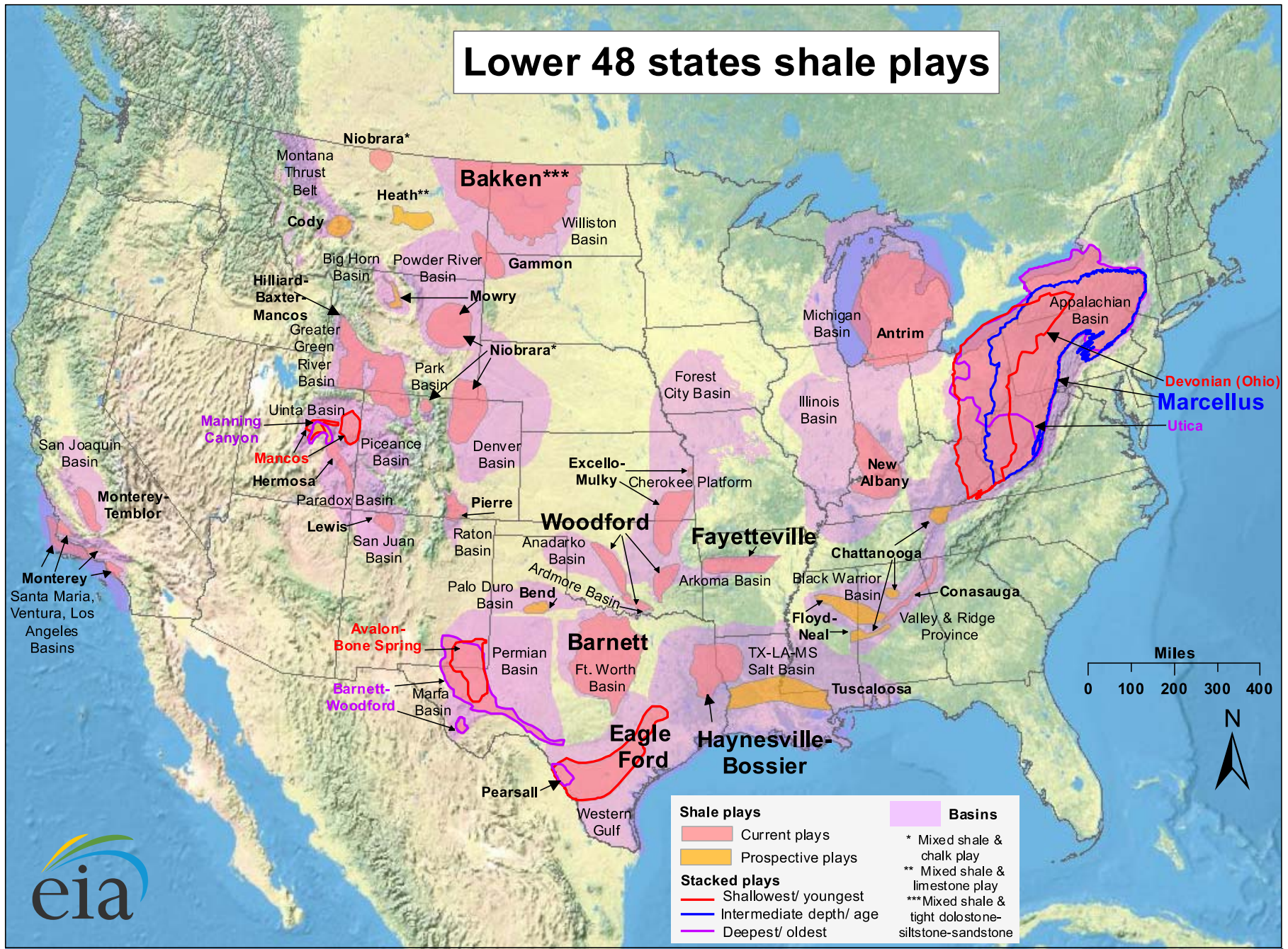
# EVOLUTION IN GAS WELL COMPLETION TECHNOLOGY - THE KEY TO TODAY'S NATURAL GAS REVOLUTION



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

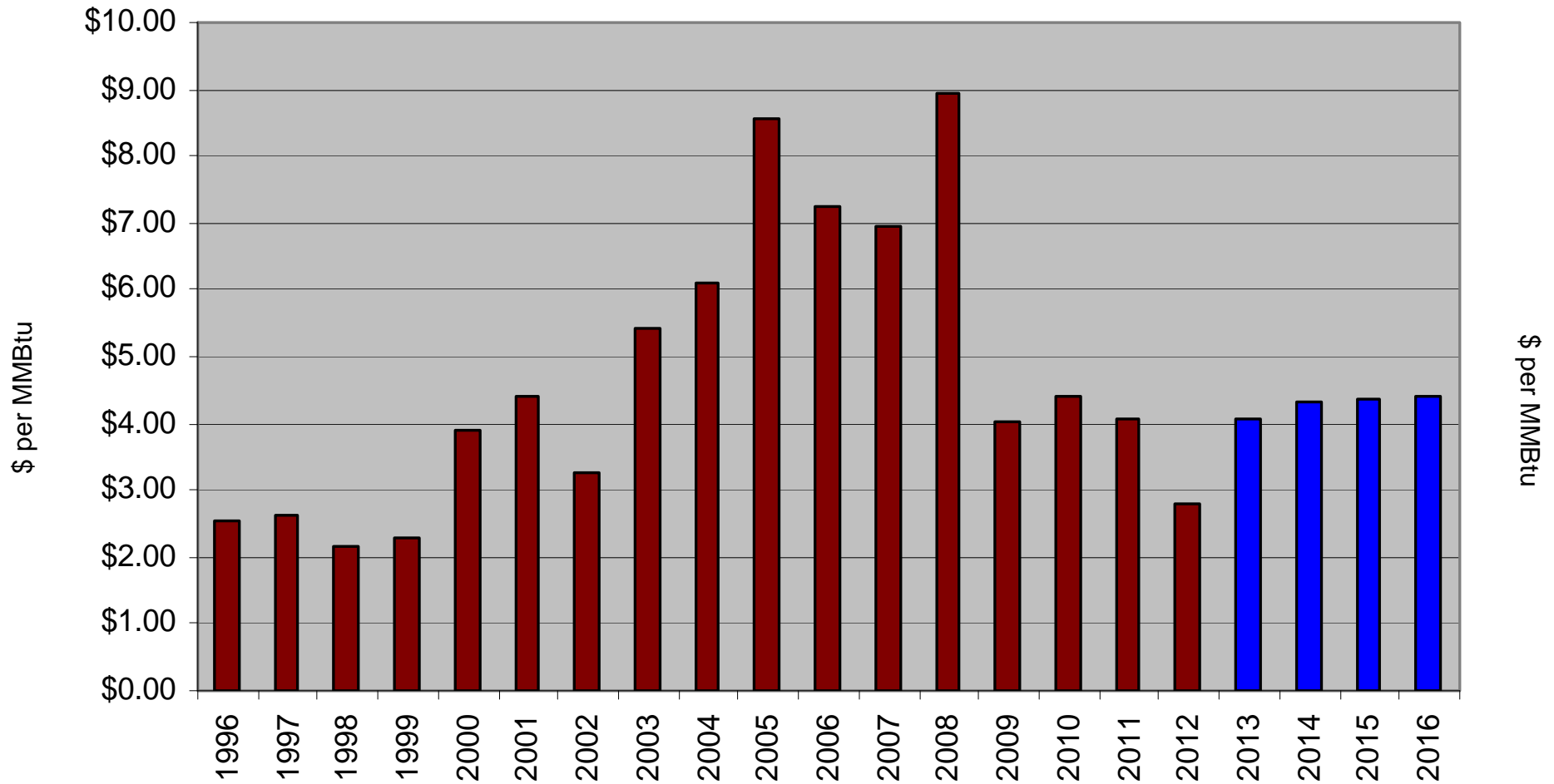


# Lower 48 states shale plays



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

# NYMEX Henry Hub Natural Gas Price\* 1996 - 2016 Actual/Forecast\*\*



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

\*\* Future forecasts based on NYMEX Henry Hub indices in Clearport Software as of 4/30/2013

# 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.

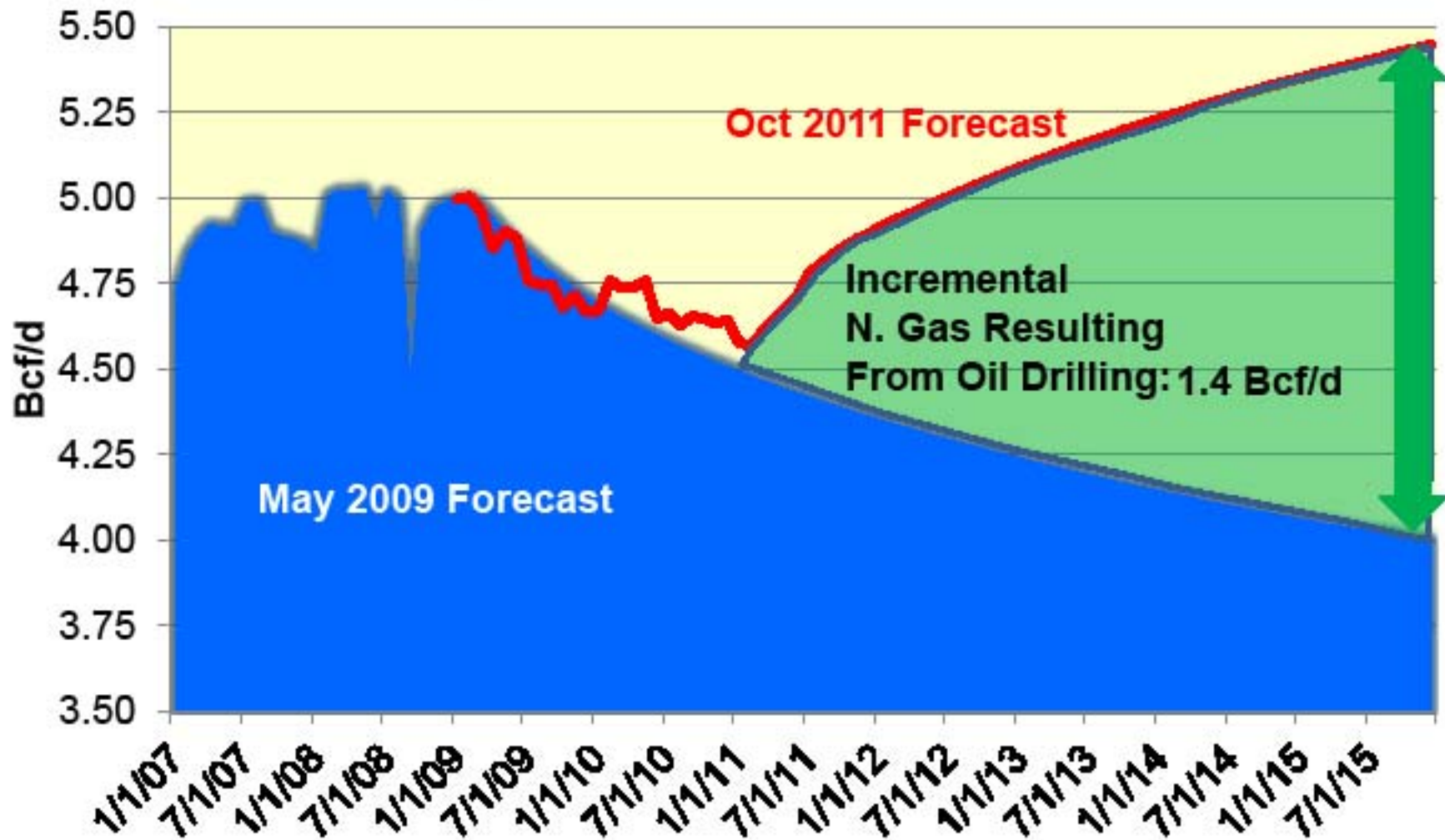
# Forecasts for Shale Gas Resource?

