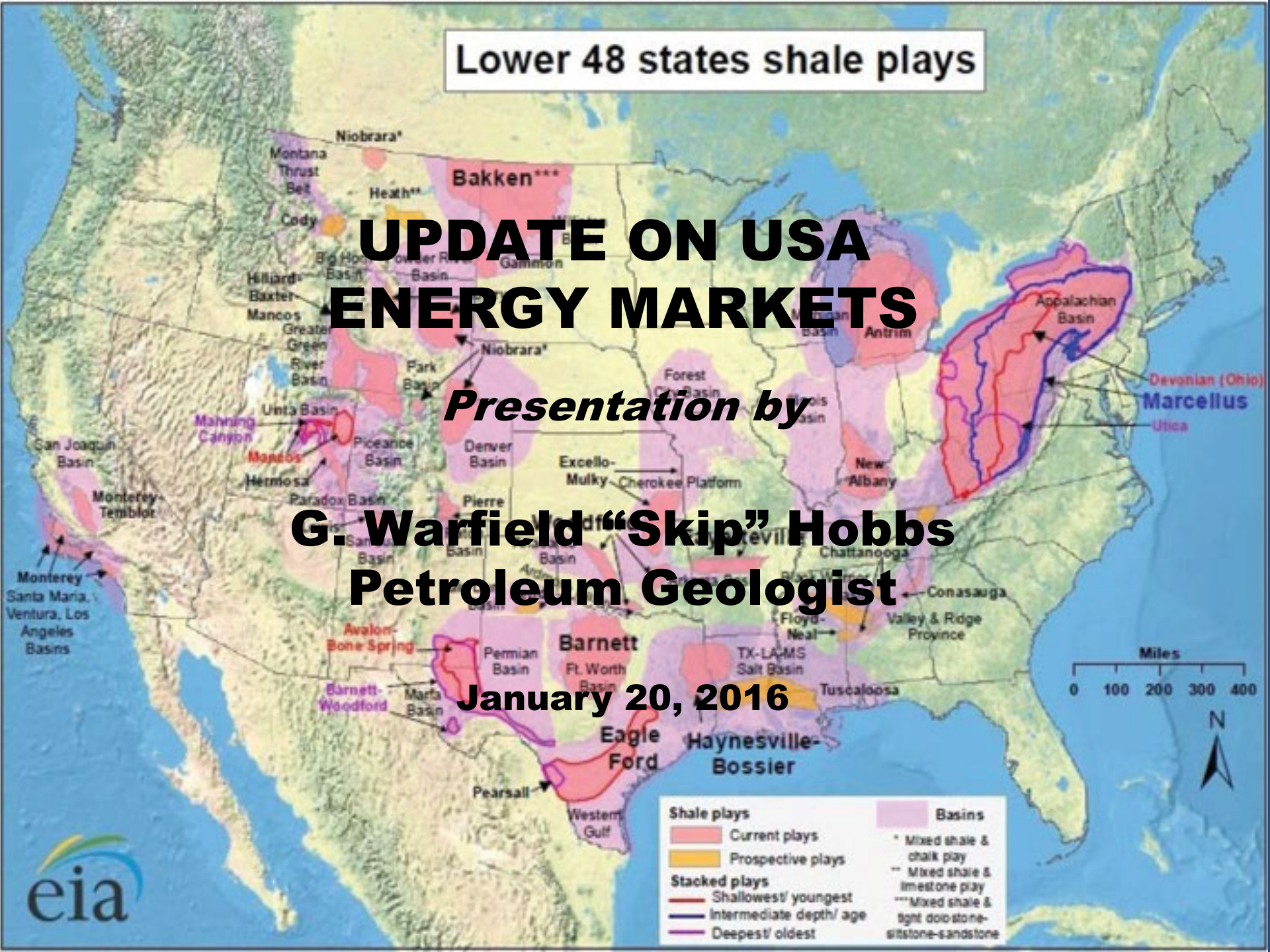


UPDATE ON USA ENERGY MARKETS

Presentation by

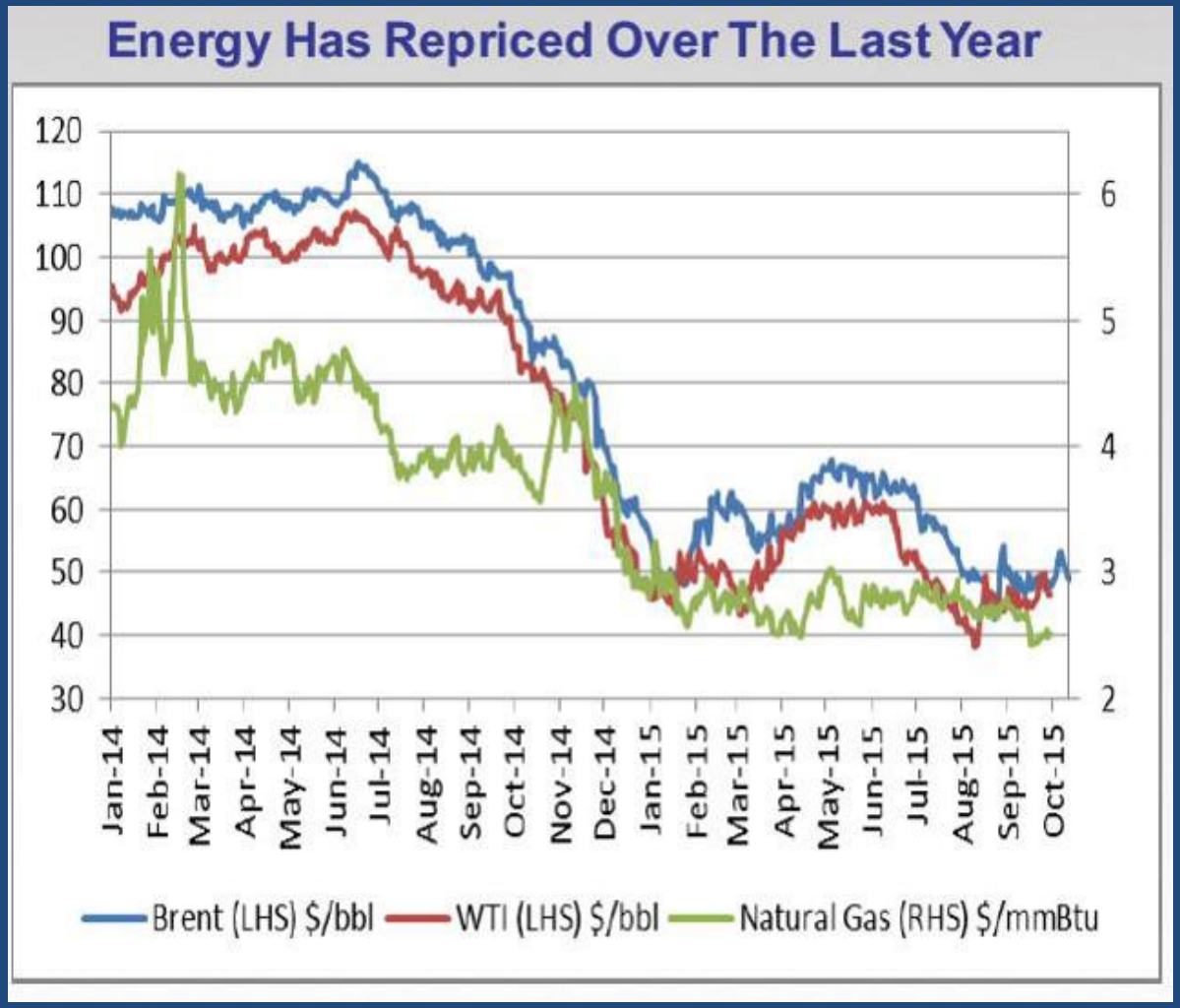
G. Warfield "Skip" Hobbs
Petroleum Geologist

January 20, 2016

THE FINANCIAL NEWS HEADLINES

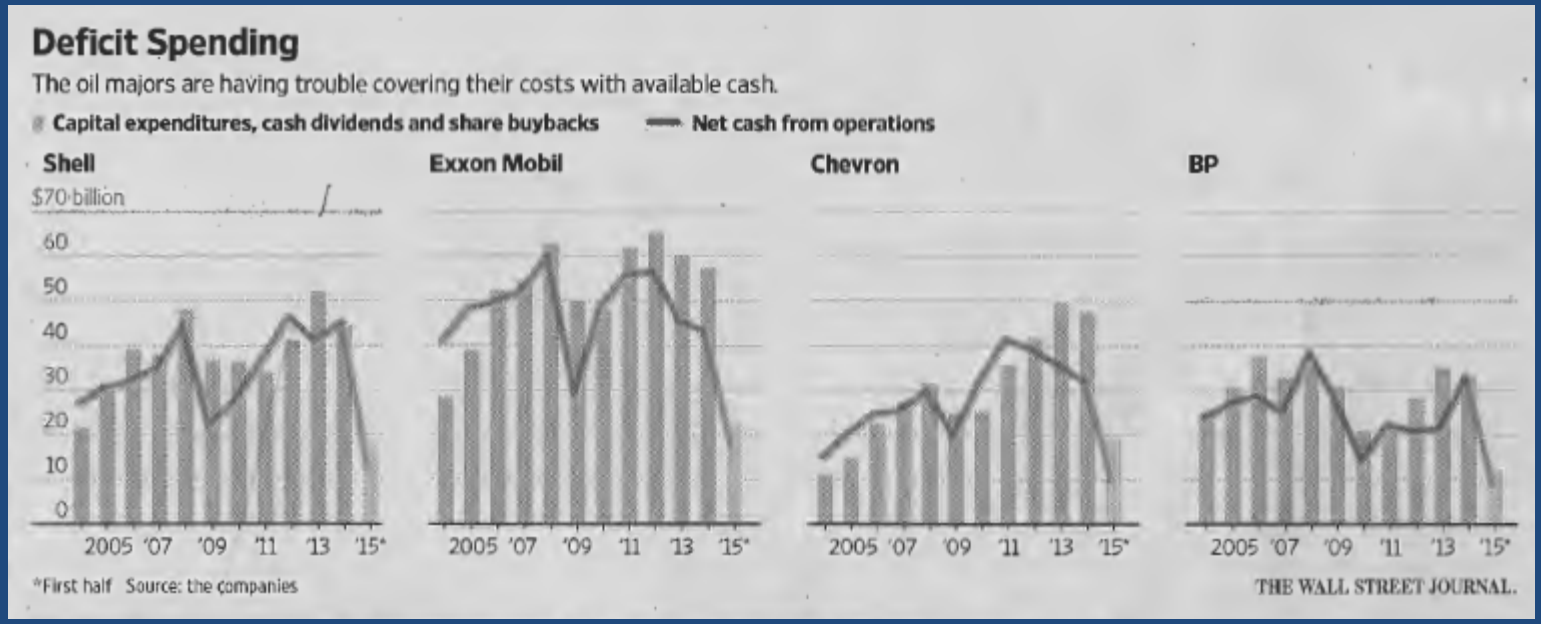
OIL PRICES CLOSE BELOW $30 AT 12-YEAR LOW

The Reality of Commodity Prices Boom to Bust in One Year



Collapsing Prices are Killing Small Oil Companies

Cash Crunch Looms for Top Oil Companies



WSJ 10-26-15

The majors will survive, but many independent production companies with excessive debt will not as collateral value of reserves is re-determined.

Oil service companies in peril as well.

OUTLINE OF TALK

Why the Bust after the Boom in petroleum ?

Technological Advances

Supply vs Demand and macroeconomics

Coal

Green Energy

The Upswing?