- 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)

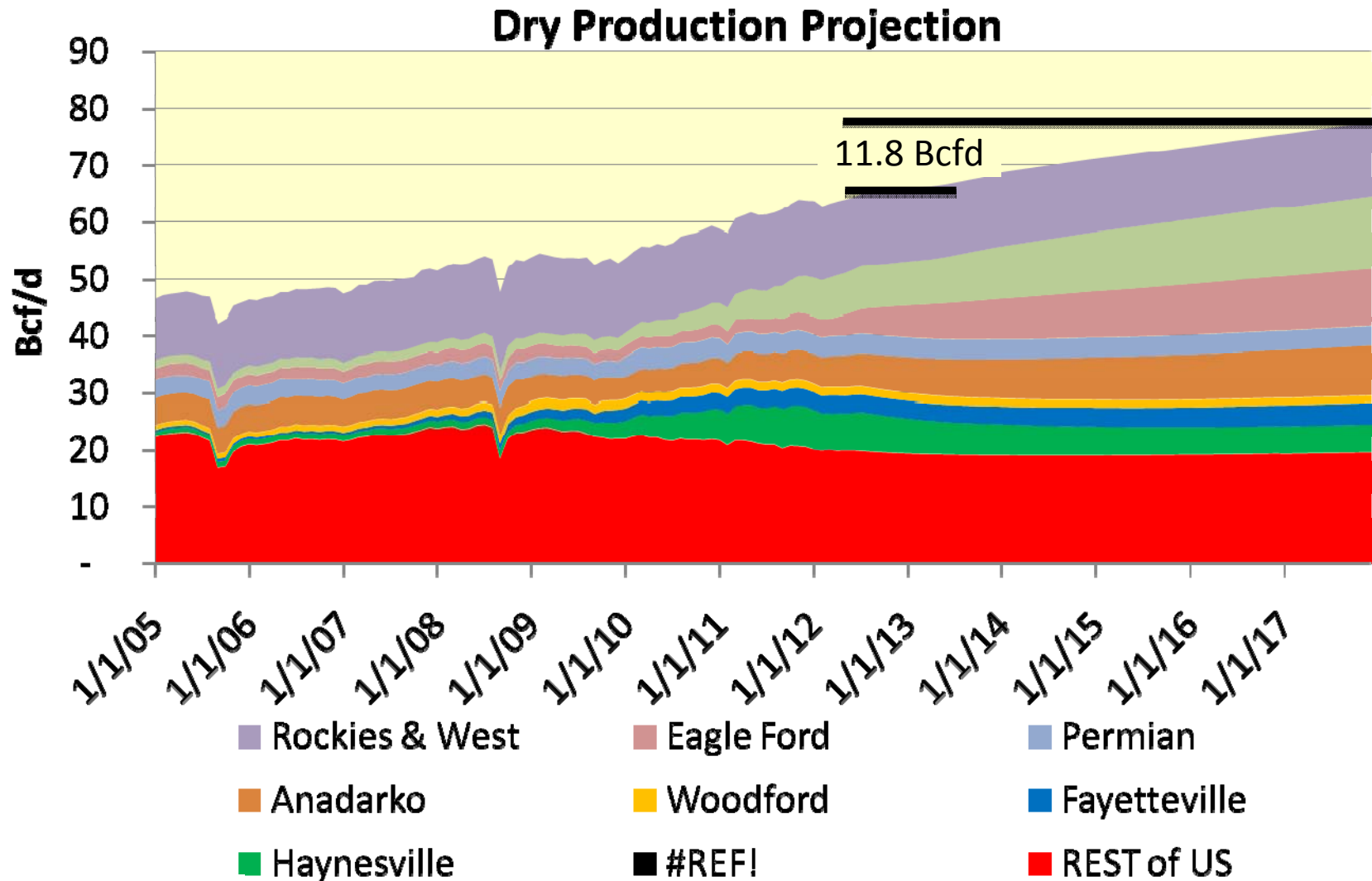
Source: Various resource estimates

# *Ironically, Oil & Liquids Exploration Drives Gas Production*

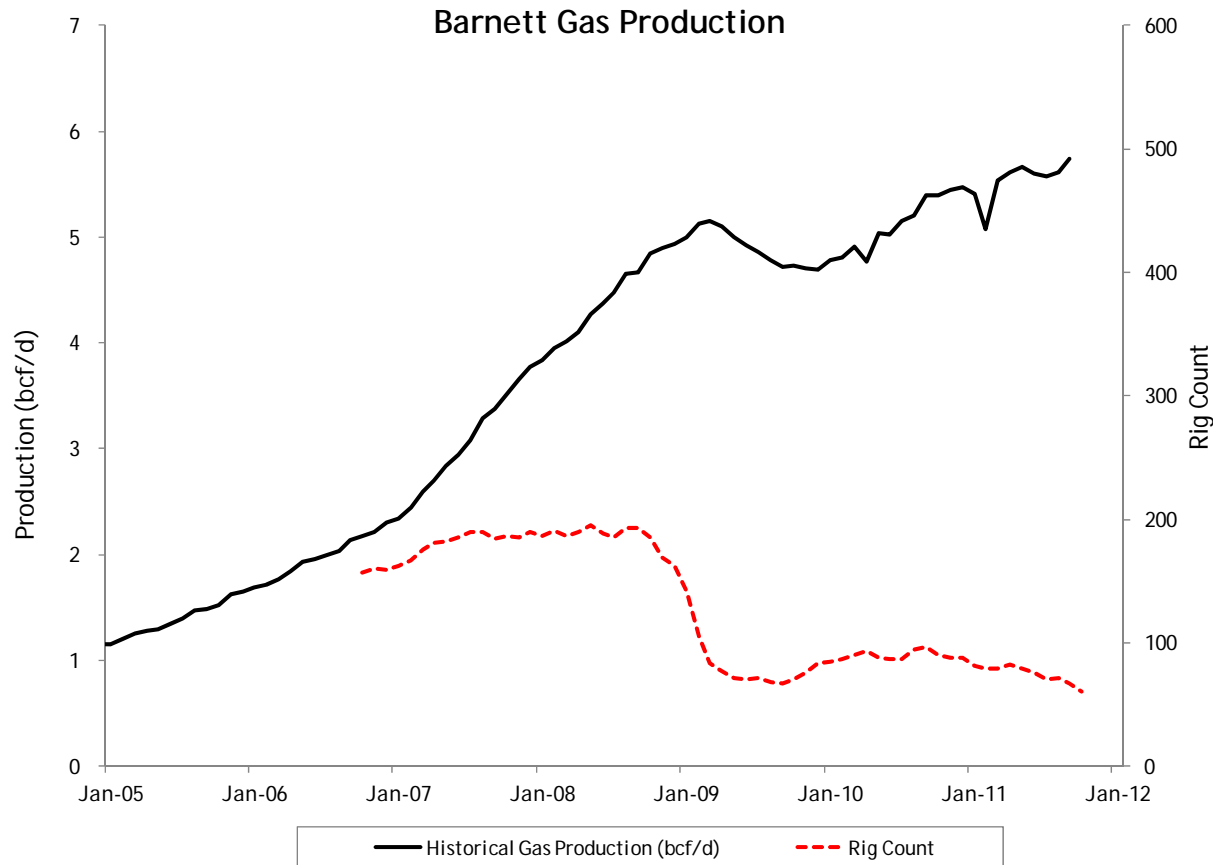
## Actual & Projected Permian Basin Wet Production



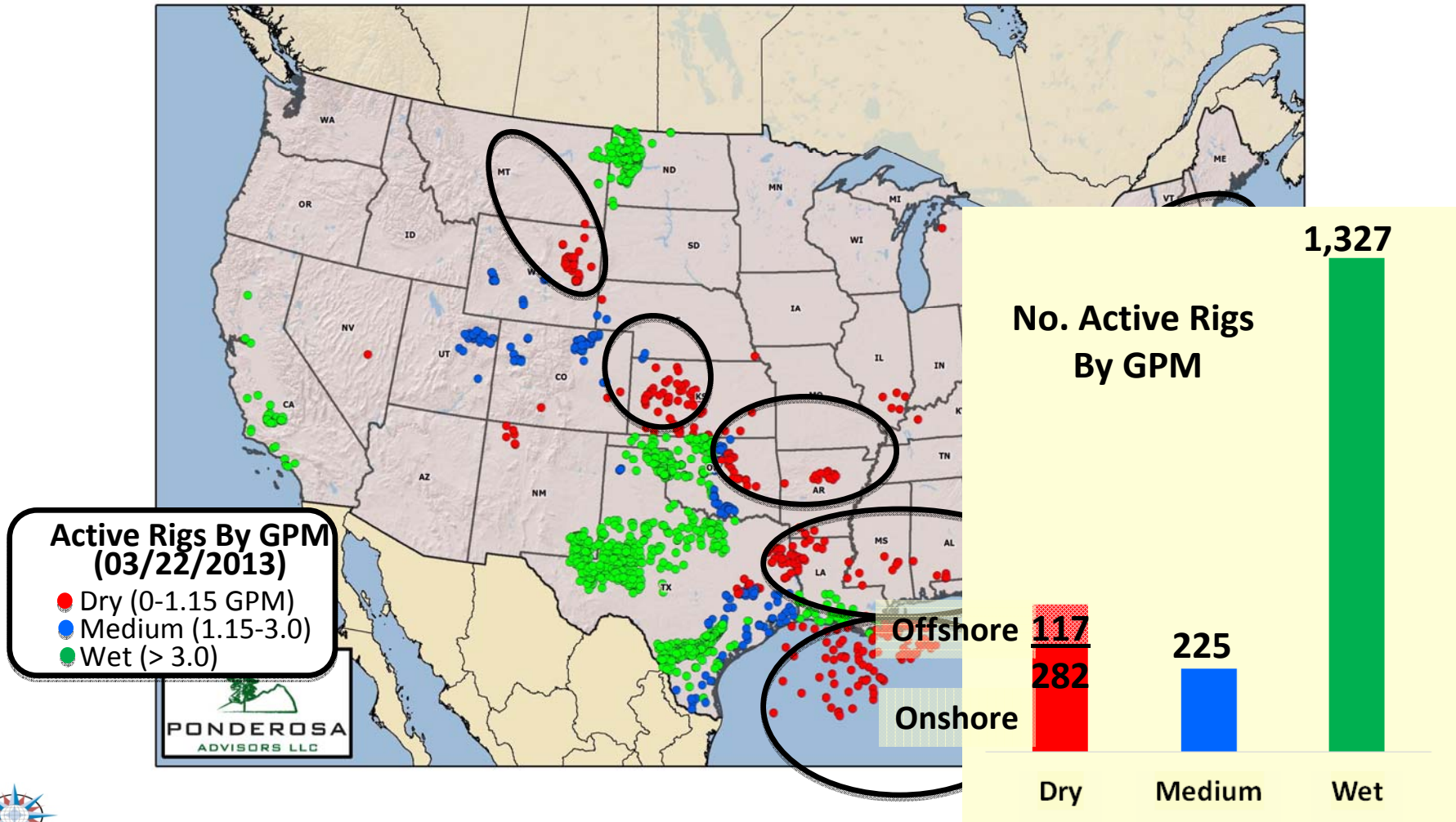
# Dry Natural Gas Production Is Expected To Grow



# Barnett – Model for Future Shale Development



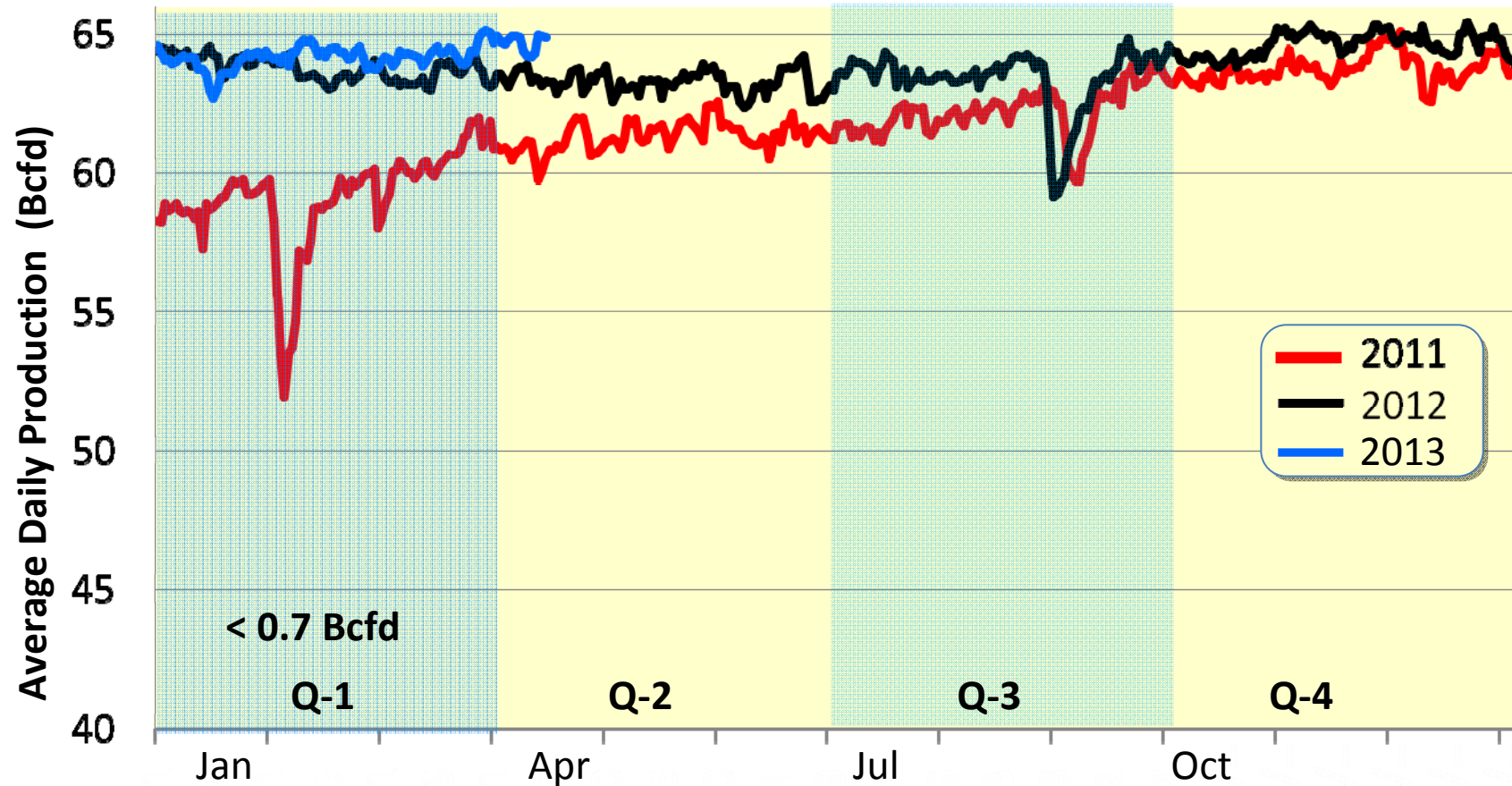
# 15% Onshore Active Rigs Are Working In Dry Gas Areas