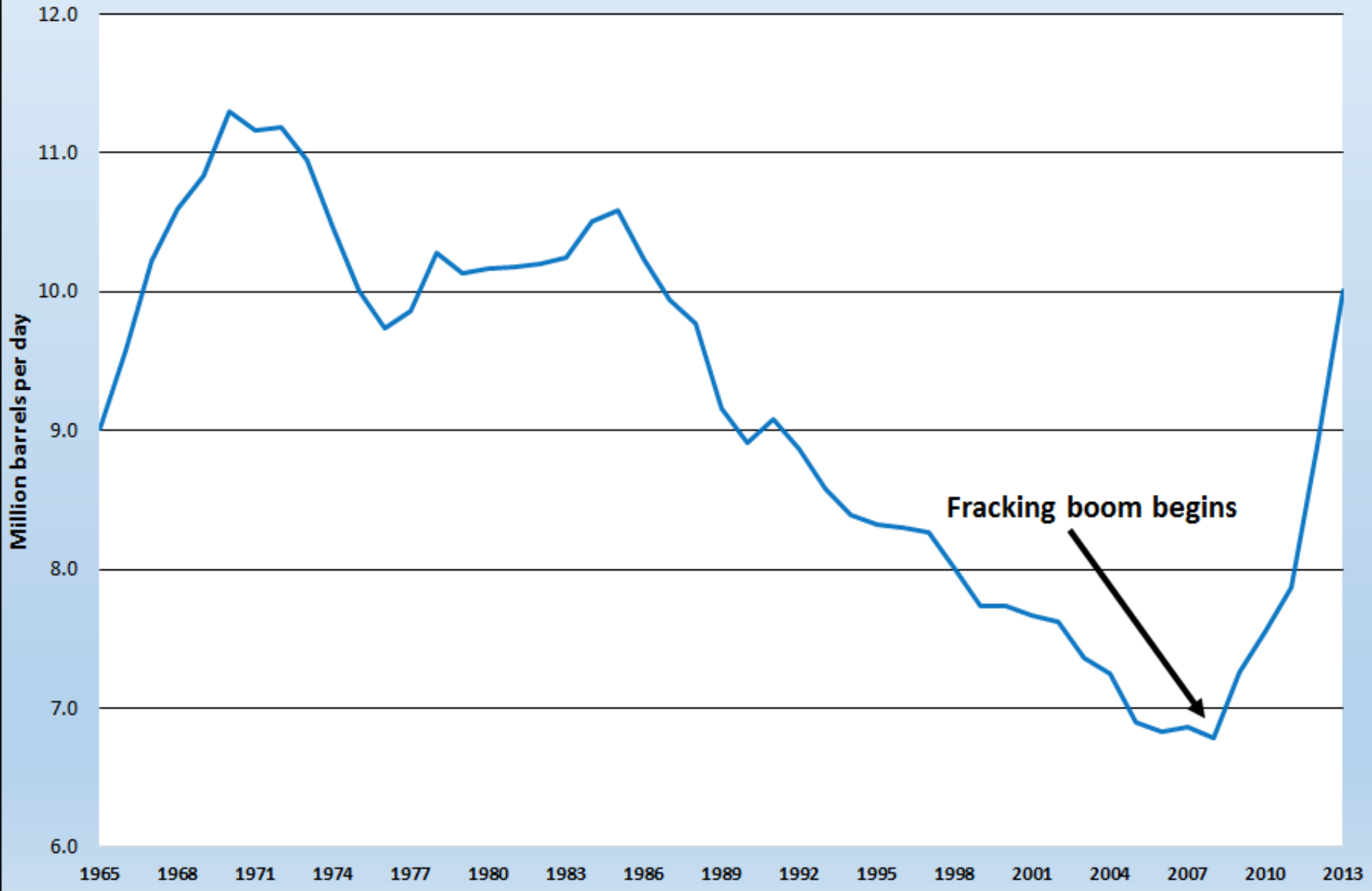
THE GOOD NEWS

USA OIL AND GAS PRODUCTION
SOARED 2008-2015

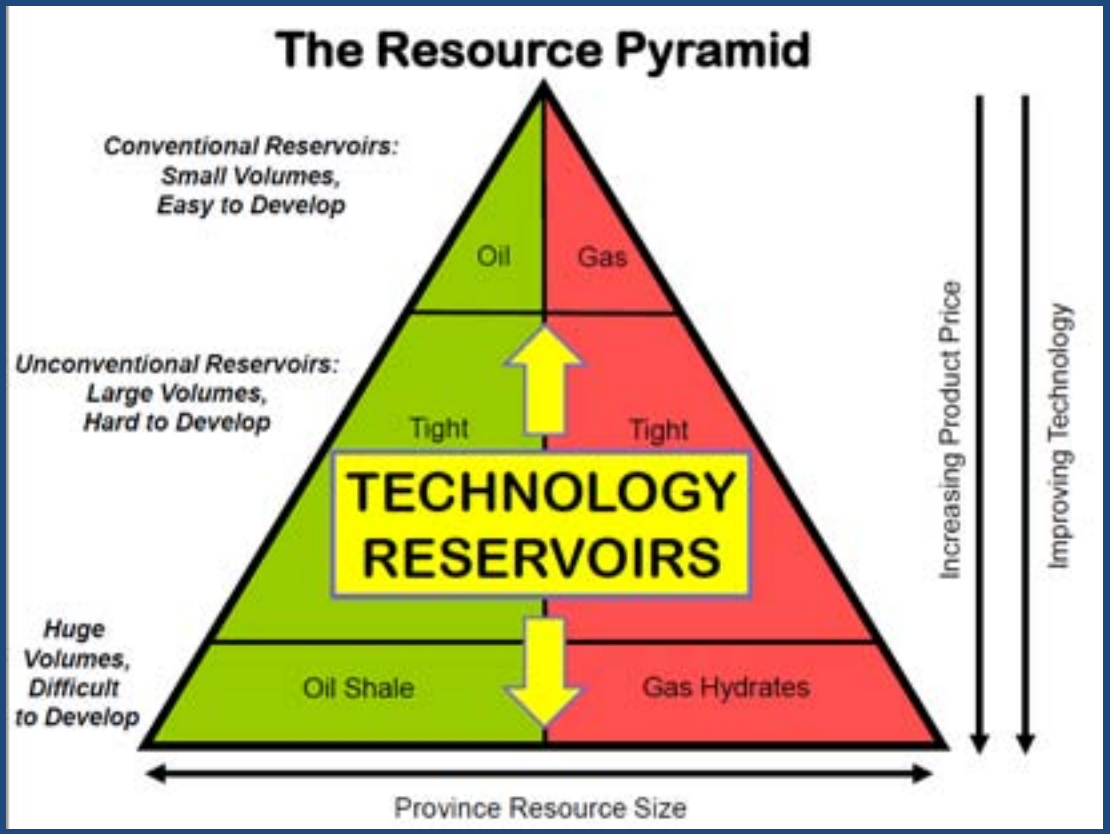
GREEN ENERGY RESOURCES BOOMING
AS INSTALLATION COSTS DROP

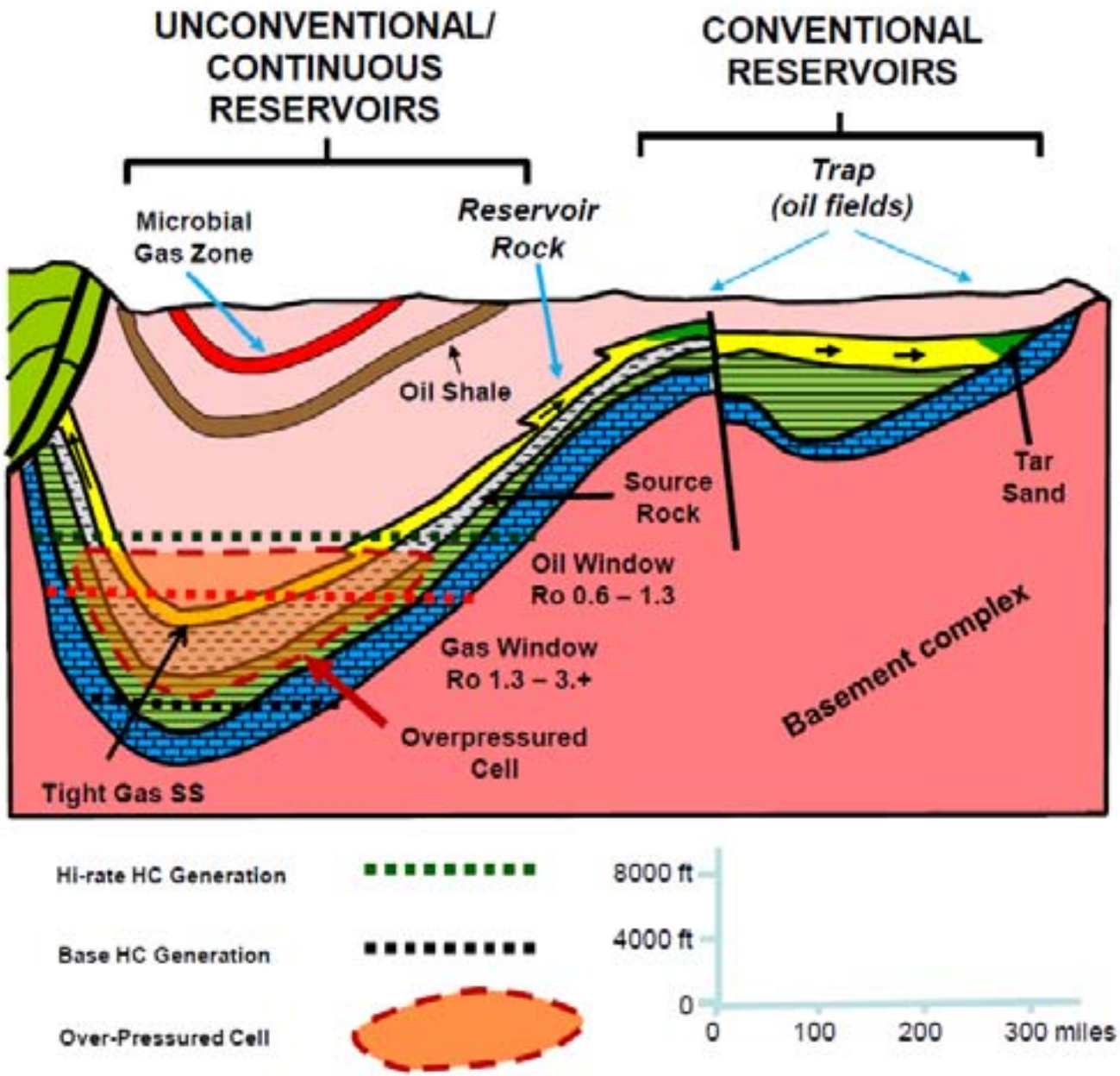
A CLEANER AND HEALTHIER ENVIRONMENT
RESULTING FROM EPA REGULATIONS

US Oil Production 1965-2013



Data source: BP Statistical Review of World Energy 2014


The Resource Pyramid
Conventional Reservoirs:
Small Volumes,
Easy to Develop
Oil
Gas
Unconventional Reservoirs:
Large Volumes,
Hard to Develop
Tight
Tight
TECHNOLOGY
RESERVOIRS
Huge
Volumes,
Difficult
to Develop
Oil Shale
Gas Hydrates
Increasing Product Price
Improving Technology
Province Resource Size



- Conventional
  - Structural
  - Stratigraphic
  - Combination
- Unconventional
  - Coalbed Methane
  - Shallow Basin Methane (biogenic)
  - Shale Gas
  - Shale Oil
  - Tight Oil ('continuous')
  - Oil Shale
  - Tar Sands

Modified from Magoon, 1988

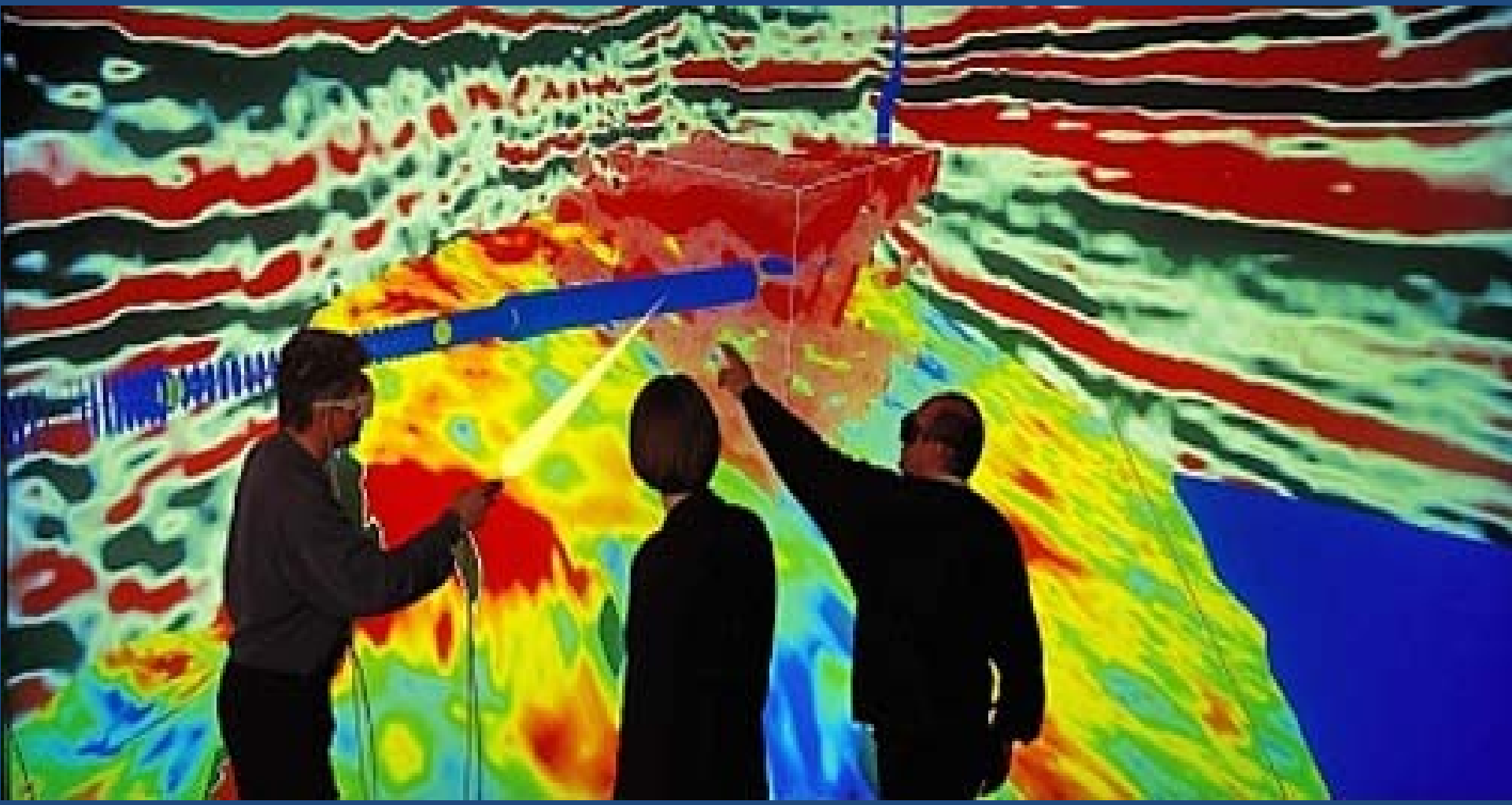
Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.
Updated: May 9, 2011

WHY THE SURGE IN USA OIL & GAS PRODUCTION?