# US Production Is Up From 2012 By Almost 400 MMcfd

## Comparison of Dry Production

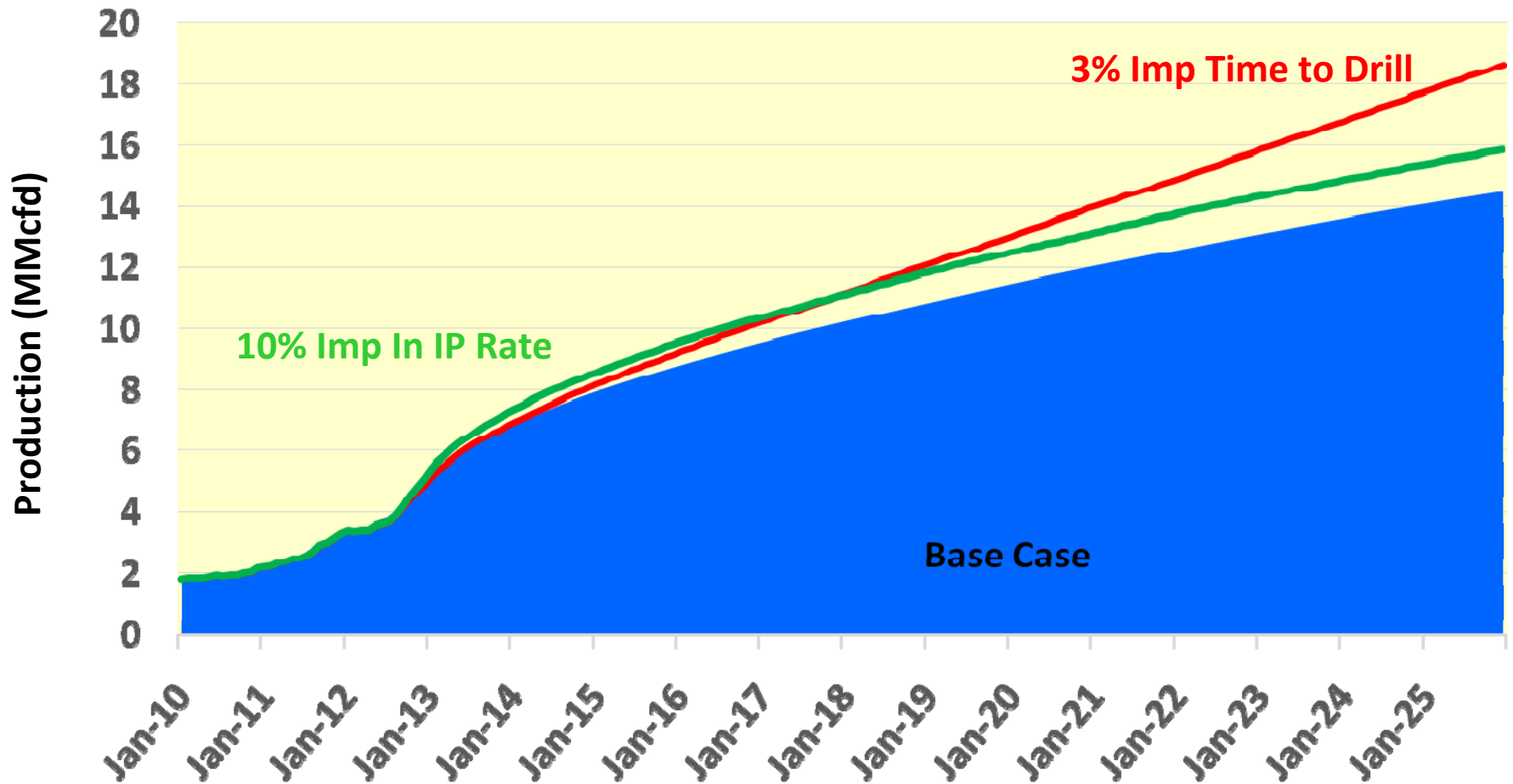


Data through January 18, 2013



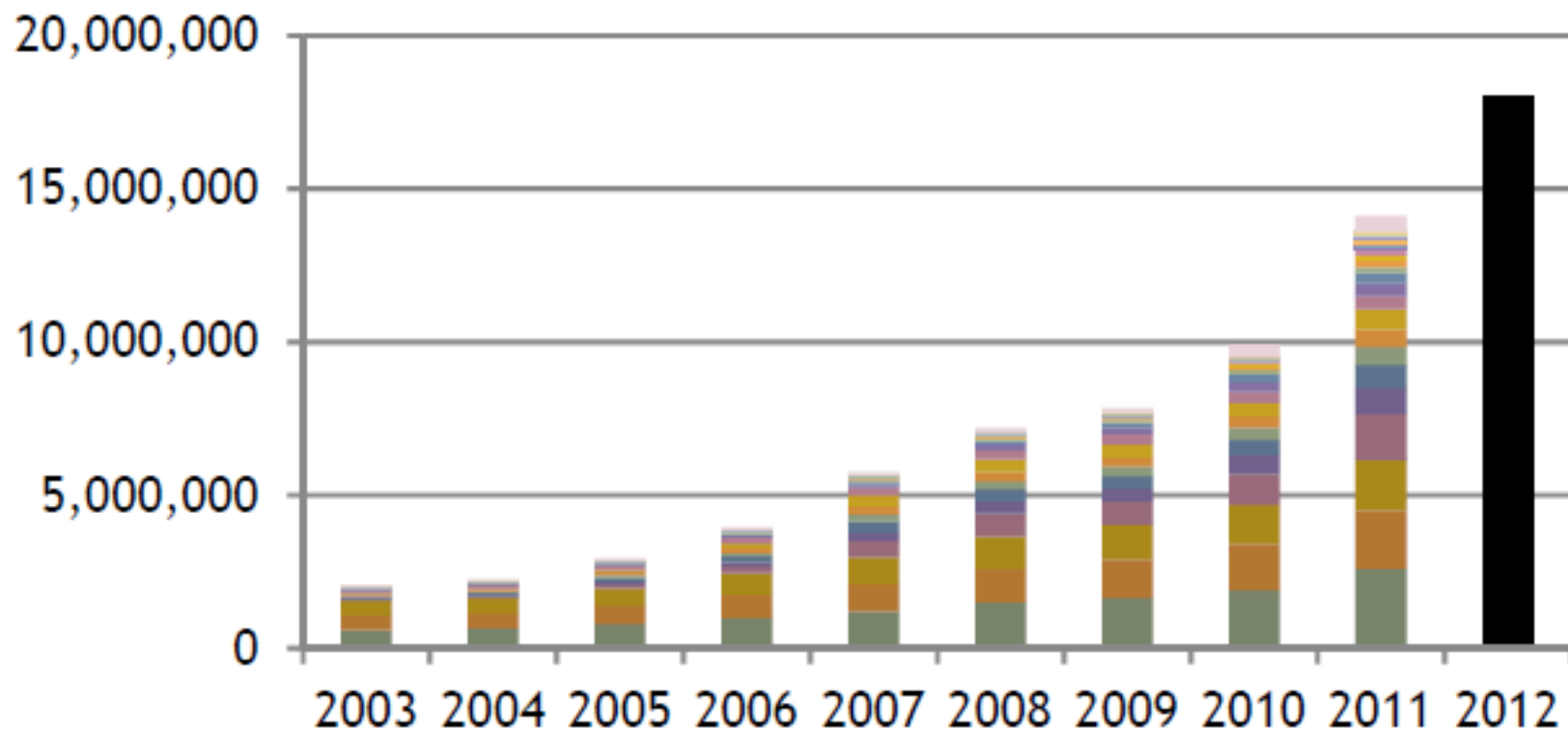
Source: Ponderosa Advisors LLC

# Faster Drilling Times Yield More Wells, More Production



# Fracturing Application Exploded

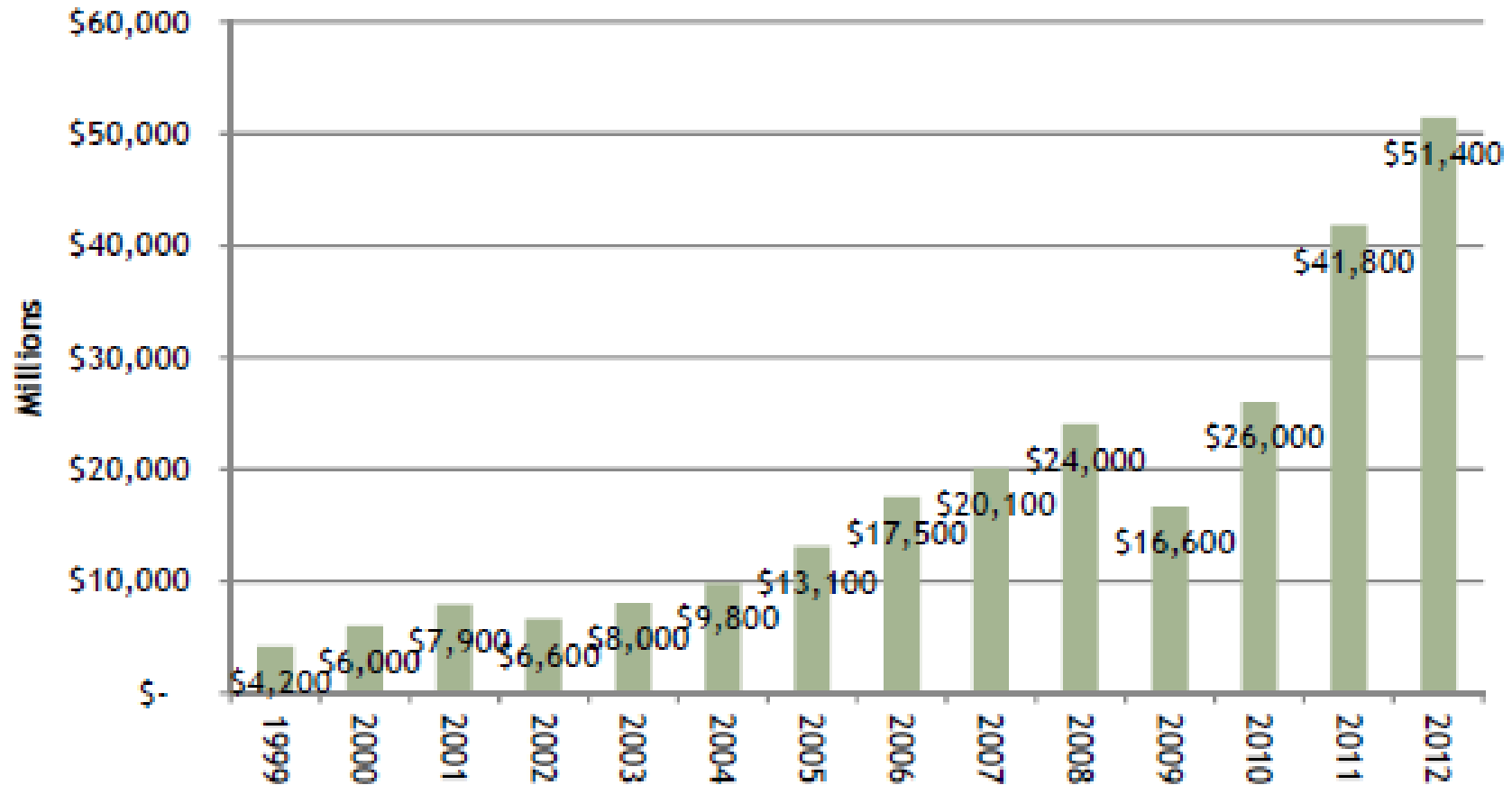
## North American Frac Horsepower



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

# 10-fold growth in 10 years

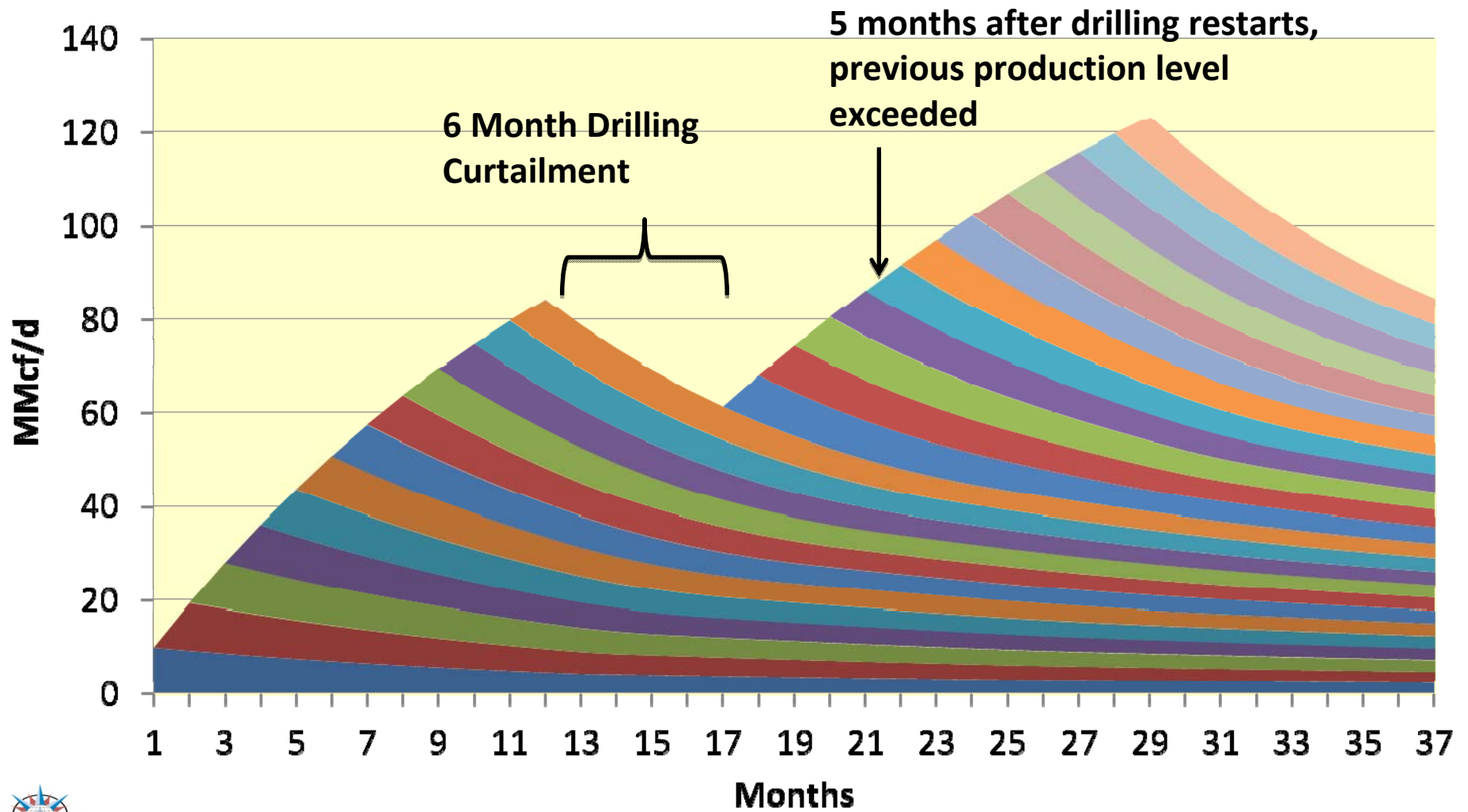
## Pressure Pumping Services



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

# *The “Ferrari” Affect Substantially Reduces The Likelihood Of Price Spikes*

One Rig In the Haynesville



# Will the Demand Side Curve Move?

*“There is no opportunity for which we can’t overcompensate.”*

Four areas to consider:

1. CNG/NGV vehicle demand
2. Coal to gas electric gen conversion
3. New industrial demand
4. LNG Exports

# 1. CNG/Natural Gas Vehicles



# How Many NGVs to Get to 1 BCF Per Day of Demand?

- “The U.S. currently has about 110,000 NGVs on the road (less than 0.1% of total U.S. vehicles), mostly owned by fleets.”
- “To get to 1 BCF per day would mean a roughly ten-fold increase in the number of U.S. NGVs.”
- It will take the right incentives and plenty of time.
- Let’s be aggressive and say 1 BCF per day of demand by 2020.

Source: Raymond James & Associates, Inc., Weekly Energy Report 6-13-11

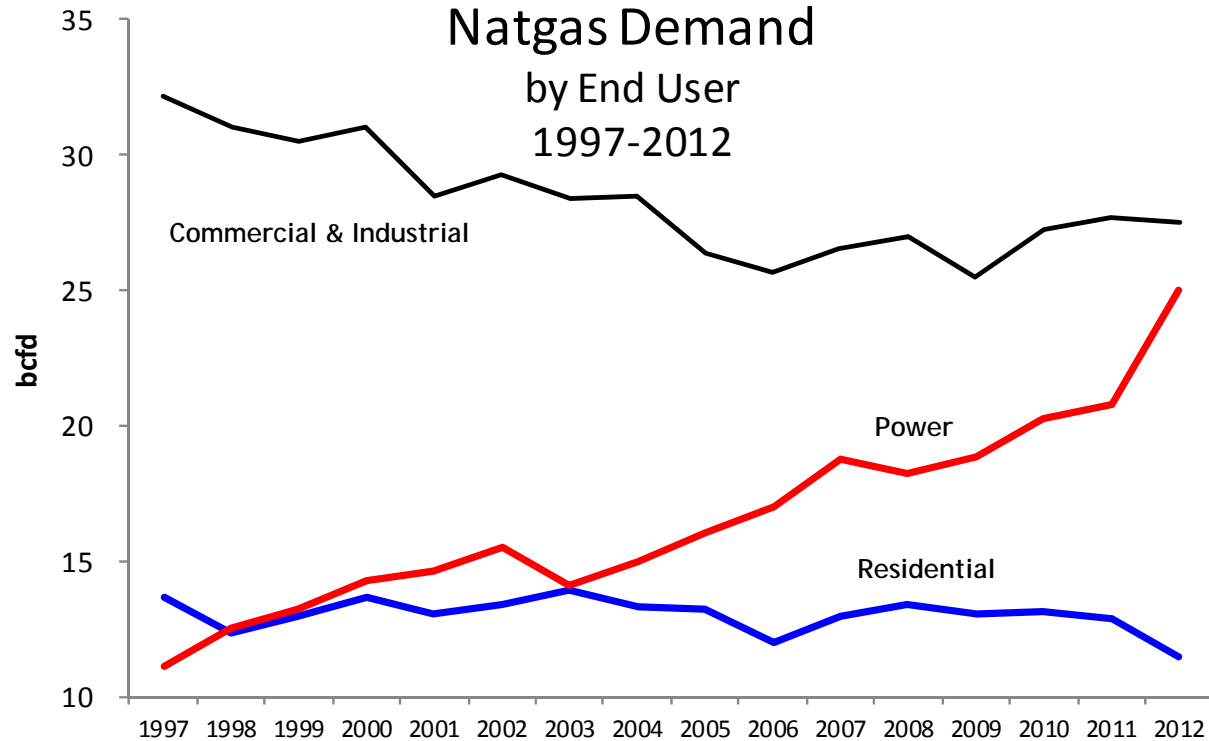


## 2. Coal to Gas Electric Generation Fuel Switching



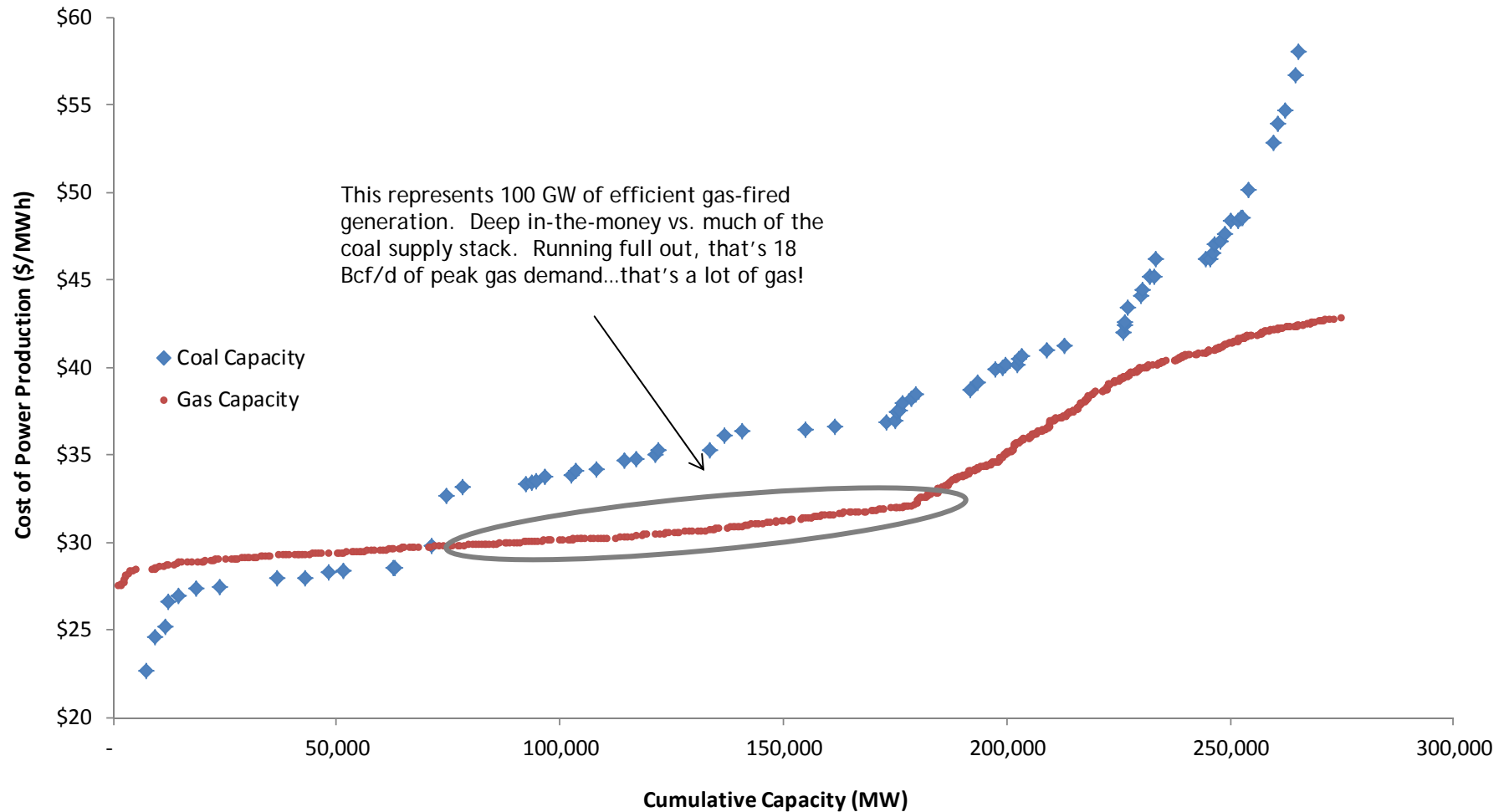
# Why Care About Power Generation?