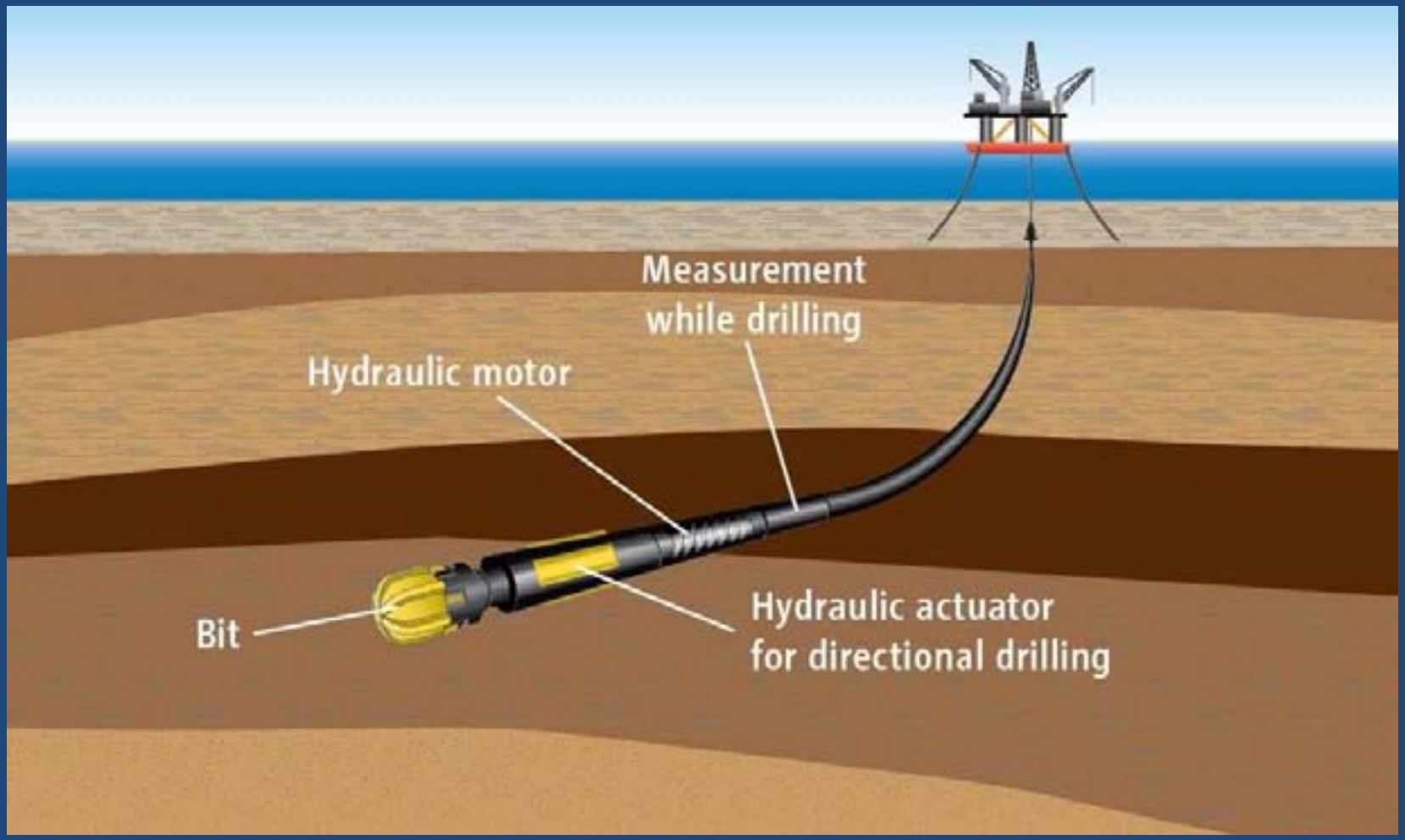
TECHNOLOGY UNLOCKED THE ABUNDANT HYDROCARBONS IN UNCONVENTIONAL RESERVOIRS.

And USA has abundant unconventional resources

TECHNOLOGY + GOOD GEOLOGY + ACCESS

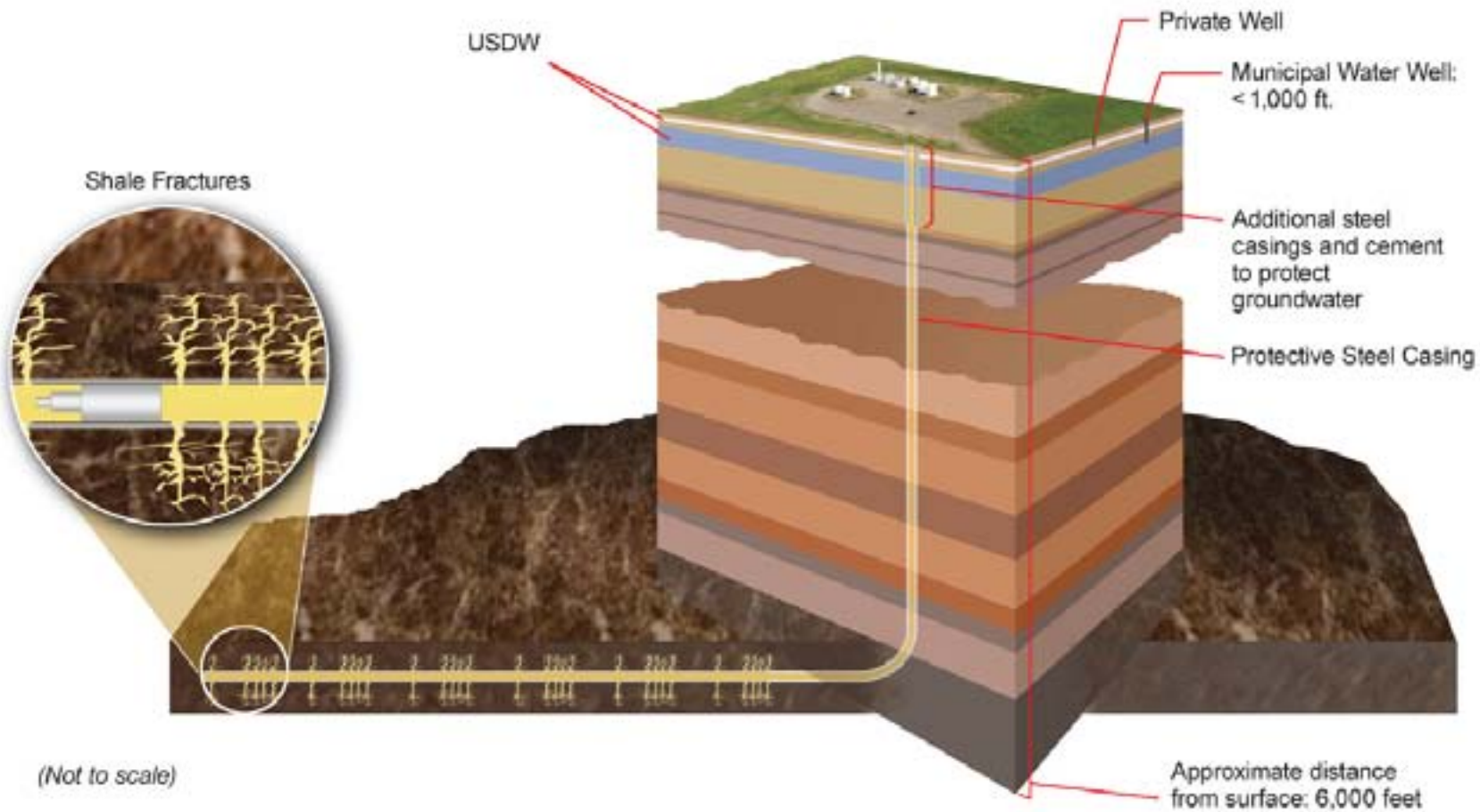


HORIZONTAL DRILLING TECHNOLOGY



Laterals are now being routinely drilled up to 10,000 ft.
(and staying within zone)

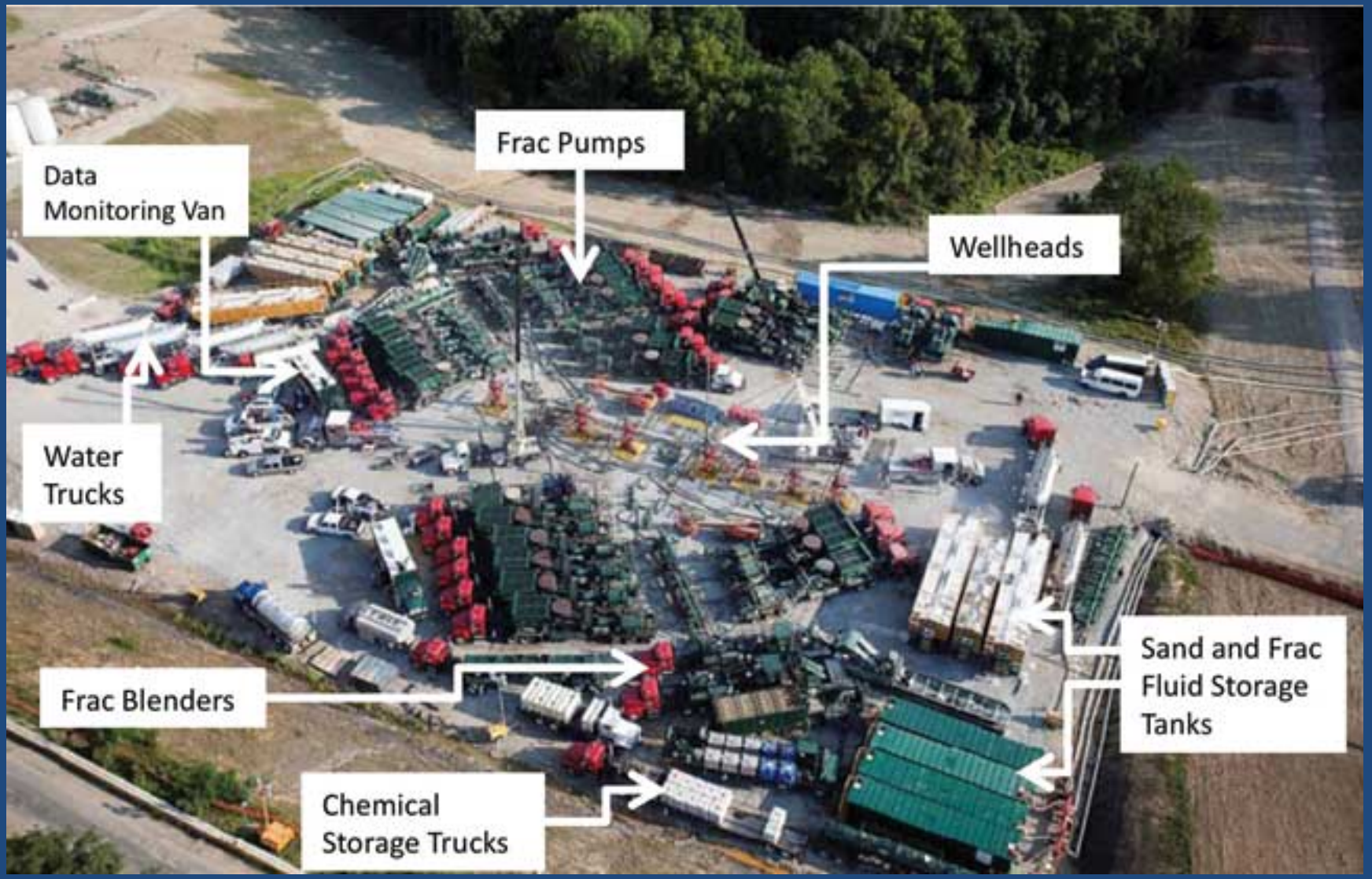
HYDRAULIC FRACTURING TECHNOLOGY



Steel casing lines the well and is cemented in place to prevent any communication up the wellbore as the fracturing job is pumped or the well is produced. Shallow formations holding fresh water that may be useful for farming or public consumption are separated from the fractured shale by thousands of feet of rock.

Now 30-40 stage fracks over a 1-2 mile lateral

FRAC JOB IN PROGRESS



A typical Marcellus Well @ 4-5 million gal H_2O and 3-5 million lbs. frac sand

Note: Unimin - New Canaan connection

FRACKING IS SAFE !

"In no case have we made a definitive determination that the fracking process has caused chemicals to enter groundwater."

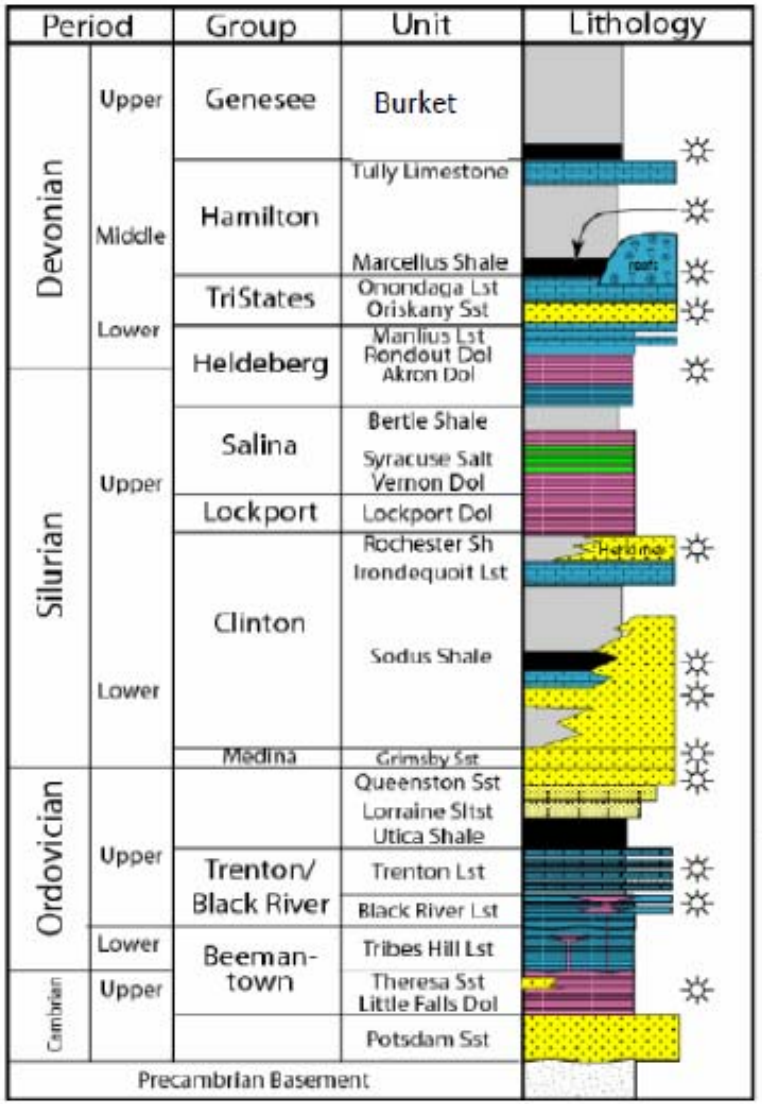
— Former EPA administrator Lisa Jackson

The Susquehanna River Basin Commission (SRBC) said Marcellus Shale development has not harmed water quality based on findings from its third report on water quality conditions in select Watersheds within SRBC. (September 2015)