- Power demand historically 20-33% of total US natural gas demand
- Grew to 39% in 2012
- Impressive but power's relative growth even more dramatic

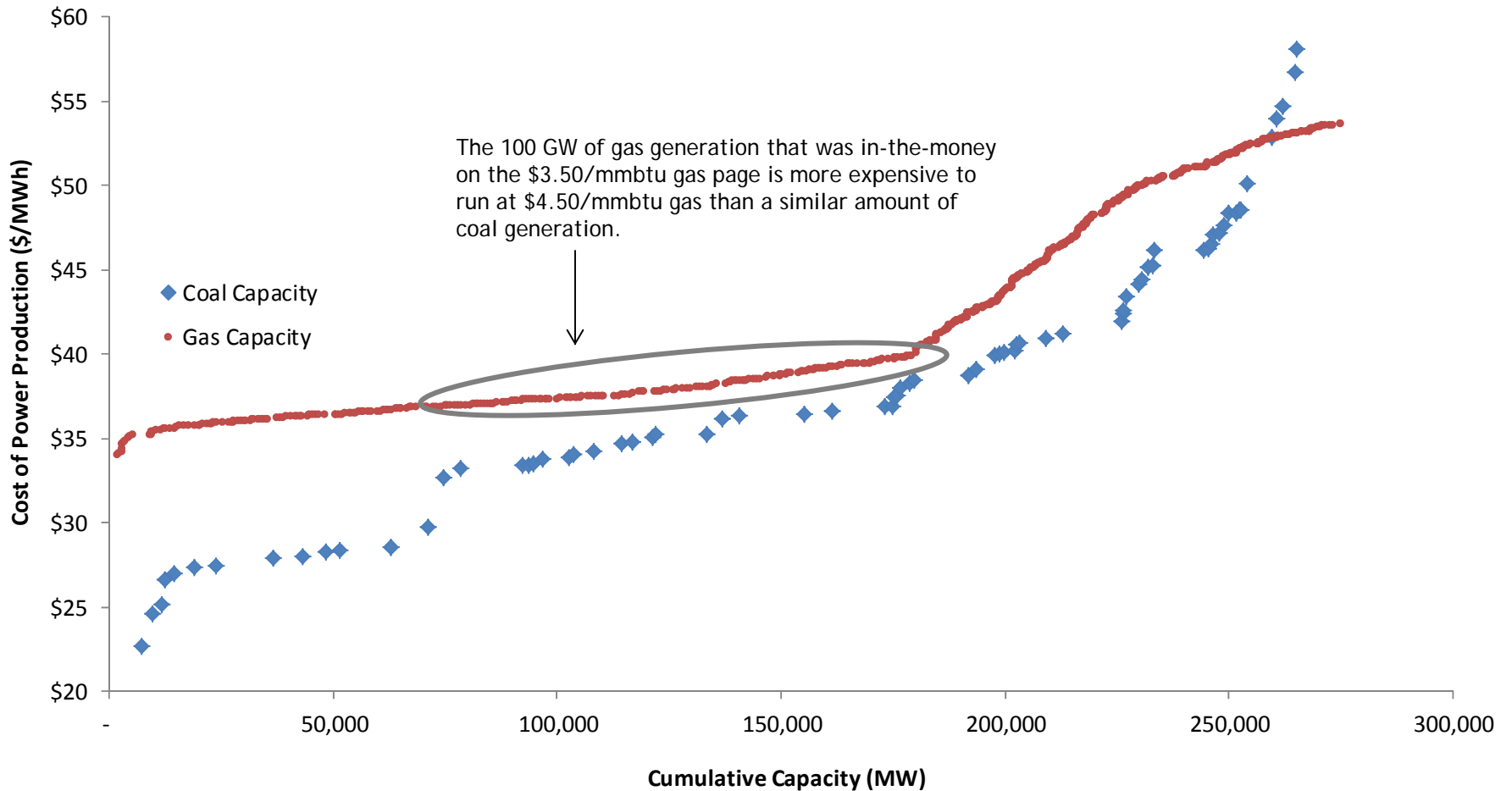


Source: EIA  
Dave Pursell, Tudor Pickering Holt & Co., *Macro Natural Gas and Oil Thoughts* presentation, May 2, 2013

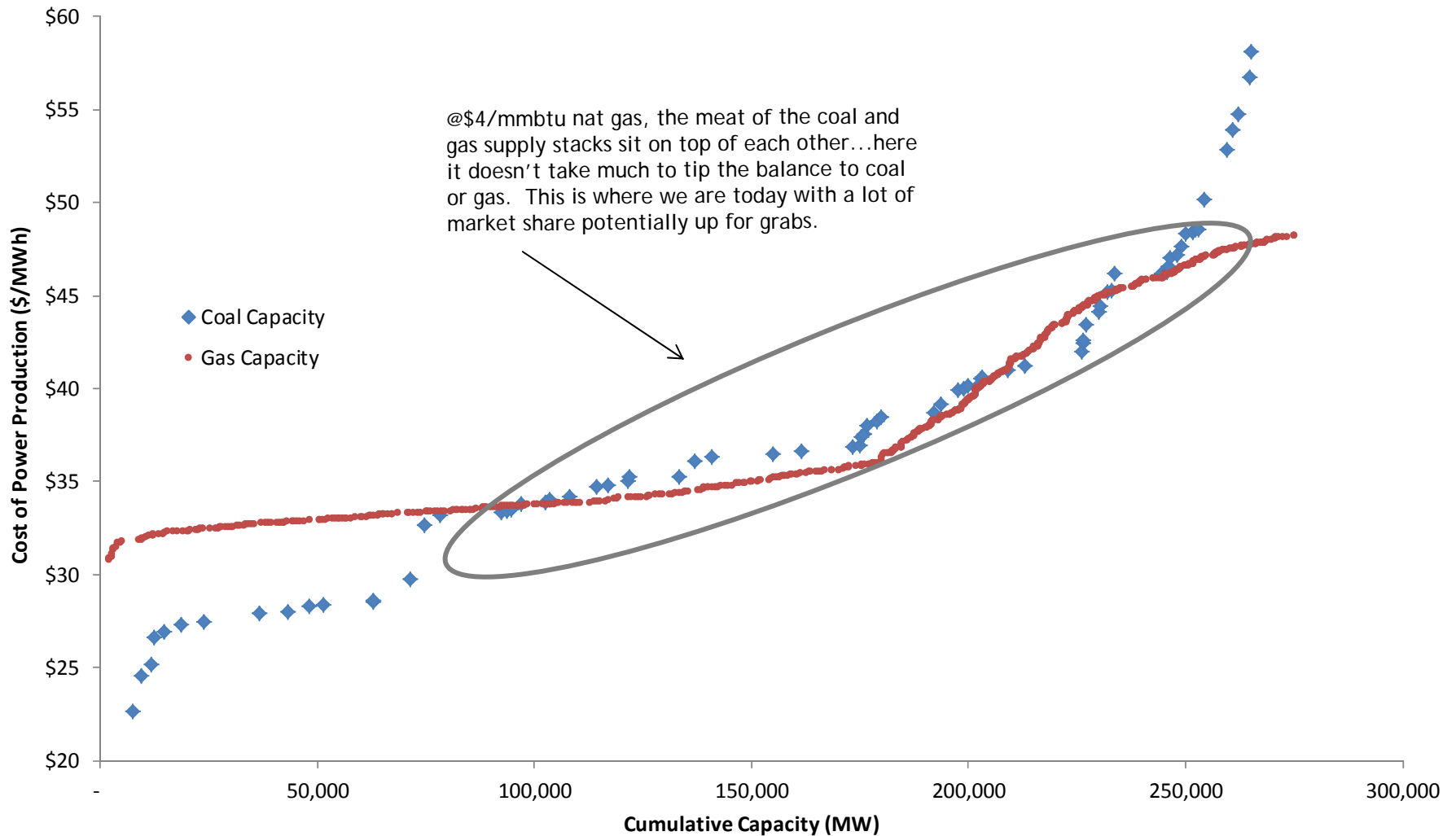
# Generation Supply Stack - \$3.50 Natural Gas Price Deck



# Generation Supply Stack - \$4.50 Natural Gas Price Deck



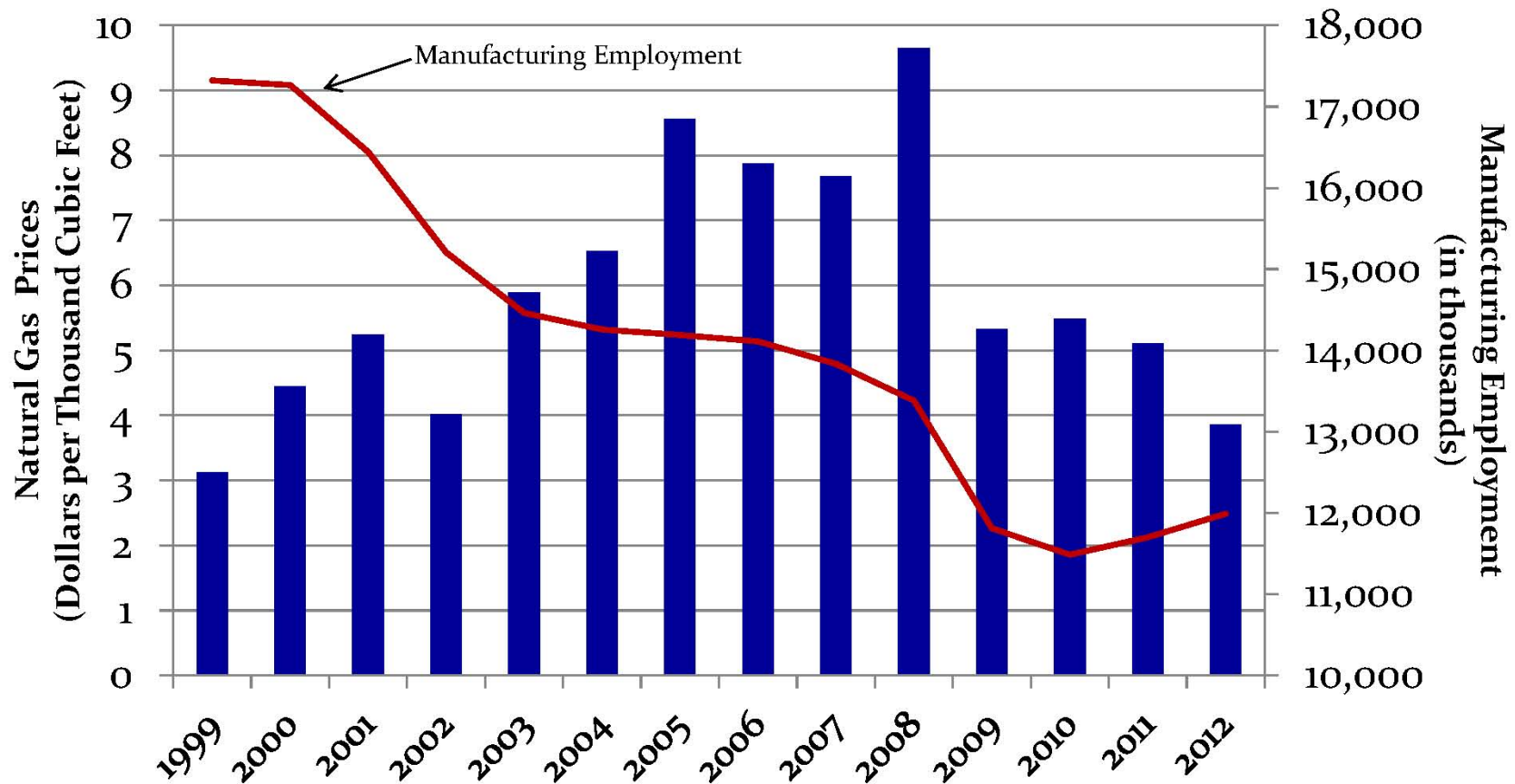
# Generation Supply Stack - \$4.00 Natural Gas Price Deck