Report from Yale researchers finds well water not tainted by fracking

A new report led by researchers from Yale University published in the Proceedings of the National Academy of Sciences has measured well water near hydraulically fractured wells to see if it might be contaminated by methane and fracking fluids flowing upward from shale formations. What did the researchers find? No contamination due to fracking. (October 2015)

Appalachian Shale Plays



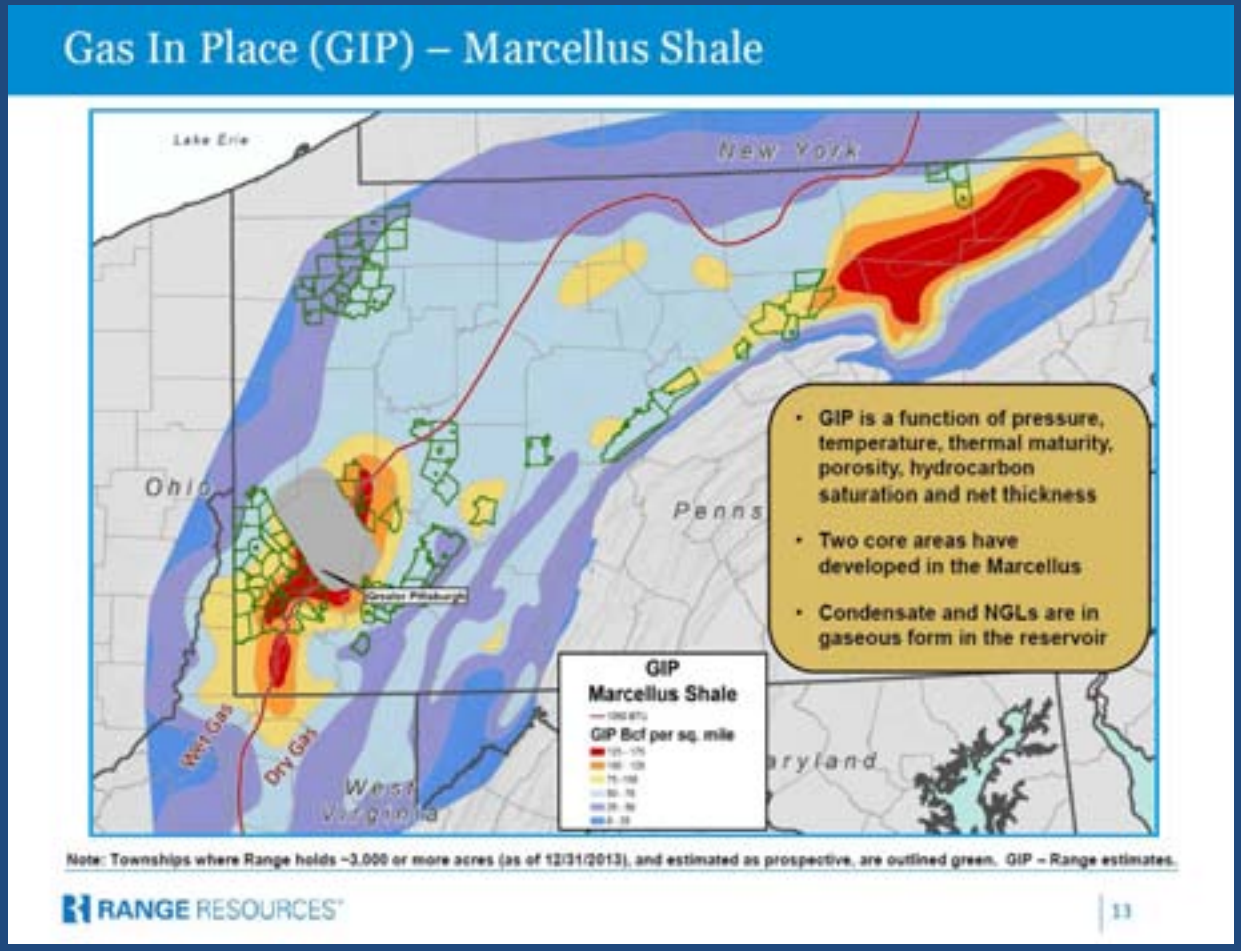
Burket

Marcellus

Utica

= gas producing formation

THE MARCELLUS
An Incredible New Resource In An Old Basin

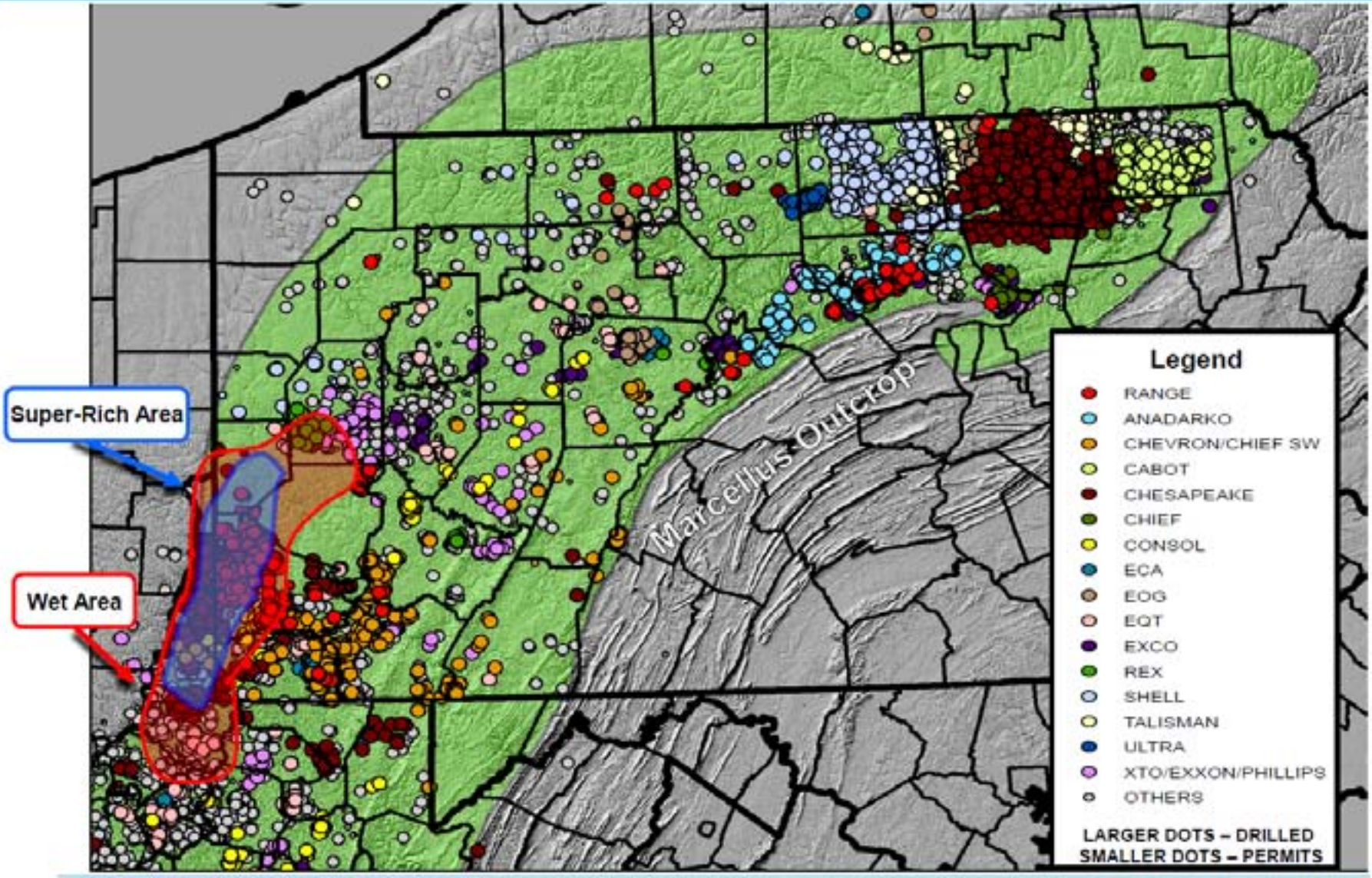


Over 6000 wells Since 2007

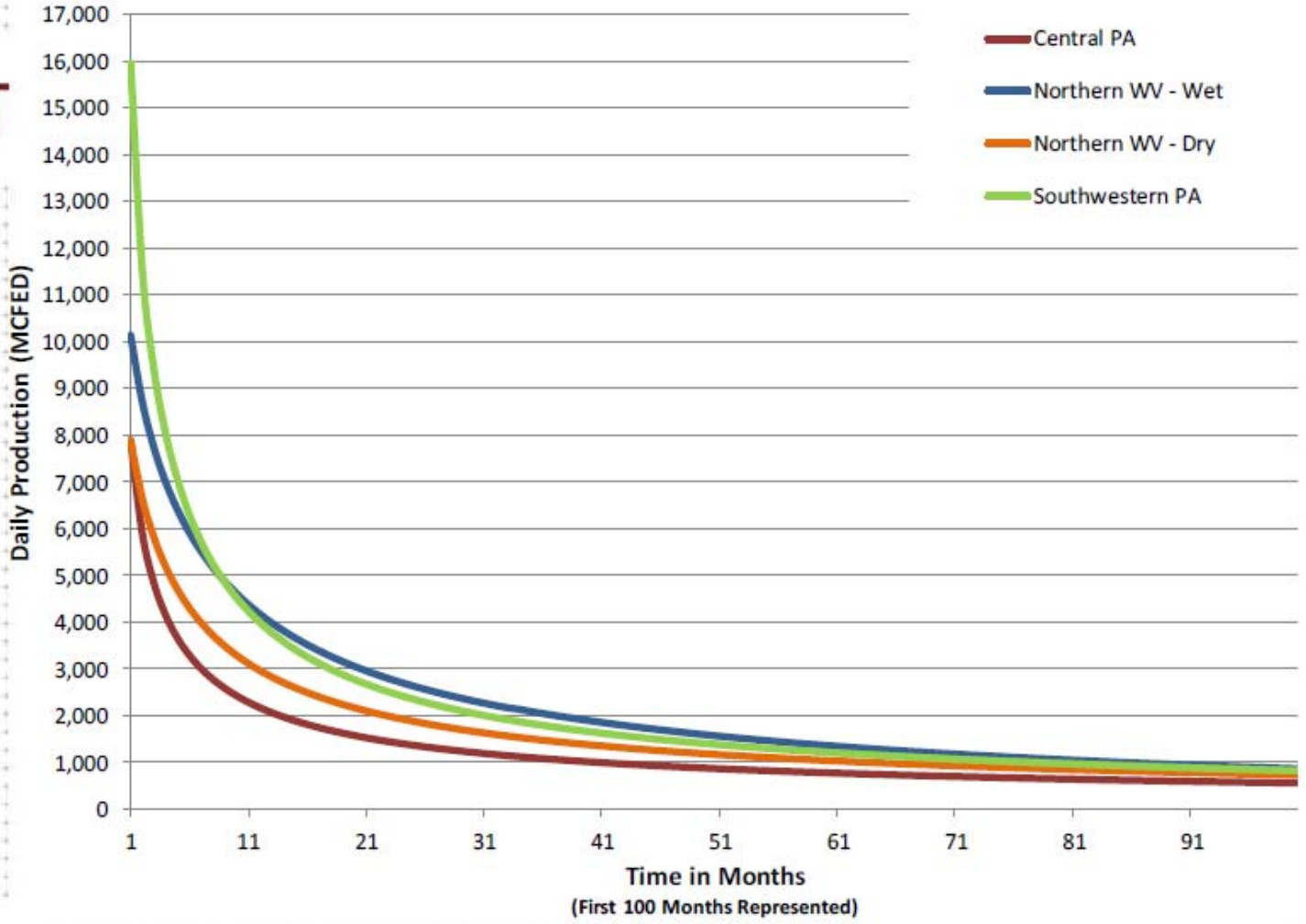
Largest Natural Gas & Liquids Play In North America

Potential recoverable Resource of 400-500 TCF

Shale Wells Drilled and Permitted



Marcellus Play
Type Curves by Area – 5,400' lateral



Type curve and well cost data posted on www.eqt.com under investor relations

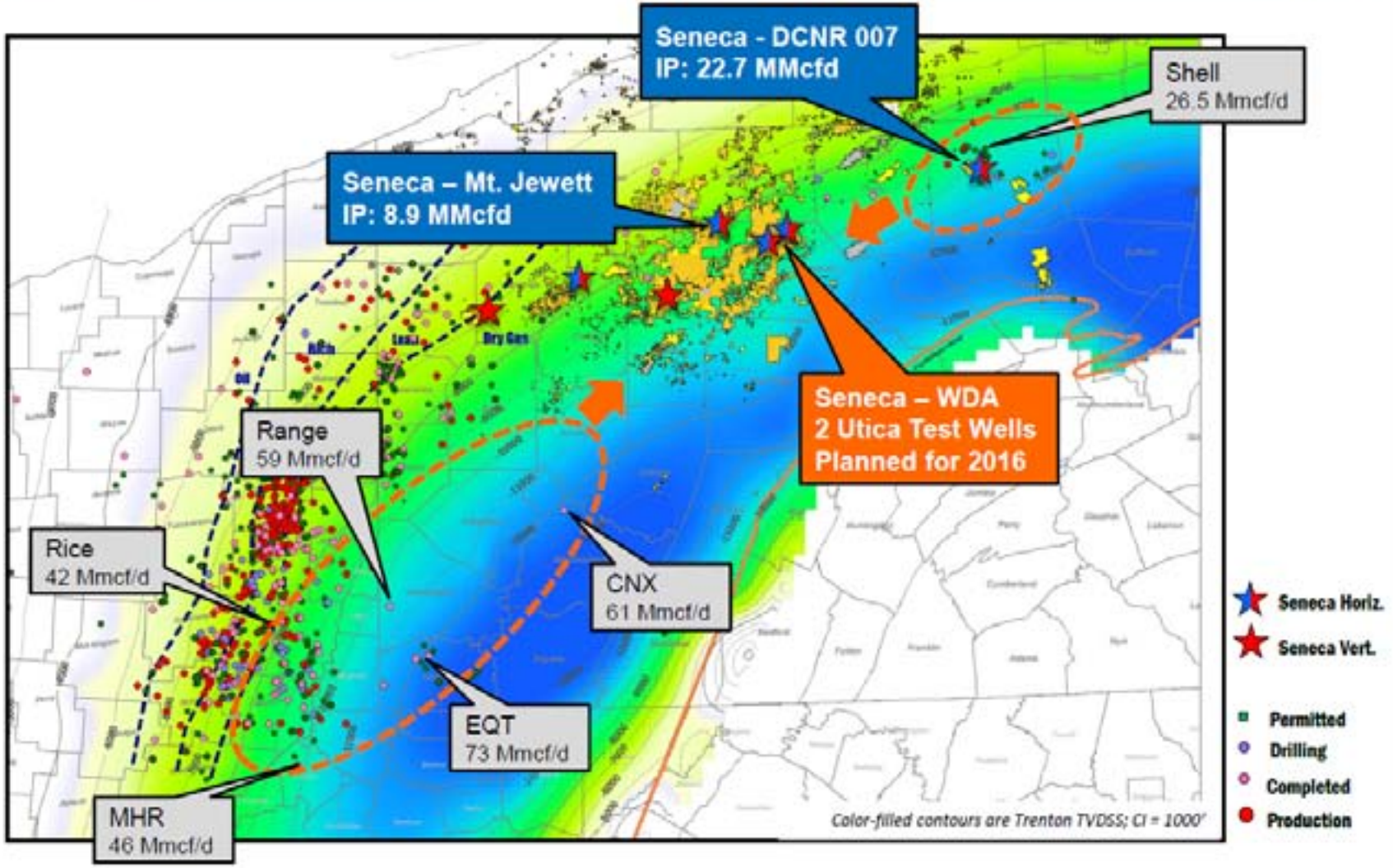
Marcellus Economics
IRR – Northern WV – Dry Gas Area

PRICE	ATAX IRR
$2.50	7%
$3.00	15%
$3.50	26%
$4.00	41%

Utica/Point Pleasant: Industry Activity

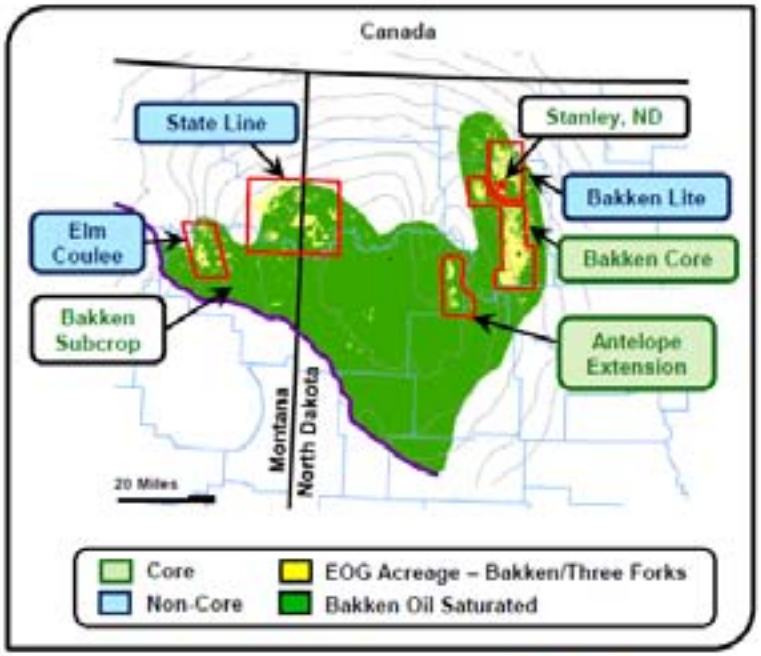
SENECA RESOURCES

Upstream

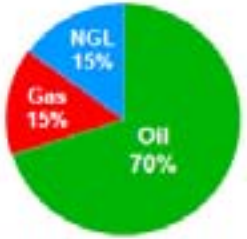


EOG Resources
Bakken/Three Forks Oil

- Increased Estimated Reserve Potential by 600 MMBoe* to 1.0 BnBoe*
  - 1,540 Net Remaining Locations
  - 8,400' Lateral
  - $7.1 MM CWC**
  - 650' Spacing
- Core – Highest Rate-of-Return Drilling
  - 120k Net Acres
  - Bakken Core and Antelope Extension
- Non-Core – Economic With Upside
  - 110k Net Acres
  - Bakken Lite, State Line and Elm Coulee
- Additional Upside Potential
  - High-Density Completions and Targeting
  - Further Downspacing



Area	Reserve Potential MMBoe, Net	Gross/Net EUR (Mboe/Well)	Net Locations
Core	360	745/610	590
Non-Core	400	510/420	950
Existing Wells	260	580/470	560
Total	1,020		2,100



Remaining Wells

* *Estimated potential reserves net to EOG, not proved reserves. Includes 219 MMBoe proved reserves in Bakken/Three Forks booked at December 31, 2014. Includes prior production from existing wells.*

** *CWC = Drilling, Completion and Well-Site Facilities.*

EOG Investor Presentation Aug 2015

Eagle Ford Play Trend

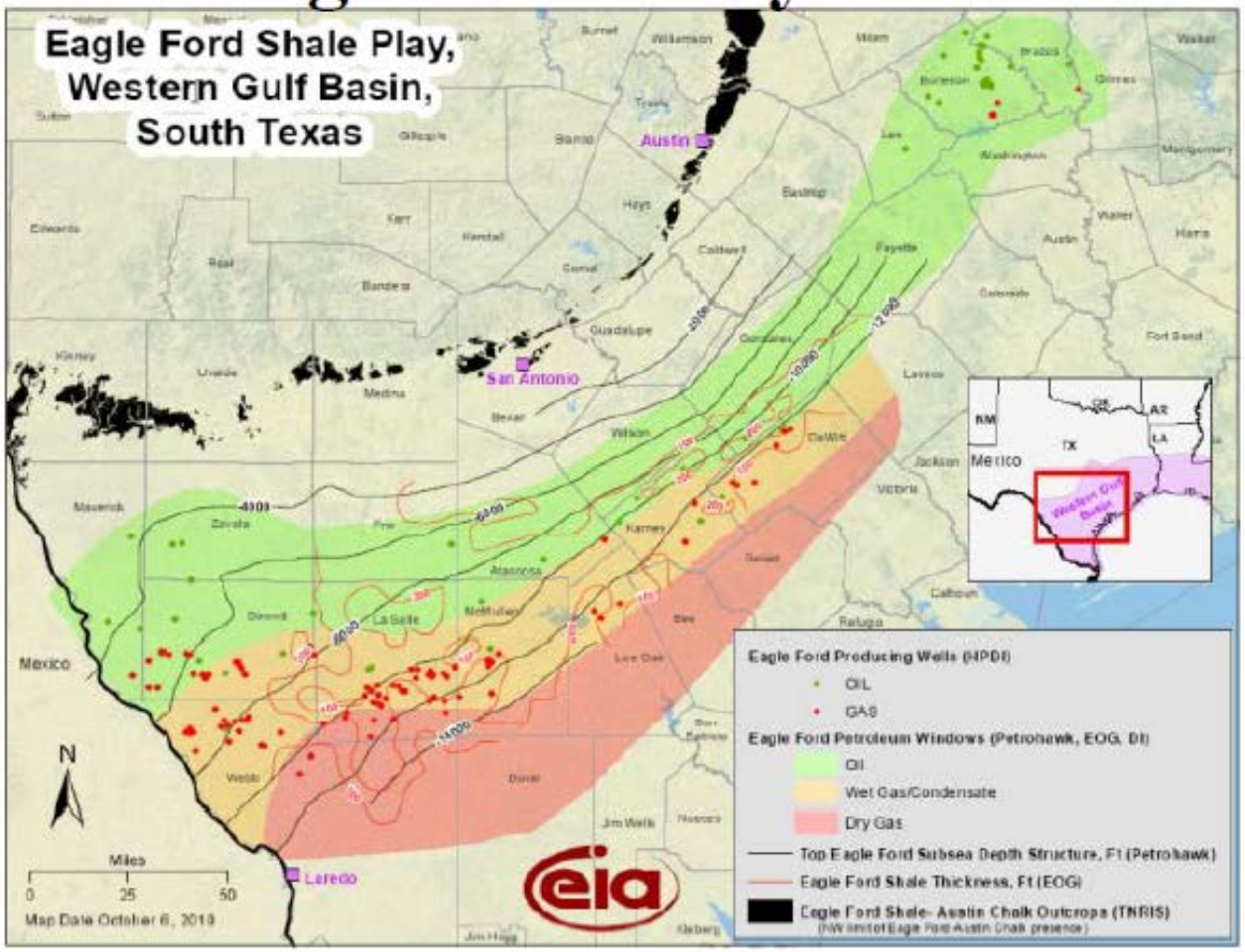
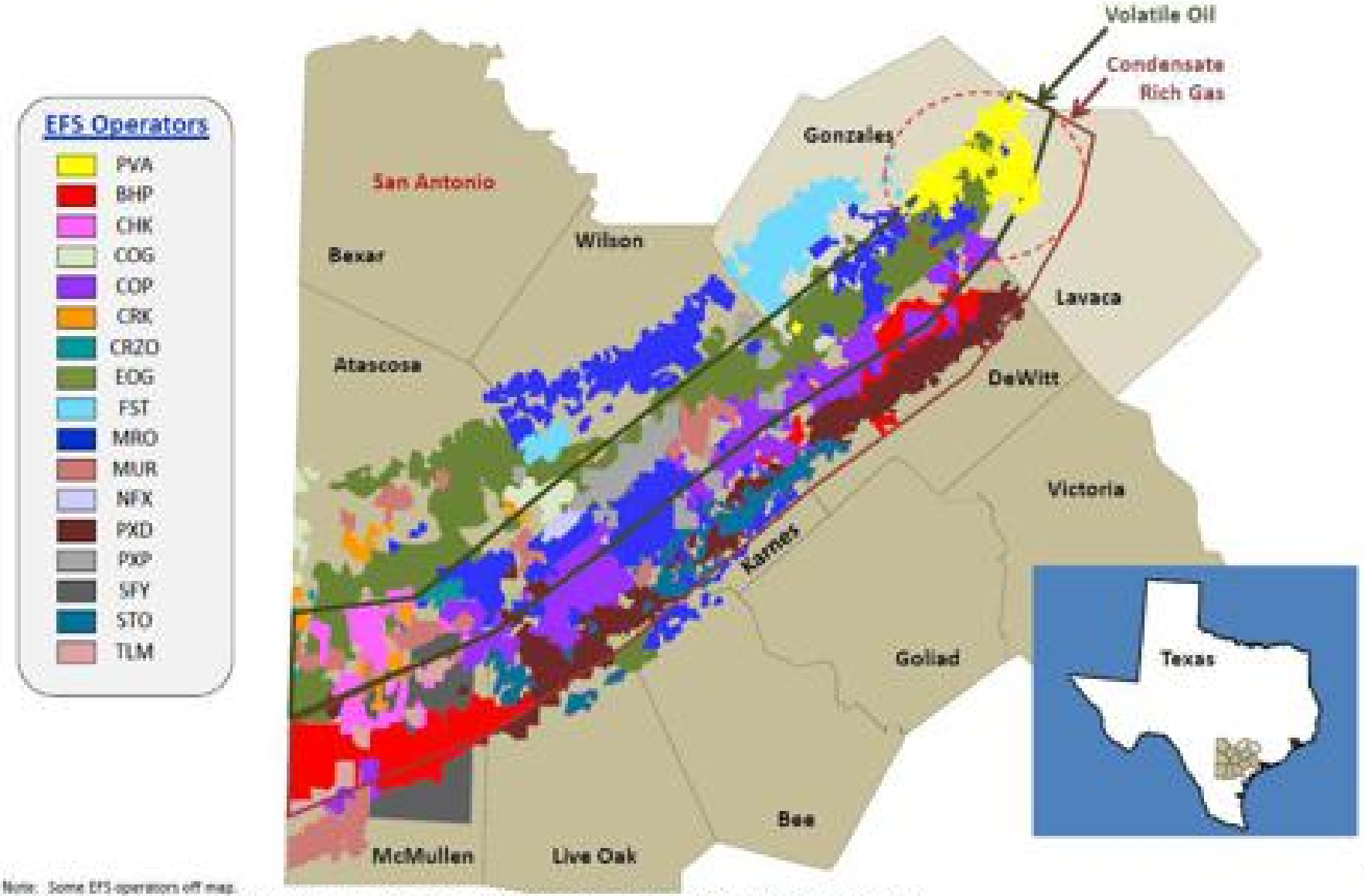