# 3. Industrial Demand Growth (Chemical, Manufacturing, Ethane Crackers, etc.)



# Natural Gas Prices Increased 209% from 1999 to 2008 (23% per year percent *increase*)

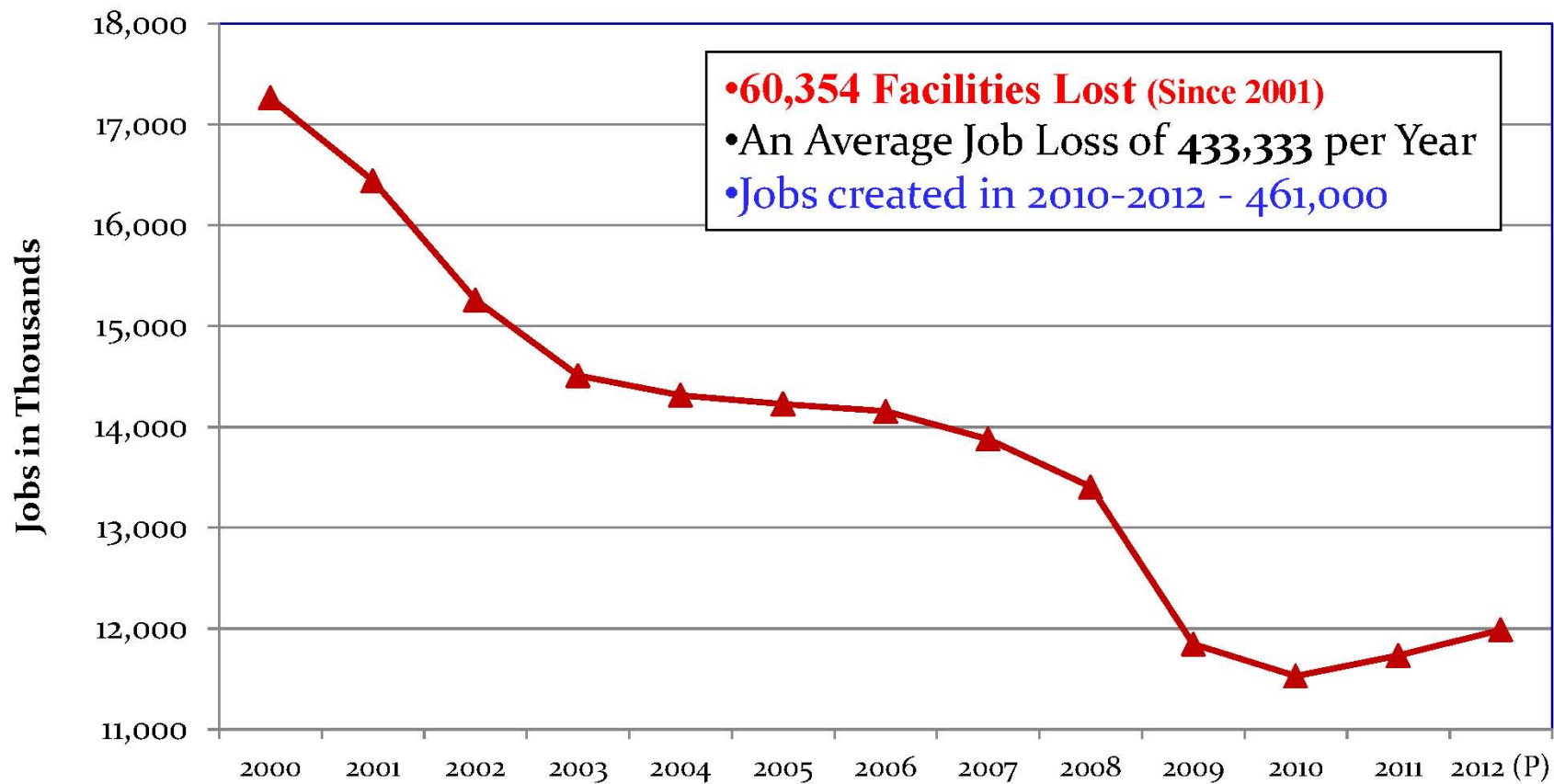


Source: EIA, Bureau of Labor Statistics



Source: *Industrial Natural Gas Demand* presentation, Paul N. Cicio, June 2013

# Natural Gas Prices Significantly Contributed to 5.2 Million Manufacturing Jobs (30.6%) Lost



Source: Bureau of Labor Statistics



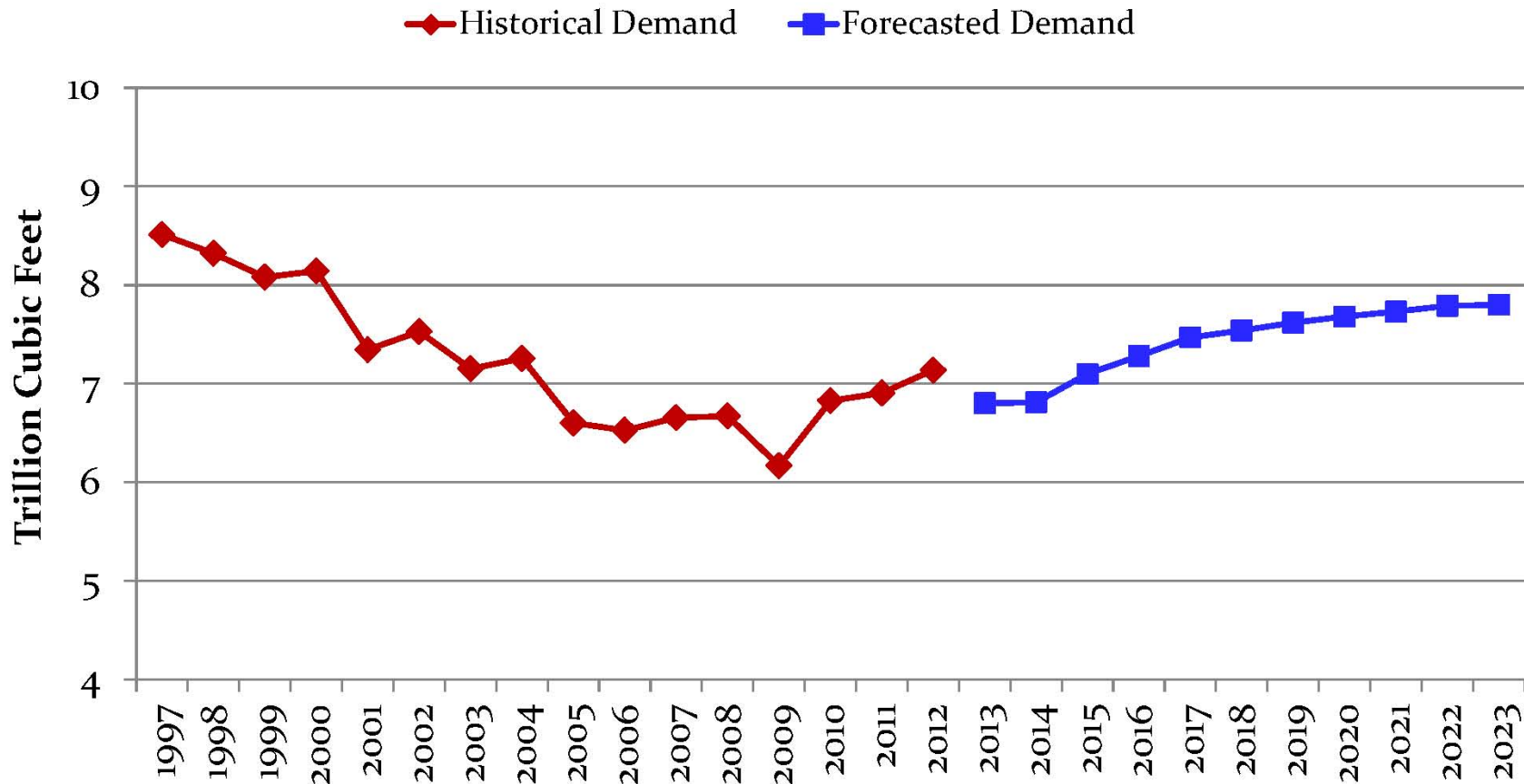
Source: *Industrial Natural Gas Demand* presentation, Paul N. Cicio, June 2013



# Industrial Natural Gas Consumption

*Demand Decreased by 16.1% from 1997 to 2012*

*EIA Forecast Shows Increased Demand by 14.7% from 2013 to 2023*



Source: EIA, AEO 2013



Source: *Industrial Natural Gas Demand* presentation, Paul N. Cicio, June 2013

# Industry Investing Over \$100B in Manufacturing Renaissance

- 123 projects... and more are being announced regularly
- 9 energy intensive sectors (chemicals, fertilizer, steel, aluminum, glass, gas-to-liquids, tires, machinery, plastics)
- **7-9 Bcf/d gas demand growth by 2020**
- 5 million manufacturing jobs (Boston Consulting Group)
- 16 different states

# The Ammonia Story

- Current approximate economics
  - Ammonia worth \$600 per ton in world market
  - Can be produced for \$180 per ton at current U.S NYMEX natural gas price strip
- 14 Ammonia plants closed in the U.S. between 1998 and 2006 thanks in part to high natural gas prices
- Top 5 world producers would like to build new facilities in the U.S.
- 1 ammonia plant can consume as much as 100,000 MMBtu per day

# Nucor EnCana – A Creative Solution

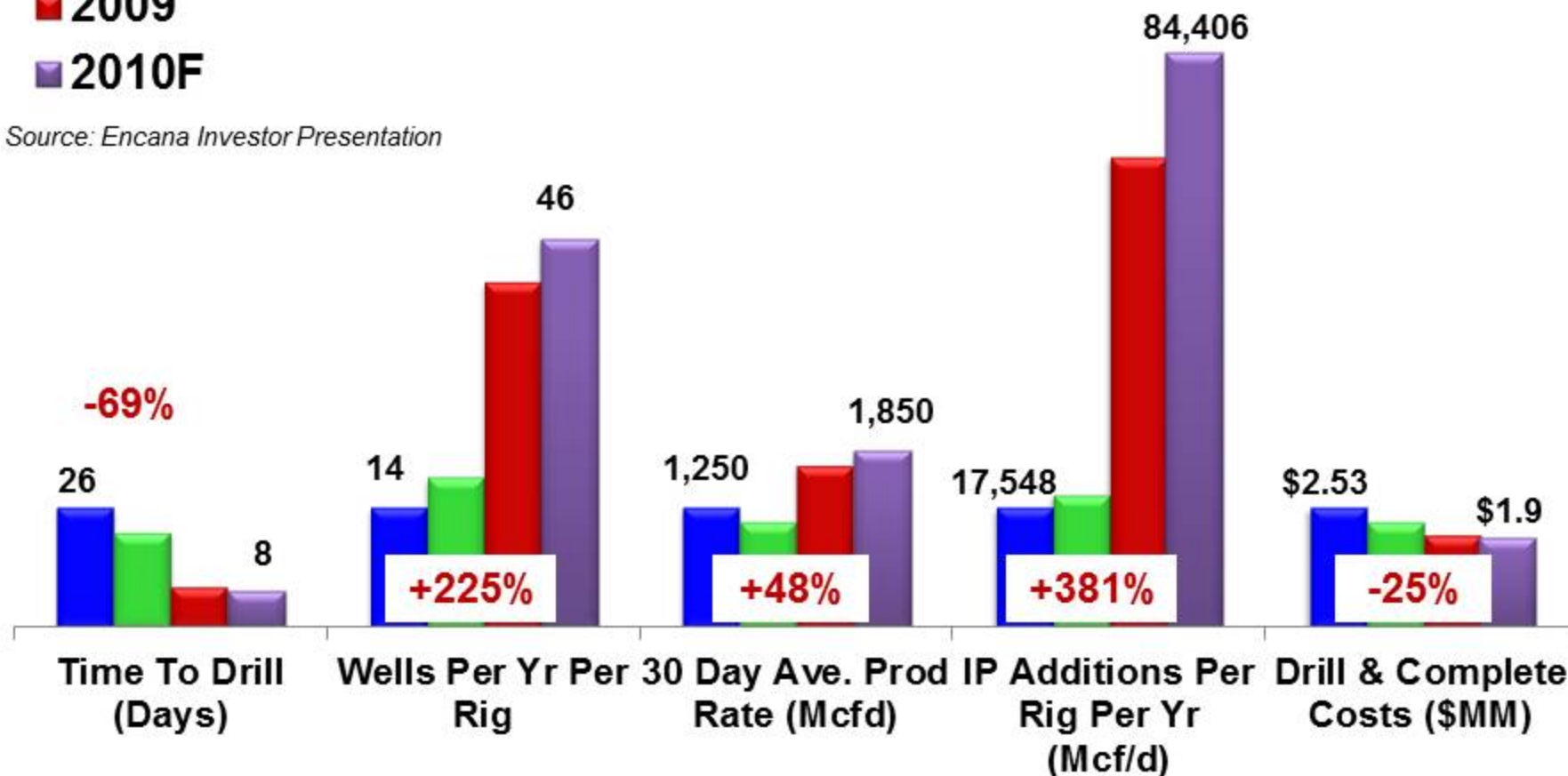
- A price protection deal for Nucor Steel
- \$3.6 billion 20 year investment in 4,000 wells located in western Colorado
- Lack of counterparty creditworthiness drove the structure of the deal
- A financial investment/partnership in drilling and development was the only solution for Nucor
- Nucor will sell the gas in western Colorado and use the cash to purchase like volumes in Louisiana
- This deal structure allowed for the phased development of a \$1.4 billion DRI steel mill
- The EnCana Nucor deal is responsible for all of EnCana's 5 drilling rigs in western Colorado and will eventually increase to 8 rigs