Figure 1

Overview of the Eagle Ford Shale

PENN VIRGINIA CORPORATION

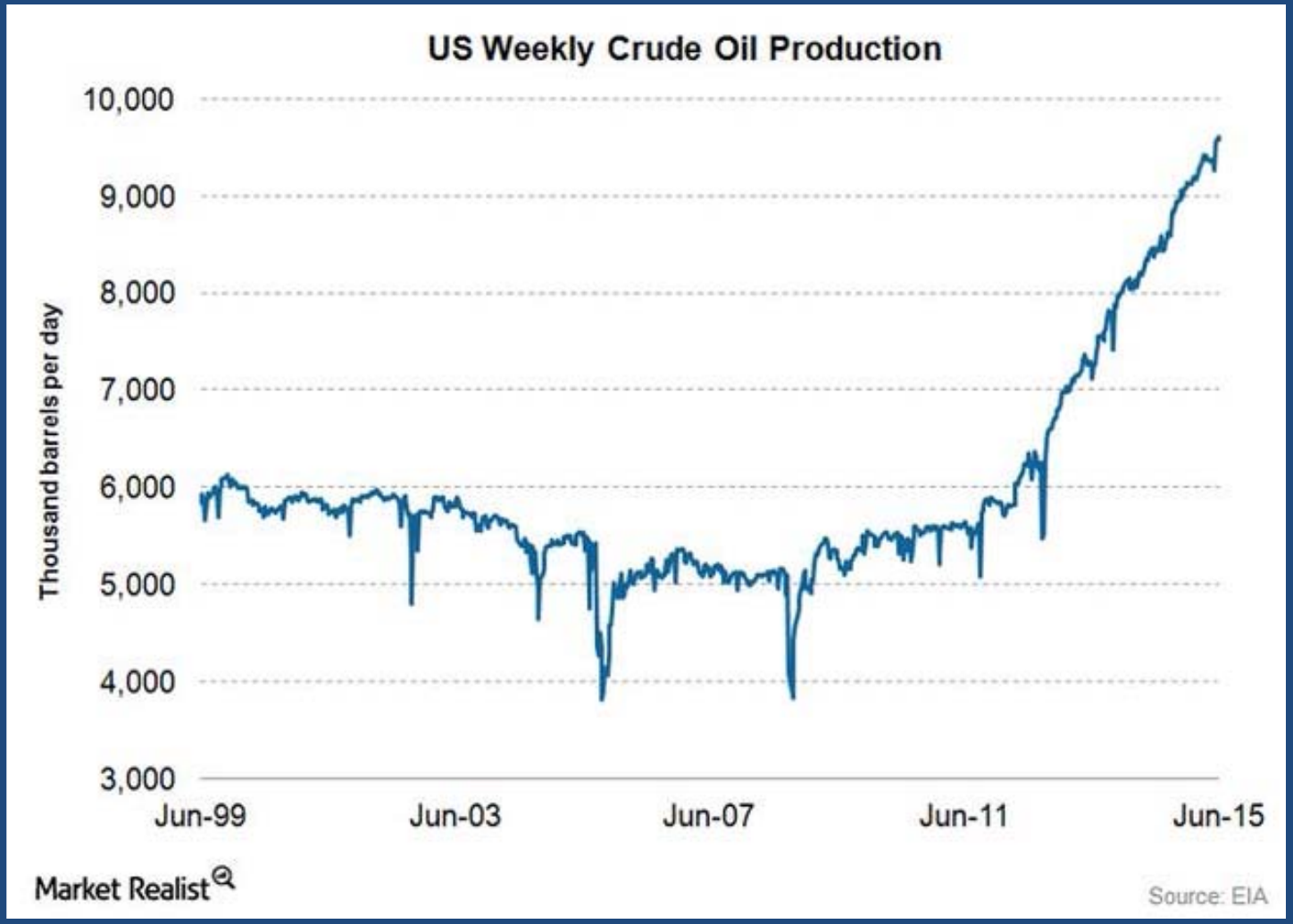
Eastern Volatile Oil and Condensate Rich Gas Windows[1]



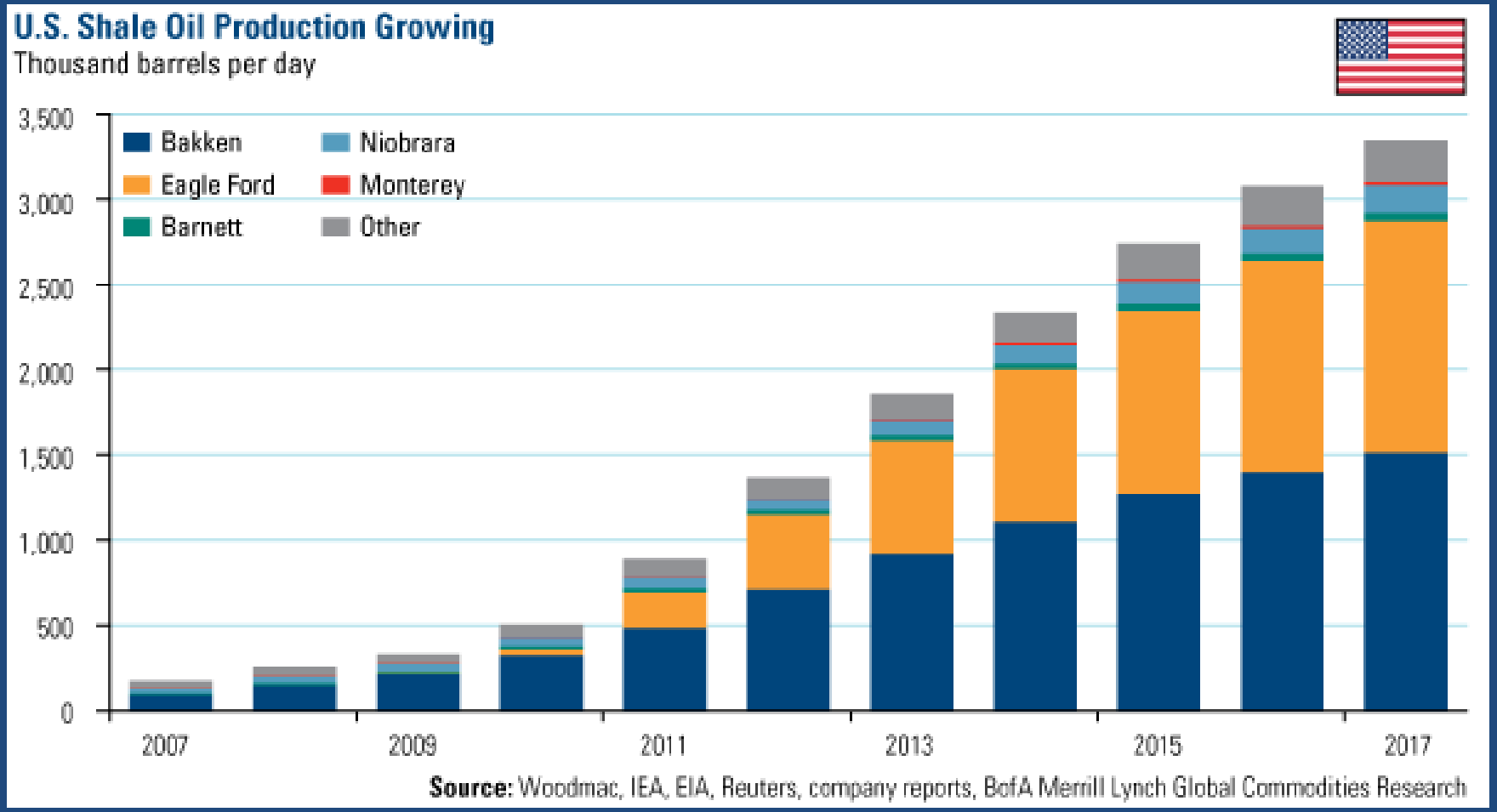
Note: Some EFS operators off map.

(1) Based on recent company presentations, as well as industry publications. Some industry publication information may be out of date.

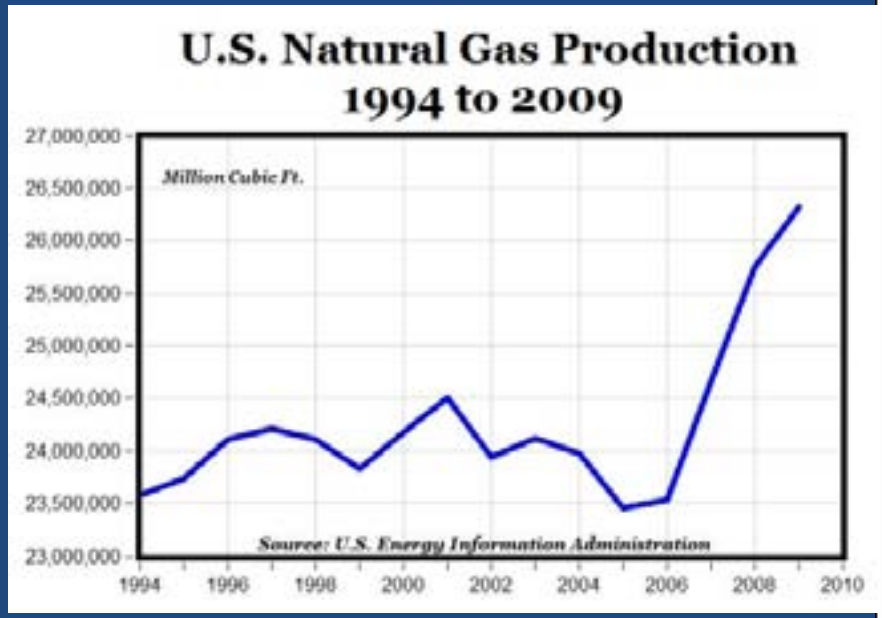
USA PRODUCTION TAKES OFF

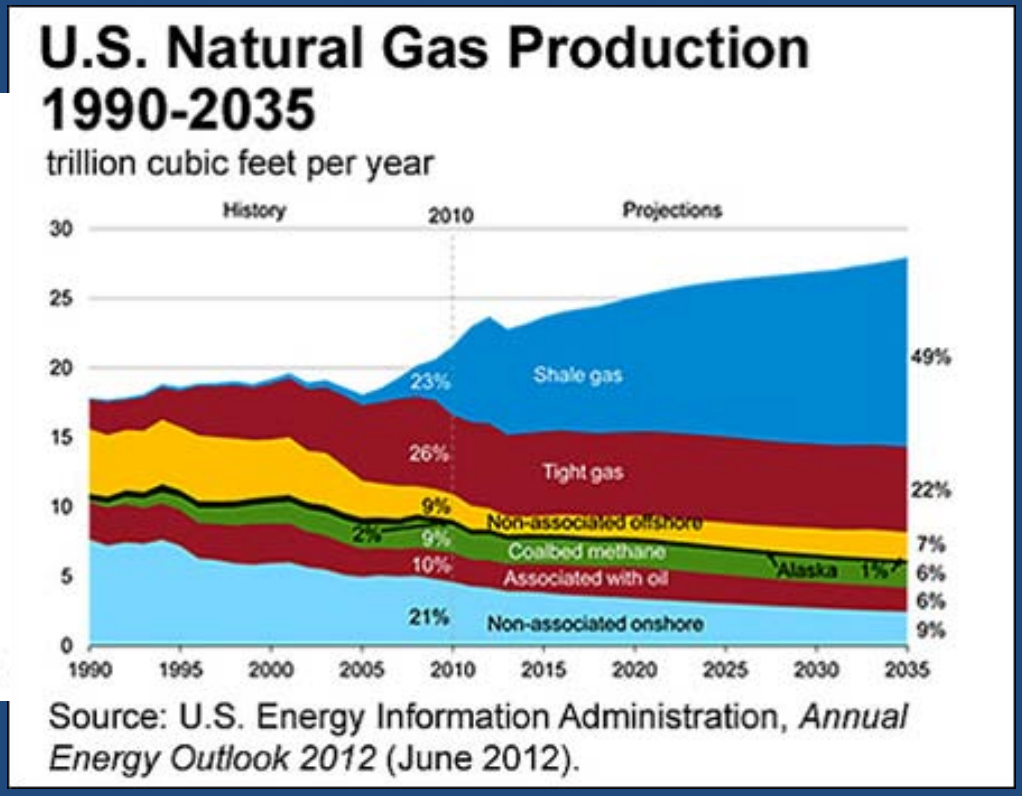


INCREMENTAL OIL PRODUCTION FROM SHALES



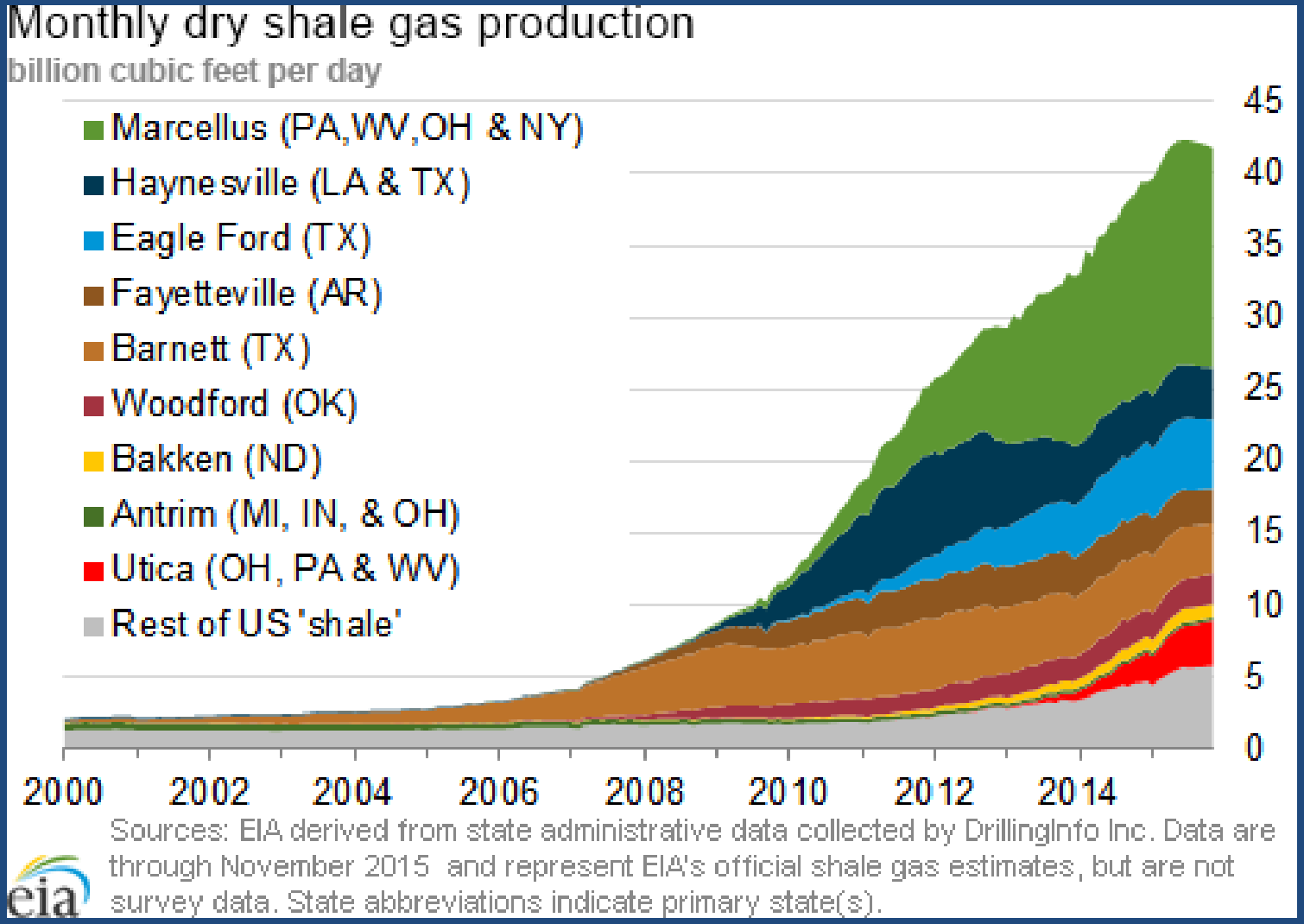
"SHALE GALE" ALSO BOOSTS USA NATURAL GAS PRODUCTION



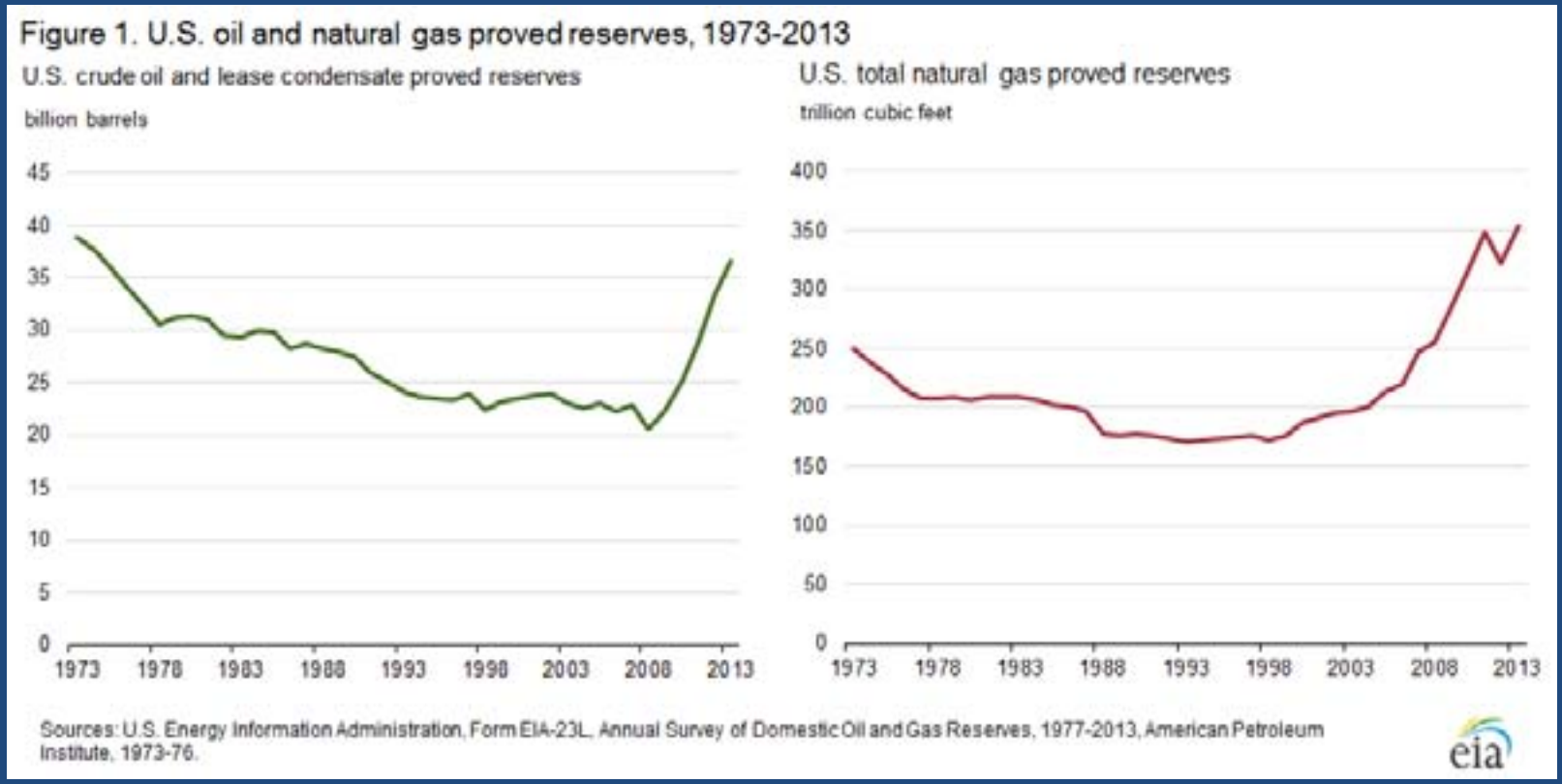


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2012* (June 2012).

SOURCE OF NEW SHALE GAS



IMPACT OF SHALE REVOLUTION ON USA RESERVES



USA Proved Reserves 12/31/13

Oil and lease condensate = 36.5 Billion bbls. (@ 7 B/yr = 5 yr supply)

Natural Gas = 354 TCF (@ 25.7 TCF/yr = 13.8 yr supply)

IMPACT OF INCREASED PRODUCTION ON OIL MARKETS

USA reliance on imported crude reduced – Energy Independence -
(not quite – we still import 46%)

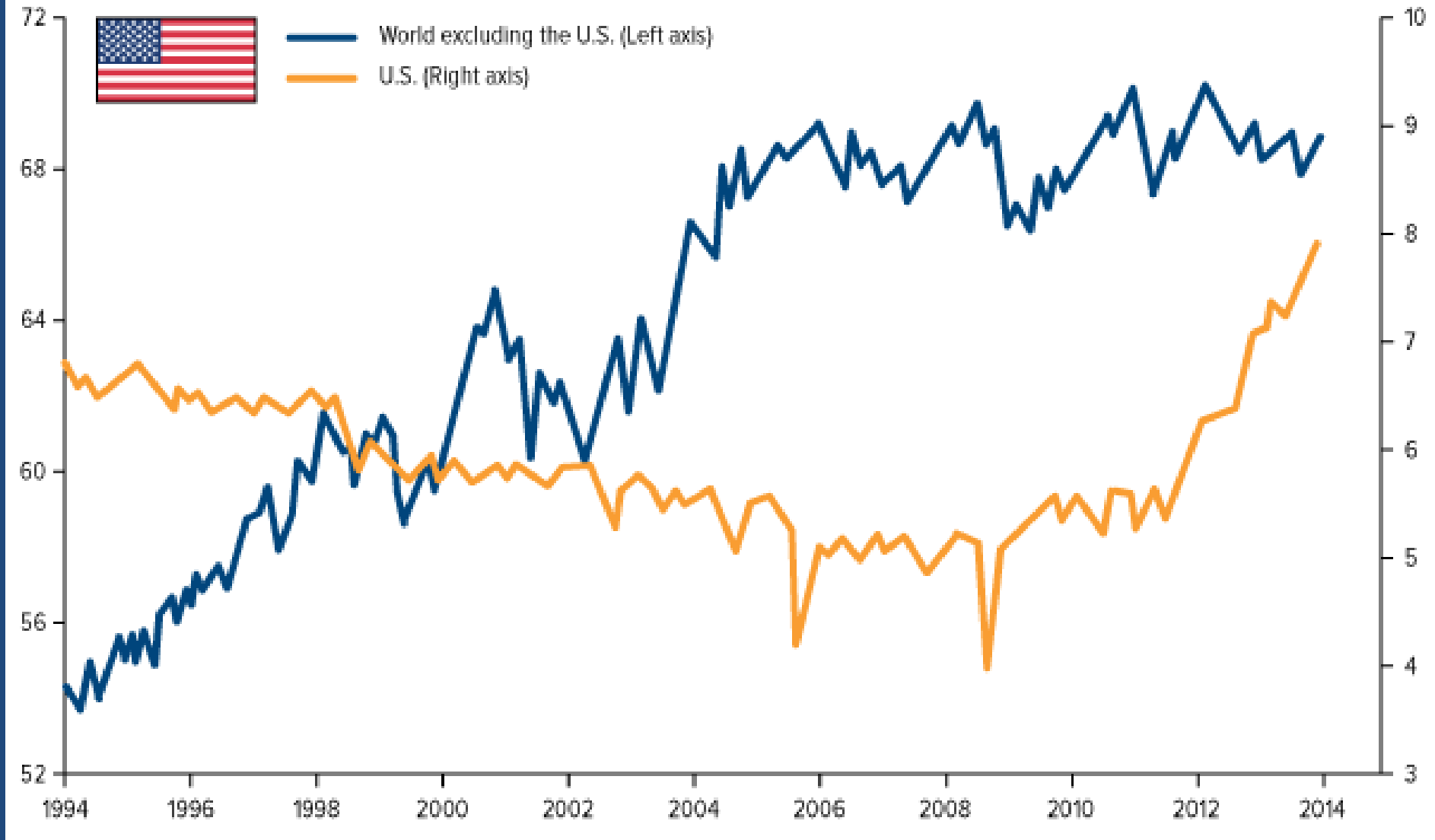
Between 2011-2014, imports of medium and light Crude oils declined by 1.8 MMBO/day
(@ $80/Bo = $144 MM/day improvement in USA Balance of trade)

Global Economy Recovery is Anemic – Petroleum demand not robust

USA Refinery Structure Mostly Built for heavy-medium sour crudes

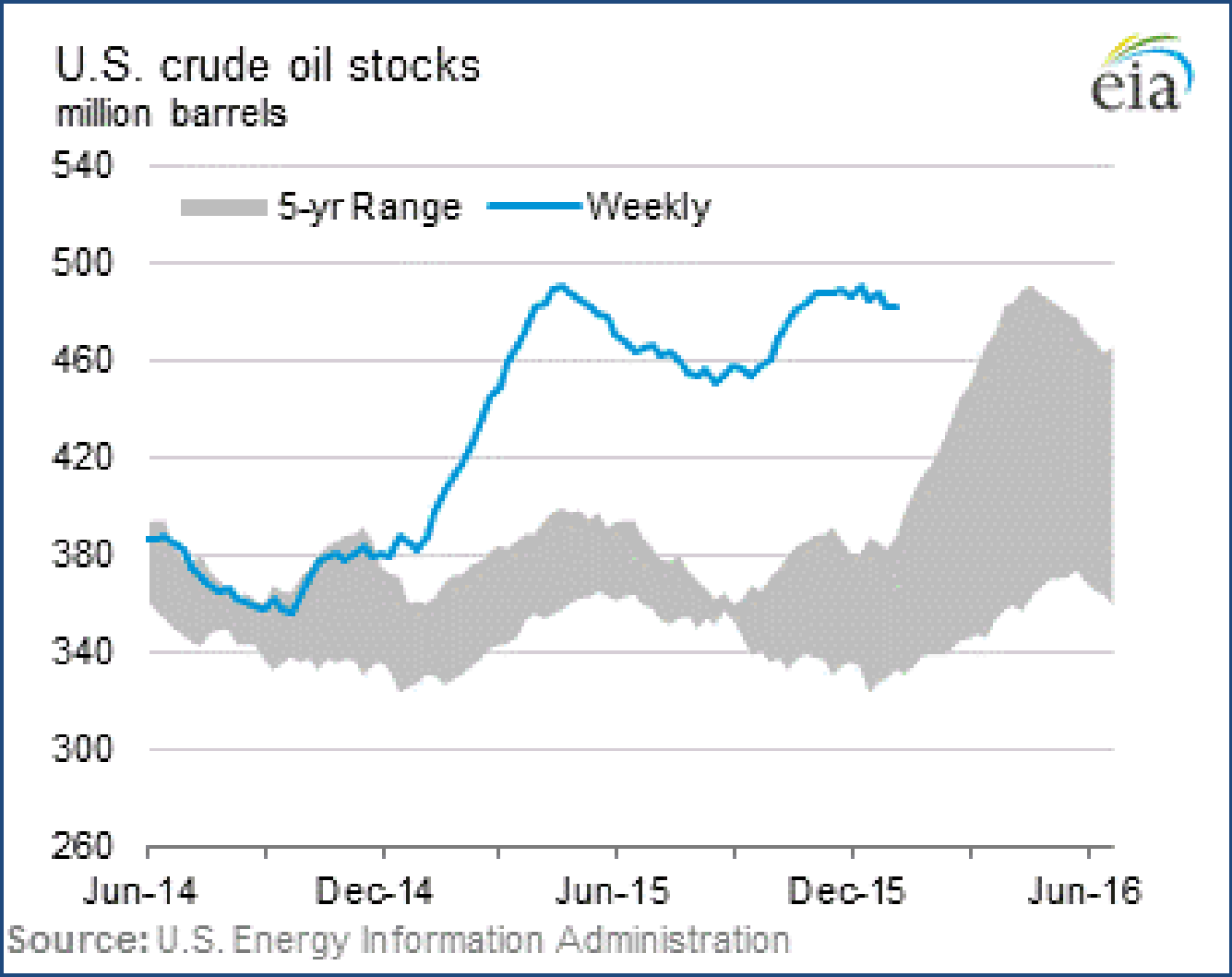
Domestic Crude Oil Production Rising Sharply as the Rest of the World Has Flat-Lined