# Encana's "Gas Factory" Yields Similar Gains

- 2005
- 2007
- 2009
- 2010F

## N. Parachute Ranch Field Piceance Basin, CO

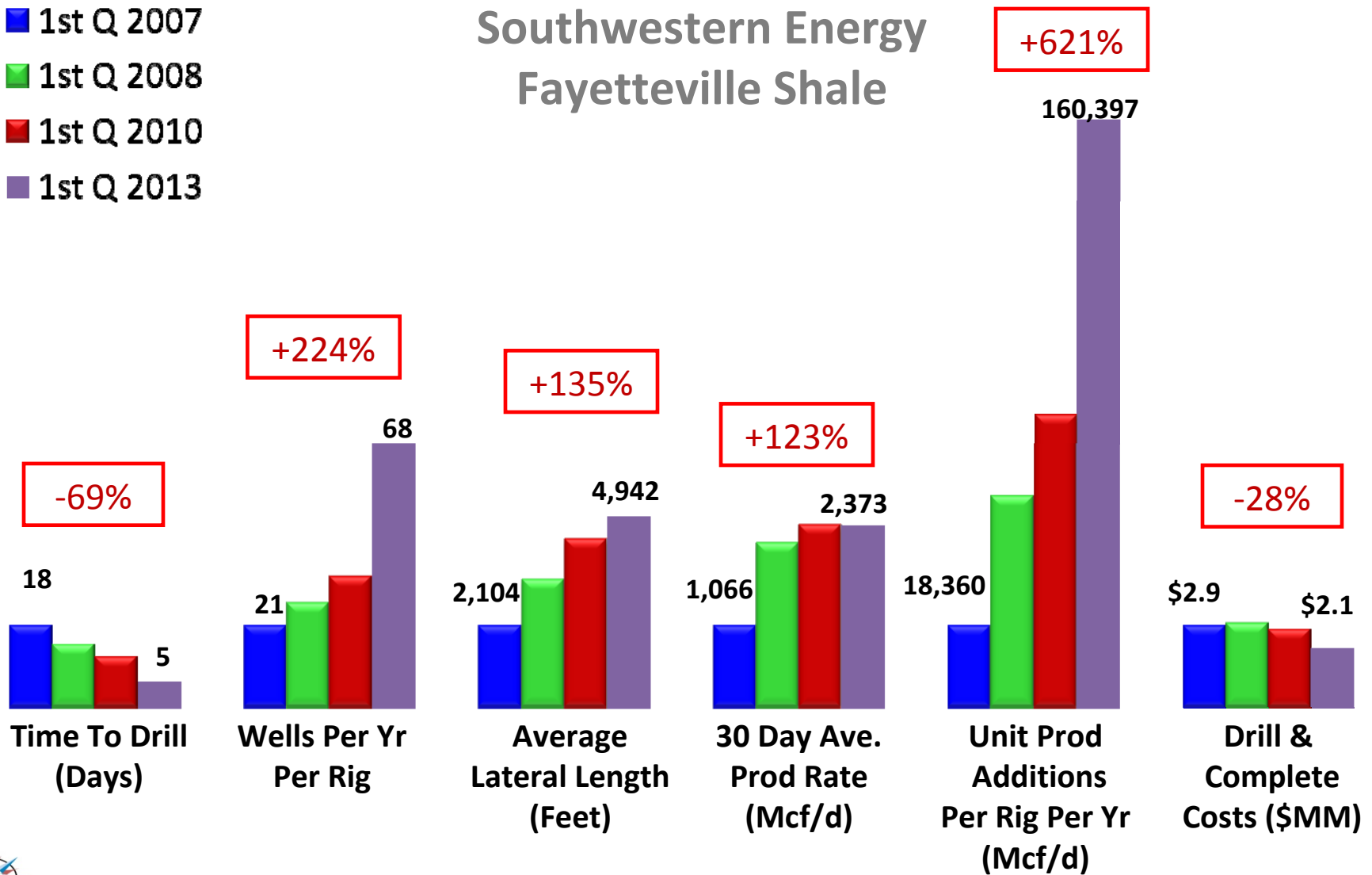
Source: Encana Investor Presentation



# Drilling Rig Productivity Continues To Improve

- 1st Q 2007
- 1st Q 2008
- 1st Q 2010
- 1st Q 2013

## Southwestern Energy Fayetteville Shale



# 4. LNG Exports



**Applications Received by DOE/FE to Export Domestically Produced LNG  
from the Lower-48 States (as of April 2, 2013)**

*All Changes Since March 7, 2013 Update Are In Red*

	Company	Quantity <sup>(d)</sup>	FTA Applications <sup>(d)</sup> (Docket Number)	Non-FTA Applications <sup>(d)</sup> (Docket Number)
1	Sabine Pass Liquefaction, LLC	2.2 billion cubic feet per day (Bcf/d) <sup>(d)</sup>	Approved ( <a href="#">10-85-LNG</a> )	Approved ( <a href="#">10-111-LNG</a> )
2	Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC	1.4 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">10-160-LNG</a> )	Under DOE Review ( <a href="#">10-161-LNG</a> )
3	Lake Charles Exports, LLC	2.0 Bcf/d <sup>(d)**</sup>	Approved ( <a href="#">11-59-LNG</a> )	Under DOE Review ( <a href="#">11-59-LNG</a> )
4	Carib Energy (USA) LLC	0.03 Bcf/d: FTA 0.01 Bcf/d: non-FTA <sup>(d)</sup>	Approved ( <a href="#">11-71-LNG</a> )	Under DOE Review ( <a href="#">11-141-LNG</a> )
5	Dominion Cove Point LNG, LP	1.0 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">11-115-LNG</a> )	Under DOE Review ( <a href="#">11-128-LNG</a> )
6	Jordan Cove Energy Project, L.P.	1.2 Bcf/d: FTA 0.8 Bcf/d: non-FTA <sup>(d)</sup>	Approved ( <a href="#">11-127-LNG</a> )	Under DOE Review ( <a href="#">12-32-LNG</a> )
7	Cameron LNG, LLC	1.7 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">11-145-LNG</a> )	Under DOE Review ( <a href="#">11-162-LNG</a> )
8	Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC <sup>(d)</sup>	1.4 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-06-LNG</a> )	Under DOE Review ( <a href="#">11-161-LNG</a> )
9	Gulf Coast LNG Export, LLC <sup>(d)</sup>	2.8 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-05-LNG</a> )	Under DOE Review ( <a href="#">12-05-LNG</a> )
10	Gulf LNG Liquefaction Company, LLC	1.5 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-47-LNG</a> )	Under DOE Review ( <a href="#">12-101-LNG</a> )
11	LNG Development Company, LLC (d/b/a Oregon LNG)	1.25 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-48-LNG</a> )	Under DOE Review ( <a href="#">12-77-LNG</a> )
12	SB Power Solutions Inc.	0.07 Bcf/d	Approved ( <a href="#">12-50-LNG</a> )	n/a
13	Southern LNG Company, L.L.C.	0.5 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-54-LNG</a> )	Under DOE Review ( <a href="#">12-100-LNG</a> )
14	Excelerate Liquefaction Solutions I, LLC	1.38 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-61-LNG</a> )	Under DOE Review ( <a href="#">12-146-LNG</a> )
15	Golden Pass Products LLC	2.6 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-88-LNG</a> )	Under DOE Review ( <a href="#">12-156-LNG</a> )
16	Cheniere Marketing, LLC	2.1 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-99-LNG</a> )	Under DOE Review ( <a href="#">12-97-LNG</a> )
17	Main Pass Energy Hub, LLC	3.22 Bcf/d <sup>(d)***</sup>	Approved ( <a href="#">12-114-LNG</a> )	n/a
18	CE FLNG, LLC	1.07 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-123-LNG</a> )	Under DOE Review ( <a href="#">12-123-LNG</a> )
19	Waller LNG Services, LLC	0.16 Bcf/d	Approved ( <a href="#">12-152-LNG</a> )	n/a
20	Pangea LNG (North America) Holdings, LLC	1.09 Bcf/d <sup>(d)</sup>	Approved ( <a href="#">12-174-LNG</a> )	Under DOE Review ( <a href="#">12-184-LNG</a> )
21	Magnolia LNG, LLC	0.54 Bcf/d	Approved ( <a href="#">12-183-LNG</a> )	n/a



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Company	Quantity <sup>(a)</sup>	FTA Applications <sup>(b)</sup> (Docket Number)	Non-FTA Applications <sup>(c)</sup> (Docket Number)
22 Trunkline LNG Export, LLC	2.0 Bcf/d**	Approved ( <a href="#">13-04-LNG</a> )	Under DOE Review ( <a href="#">13-04-LNG</a> )
23 Gasfin Development USA, LLC	0.2 Bcf/d	Approved ( <a href="#">13-06-LNG</a> )	n/a
24 Freeport-McMoRan Energy LLC	3.22 Bcf/d***	Pending Approval ( <a href="#">13-26-LNG</a> )	Under DOE Review ( <a href="#">13-26-LNG</a> )
25 Sabine Pass Liquefaction, LLC	0.28 Bcf/d <sup>(d)</sup>	Pending Approval ( <a href="#">13-30-LNG</a> )	Under DOE Review ( <a href="#">13-30-LNG</a> )
26 <b>Sabine Pass Liquefaction, LLC</b>	<b>0.24 Bcf/d<sup>(d)</sup></b>	<b>Pending Approval (<a href="#">13-42-LNG</a>)</b>	<b>Under DOE Review (<a href="#">13-42-LNG</a>)</b>
<b>Total of all Applications Received</b>		<b>29.93 Bcf/d(**) (***)</b>	<b>28.54 Bcf/d</b>

\*\* Lake Charles Exports, LLC (LCE) and Trunkline LNG Export, LLC (TLNG), the owner of the Lake Charles Terminal, have both filed an application to export up to 2.0 Bcf/d of LNG from the Lake Charles Terminal. The total quantity of combined exports requested between LCE and TLNG does not exceed 2.0 Bcf/d (i.e., both requests are not additive and only 2 Bcf/d is included in the bottom-line total of applications received).

\*\*\* Main Pass Energy Hub, LLC (MPEH) and Freeport McMoRan Energy LLC (FME), have both filed an application to export up to 3.22 Bcf/d of LNG from the Main Pass Energy Hub. (The existing Main Pass Energy Hub structures are owned by FME). The total quantity of combined FTA exports requested between MPEH and FME does not exceed 3.22 Bcf/d (i.e., both requests are not additive and only 3.22 Bcf/d is included in the bottom-line total of FTA applications received). FME's application includes exports of 3.22 Bcf/d to non-FTA countries and is included in the bottom line total of non-FTA applications received, while MPEH has not submitted an application to export LNG to non-FTA countries.

# LNG Update

- U.S. Department of Energy Grants Freeport LNG Non-FTA Export Approval
- This is the first such license granted to an LNG export facility in the U.S. since approval was granted to Sabine Pass LNG in May 2011.

Source: <http://gcaptain.com/u-s-energy-department-grants/> Rob Almeida, May 17, 2013

# Australia LNG

## While we review, they build...



**Gladstone Australia's 3 LNG plants represent \$60 billion in investments**

# World LNG Estimated June 2013 Landed Prices



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

Updated May/ 23, 2013 2188

# Incremental Demand/Supply Increase By 2020?

	Low Case	High Case
1. CNG/Natural Gas Vehicles	0.5 BCF/day	1.0 BCF/day
2. Coal to Gas	5.0 BCF/day	8.0 BCF/day
3. Industrial Demand Growth	3.0 BCF/day	7.0 BCF/day
4. LNG Exports	3.0 BCF/day	6.0 BCF/day
<b>Incremental Demand Total</b>	<b>11.5 BCF/day</b>	<b>22.0 BCF/day</b>
<b>Incremental Supply Total*</b>	<b>15.0 BCF/day</b>	<b>25.0 BCF/day</b>

\*Current daily supply is 65 BCF per day.

# Natural Gas Demand Forecast by Sector (Bcf/d)

Sector	2009	2020	Difference
Residential and Commercial	21.6	21.9	1.39%
Power	18.8	29.6	57.45%
Industrial ( <i>w/ethane and propane conv. to dry gas equiv. after 2012</i> )	16.9	28.0	65.68%
Transportation	0.1	1.5	1400.00%
Lease, Plant, and Pipeline Fuel	5.3	6.9	30.19%
Exports to Mexico	0.9	5.4	500.00%
LNG Exports High Case		10.0	--
<b>TOTAL</b>	<b>63.7</b>	<b>103.3</b>	<b>62.17%</b>
Industrial ( <i>dry gas only</i> )	16.9	26.4	56.21%

Source: Industry Sources



Source: *Industrial Natural Gas Demand* presentation, Paul N. Cicio, June 2013

# Two Stories on Hydraulic Fracturing or “Fracking”

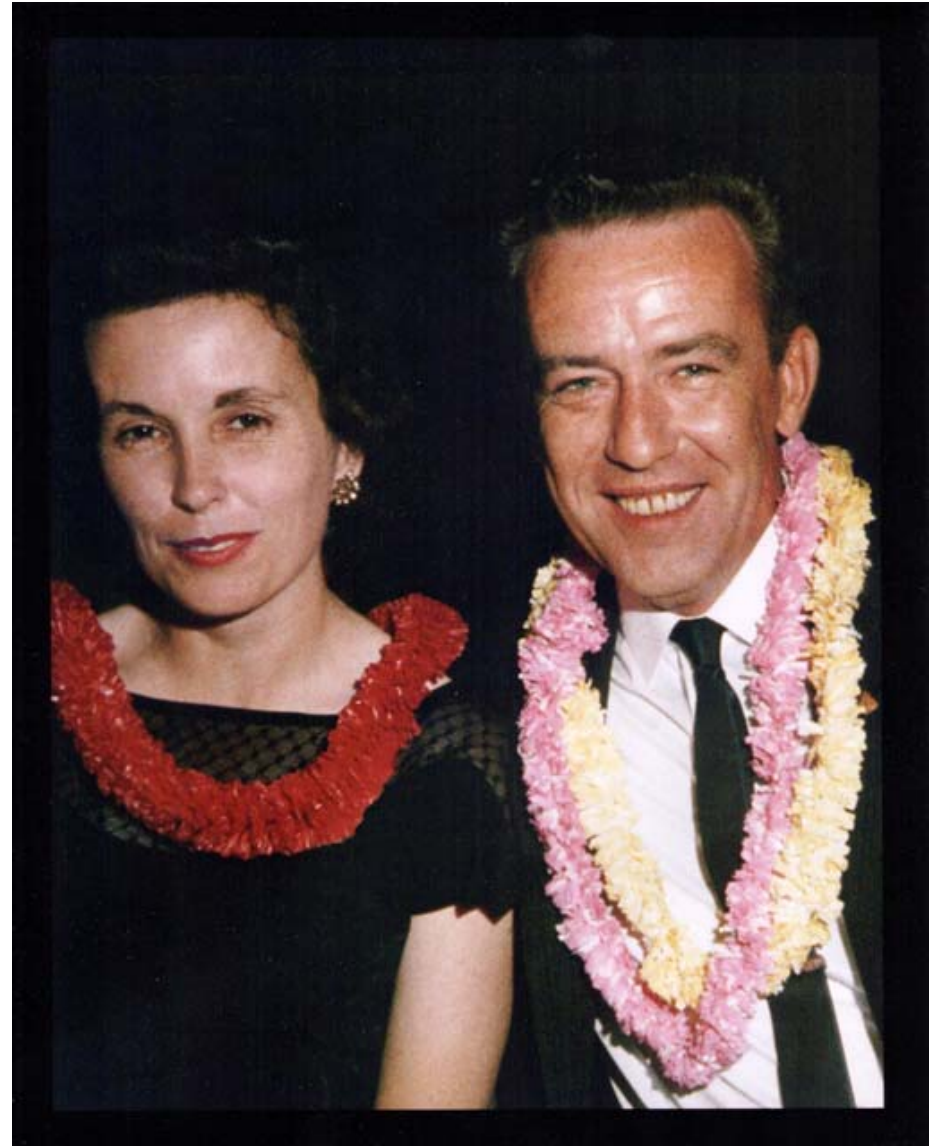
Story Number 1:

How “fracking” positively affects the poor

Story Number 2:

“Fracking” and China

# Story Number 1







May 13<sup>th</sup>, 1966





# 35 Years of Energy Bills



# World LNG Estimated June 2013 Landed Prices



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

Updated May/23, 2013 2188

# Perspective: Residential Gas Usage



In a single year, the average US home uses 84 MCF of natural gas.

Source: Natural Gas Supply Association

# The Effect of Fracking on Residential Gas Cost



**PUBLIC SERVICE COMPANY OF COLORADO** \*  
 P O BOX 840  
 DENVER, CO. 80201  
 (800) 895-4999 Español: (800) 687-8778

Page 1 of 1

Customer Name	Service Address	Account No.	Date Due	Amount Due
[REDACTED]	[REDACTED]	[REDACTED]	Dec 26, 2012	<b>\$37.75</b>

Account Activity			
Date of Bill	Dec 5, 2012	Previous Balance	\$29.26
Number of Payments Received	1	Total Payments	(\$29.26)
Number of Days in Billing Period	34	Balance Forward	\$0.00
Statement Number	349691134	+ Current Bill	\$37.75
Premise Number	300801460	<b>Current Balance</b>	<b>\$37.75</b>

Gas Service - Account Summary			
Invoice Number	0227514926	Residential	
Meter No.	00000R471013	Usage Charge	45 therms x 0.090444 \$4.07
Rate	RG Residential	Interstate Pipeline	45 therms x 0.000020 \$0.90
Days in Bill Period	34	Natural Gas 4 Qtr	45 therms x 0.355870 \$16.01
Current Reading	7720 Actual 12/05/2012	Pipe Sys Int Adj	45 therms x 0.016660 \$0.75
Previous Reading	7668 Actual 11/01/2012	Service & Facility	\$11.94
Measured Usage	52	<b>Subtotal</b>	<b>\$36.65</b>
Therm Multiplier	0.8606	Franchise Fee	3.00% \$1.10
Therms Used	45.0	Sales Tax	\$0.00
		<b>Total Amount</b>	<b>\$37.75</b>

1/1



# The Effect of Fracking on Residential Gas Cost

- With the gas cost in **Spain** of **\$10.05/MMBtu**, the total residential bill would have been:

**\$67.84**

**80%  
Increase**

- With the gas cost in **China** of **\$13.70/MMBtu**, the total residential bill would have been:

**\$82.29**

**118%  
Increase**



# What Fracking Means to Low Income Households

2003-2008 NYMEX<sup>1</sup> Avg. Price<sup>2</sup>/MMBtu

**\$7.21**

2012 NYMEX<sup>1</sup> Avg. Price/MMBtu

**\$2.80**

**61%  
Drop**

---

Price Differential/MMBtu

**\$4.41**

**x**

2012 Residential Gas Usage<sup>3</sup>/MMBtu

**4,179,740,000**

---

2012 Residential Cash Savings

**= \$18,432,653,400**

<sup>1</sup> NYMEX – Average last 3 days of close of Natural Gas Contract as reported in Platts Gas Daily Report

<sup>2</sup> See Addendum A for supporting documentation

<sup>3</sup> 2012 Residential Gas Usage – EIA Natural Gas Consumption by End Use

# What Fracking Means to Low Income Households

- 36% of residential households (114 million total<sup>4</sup>) are estimated to qualify for LIHEAP assistance<sup>5</sup>

2012 Residential Cash Savings = **\$18,432,653,400**

Percent of households LIHEAP eligible × **.36**

2012 LIHEAP Eligible Cash Savings = **\$6,635,755,224**

2012 LIHEAP Total Cash Assistance<sup>7</sup> = **\$2,625,000,000**

<sup>4</sup> US Census Bureau State and County Quickfacts

<sup>5</sup> LIHEAP Home Energy Notebook for FY 2009: Appendix B: Income Eligibility Household Estimates; See Addendum A

<sup>6</sup> Households with income up to 150% of the federal poverty income guidelines or, if greater, 60% of the state median income

<sup>7</sup> 10% decrease due to General Administrative Expense; 15% due to efficiency

# Story Number 2: "Fracking" and China

**Rocky Mountain News**  
A Scripps-Howard Newspaper  
113TH YEAR, NO. 85  
Published every morning by Denver Publishing Co.  
Second class postage paid at Denver, Colorado  
Reg. U.S. Pat. Off.  
Colorado's First Newspaper—Founded in 1859  
DENVER, COLORADO 80201, FRIDAY, JULY 16, 1971

**FINAL EDITION**  
★★★★★  
FORECAST:  
Partly cloudy  
10c  
128 PAGES

**Trip before May at Chou En-lai's invitation**

# President to visit mainland China

LOS ANGELES (UPI)—In a stunning surprise, President Nixon announced Thursday night he had accepted an invitation from Premier Chou En-lai to visit the Peoples Republic of China sometime before next May.

He said the trip was arranged during a secret visit of his national security adviser, Dr. Henry A. Kissinger, to Peking July 9 to July 11 while Kissinger was on an around the world trip.

"I have taken this action because of my profound conviction that all nations will gain from a reduction of tensions and a better relationship between the United States and the People's Republic of China," the President said in a five minute nationwide radio and television statement.

He would be the first U.S. President to visit the People's Republic of China, the world's largest Communist nation, which the United States has never formally recognized.

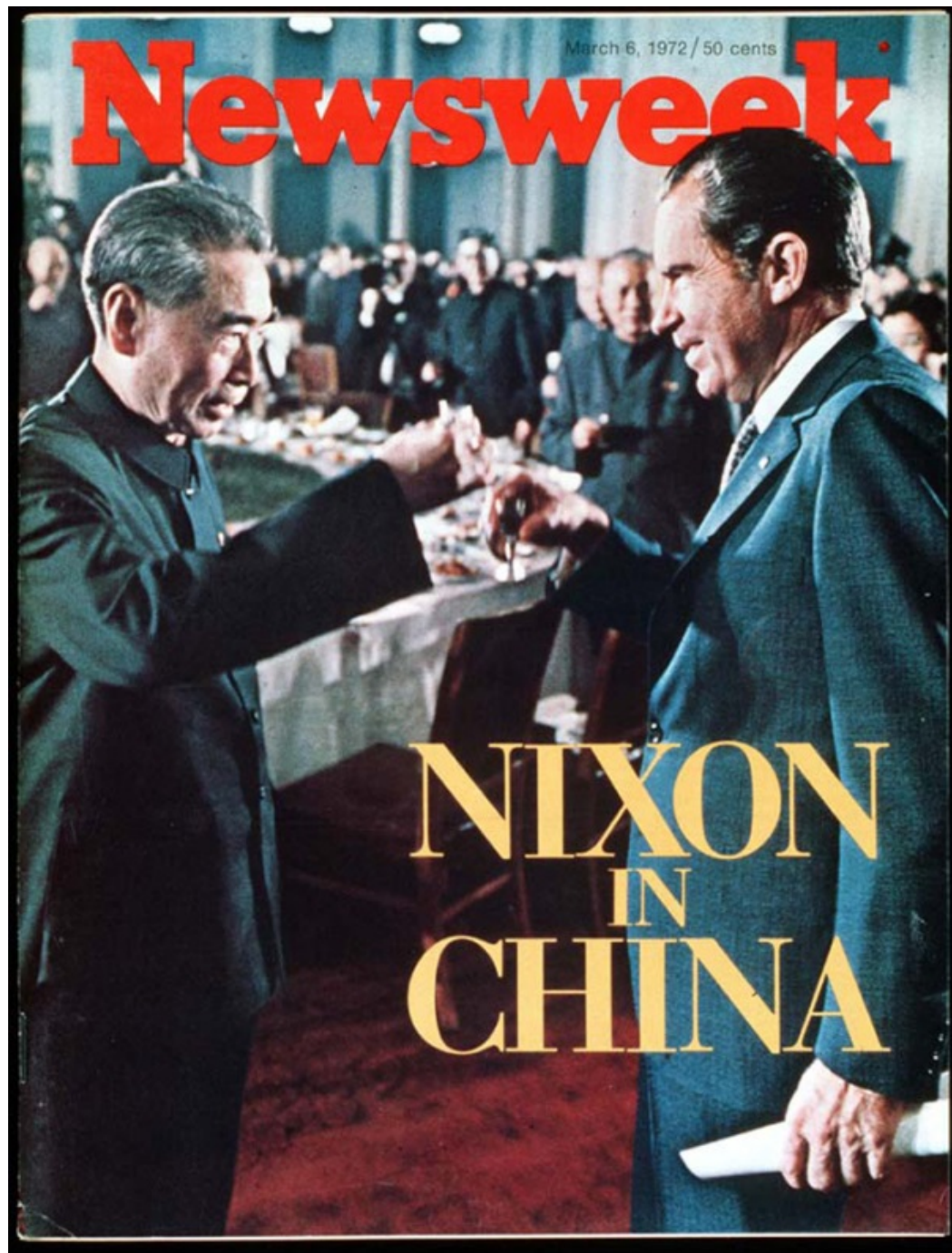
The announcement, made simultaneously here and in Peking, signaled a major departure in the policy which the United States has followed since the Communists took over mainland China at the end of World War II.

"As I have pointed out on a number of occasions over the past three years, there can be no stable and enduring peace without the participation of the Peoples Republic of China and its 750 million people," the President said.

In anticipation of the protest that appeared sure to be heard from the government of the Republic of China in Taiwan, the President said his action in seeking a new relationship with mainland China "will not be at the expense of our old friends."

"It is not directed against any other nation. We seek friendly relations with all nations. Any nation can be our friend without being any other nation's enemy."

The announcement came on the heels of several initiatives toward normalizing relations with the Communist Chinese government. The President recently relaxed trade and travel restrictions to mainland China and indicated that the United States might drop



# Harpoles In China: 2010 & 2012













# China is Looking to Us











# 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 \$4.50 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.



# Wildcards

- World economy (every one is “talking their own book”)
- Ban on hydraulic fracturing in U.S. (it is a battle city by city, town by town)
- The Streetlight Effect



# 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  
Dave Pursell, Tudor Pickering Holt & Co  
Tudor Pickering Holt & Co  
Bloomberg  
America's Natural Gas Alliance  
HPDI  
RigData  
SNL 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  
Platts Gas Daily Report, A McGraw Hill Publication  
SEC Filings  
Paul N. Cicio

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