Millions of Barrels per Day



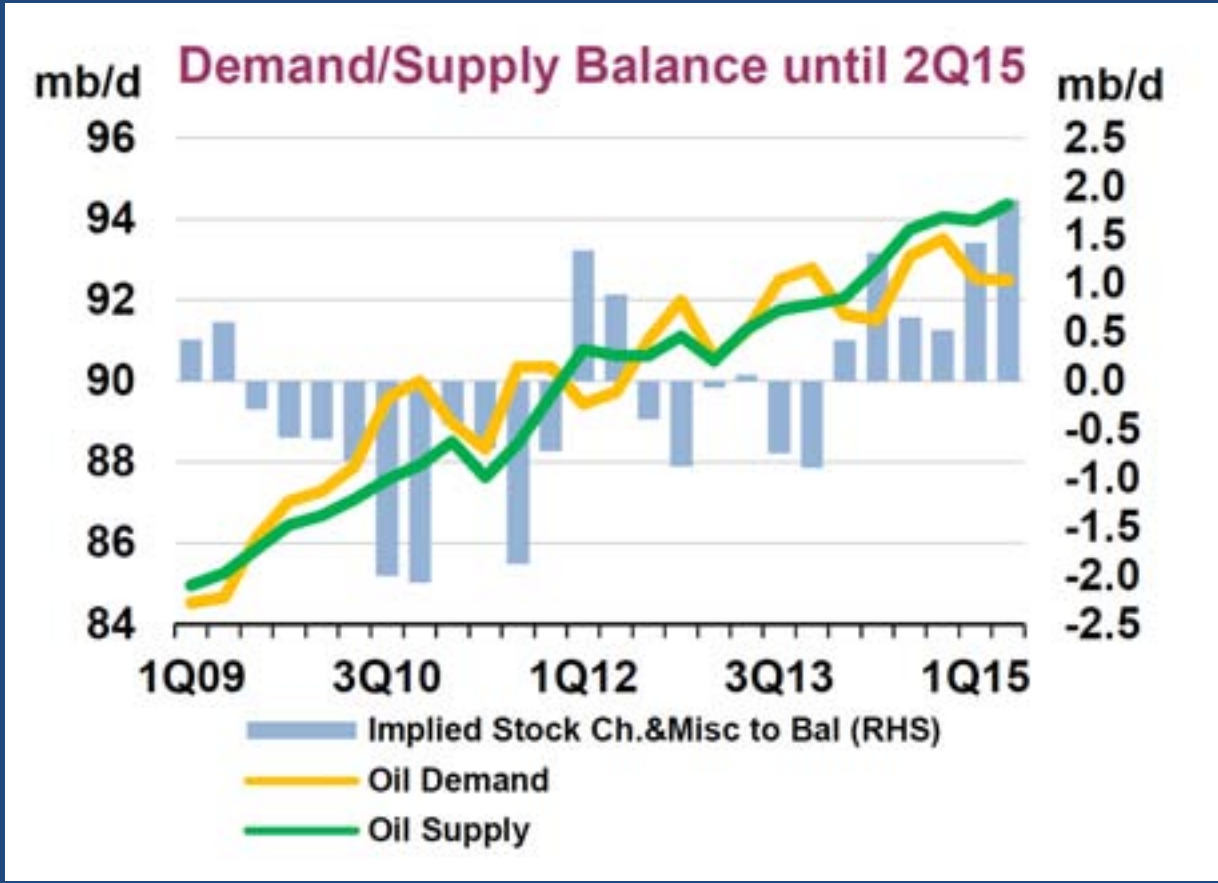
Source: Energy Information Administration, Agora Financial, U.S. Global Investors

REDUCED DEMAND AND MISMATCH WITH REFINERIES



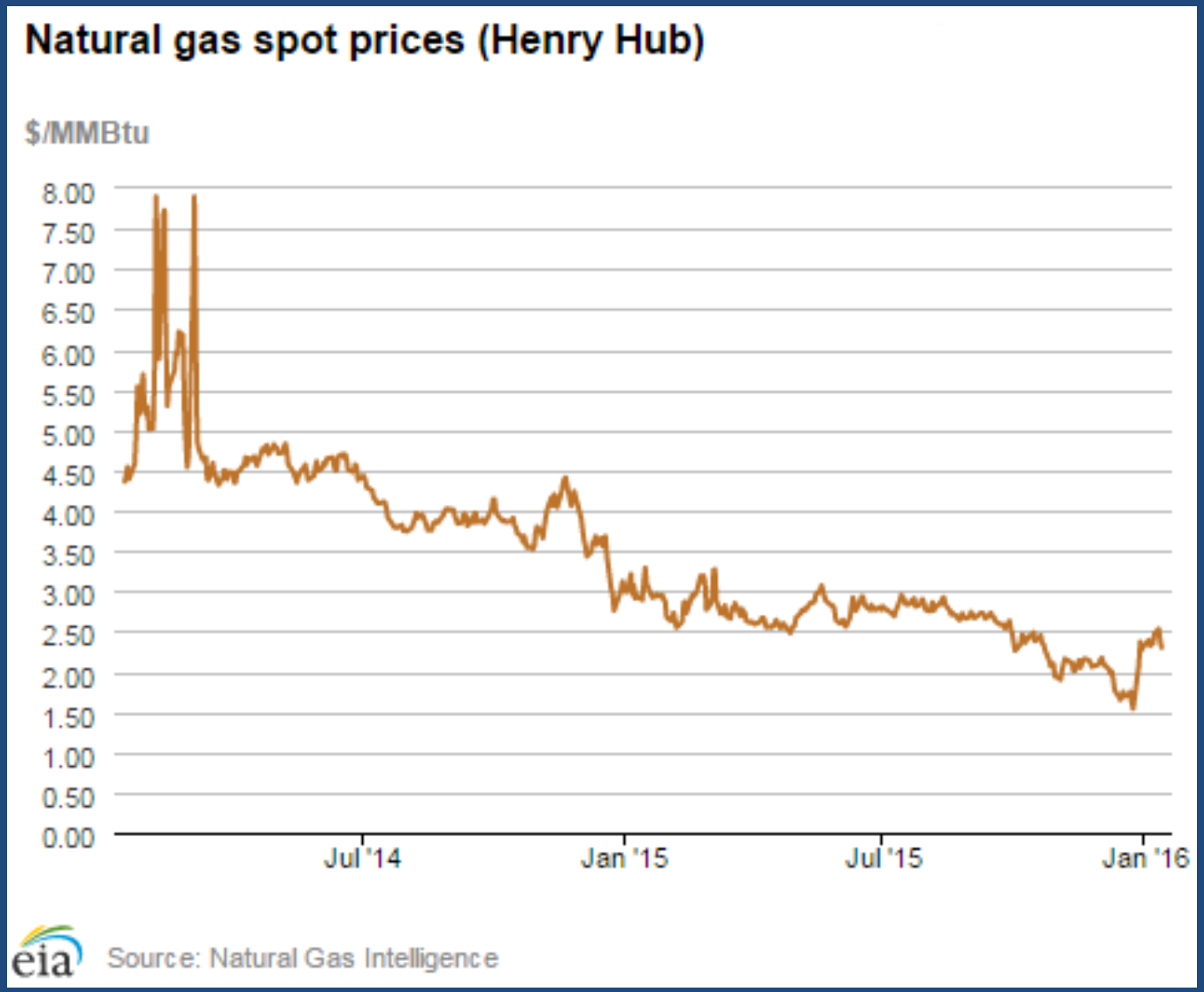
+ Global Economic Malaise = Supply Exceeds Demand

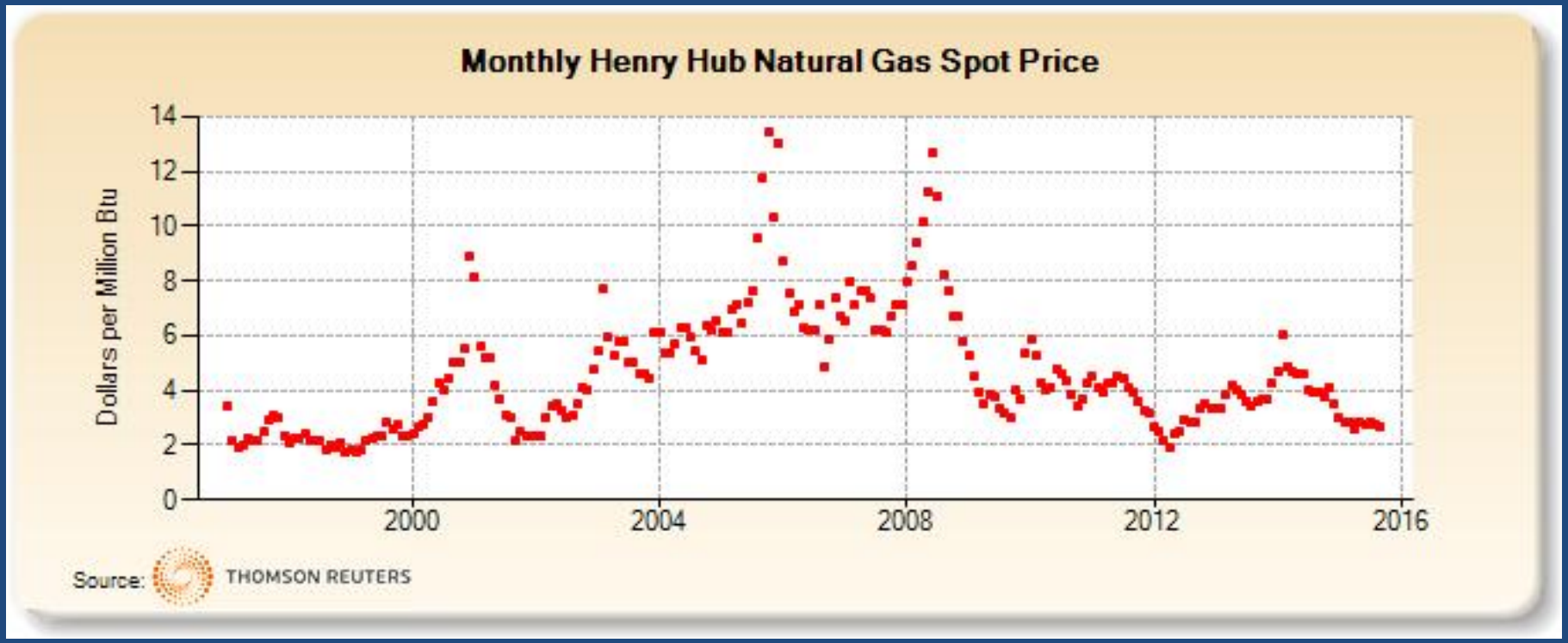
GLOBAL OIL SUPPLY / DEMAND 2009-2015



Incremental : 2-3 MMBO/day USA Shale Production
+ Russia + OPEC

ECON 101 : What Happens to Prices When Supply > Demand

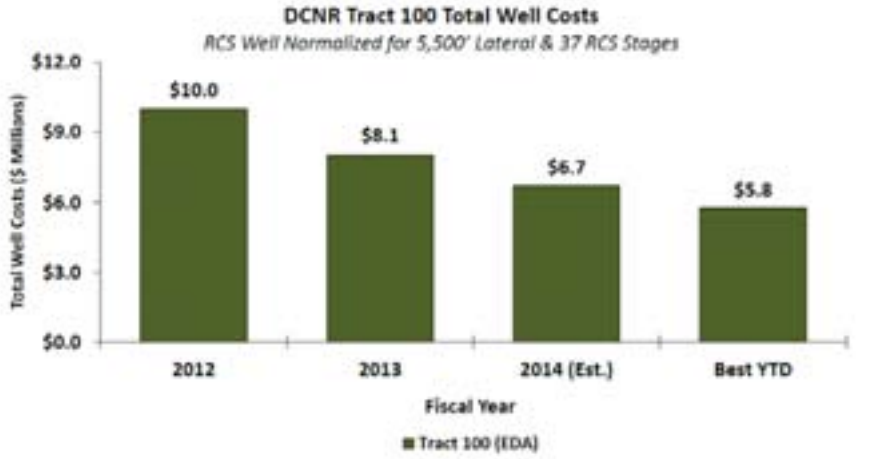

Natural gas spot prices (Henry Hub)
$/MMBtu
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul '14
Jan '15
Jul '15
Jan '16
eia
Source: Natural Gas Intelligence


Monthly Henry Hub Natural Gas Spot Price
Dollars per Million Btu
14
12
10
8
6
4
2
0
2000
2004
2008
2012
2016
Source:
THOMSON REUTERS

Seneca's Operations

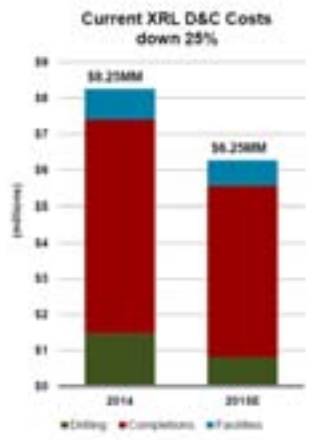
Driving Down Well Costs

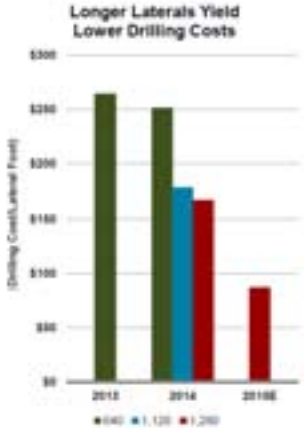
In 2014, total well costs are expected to be ~35-40% lower than 2012



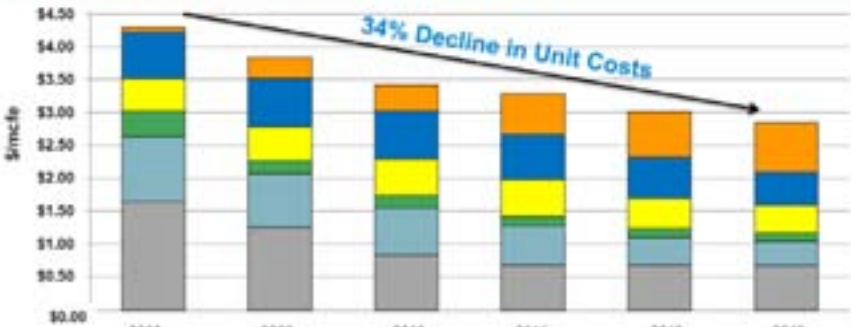
STAYING PROFITABLE BY CUTTING COSTS AND IMPROVING PRODUCTION EFFICIENCIES

Enhancing Cost Efficiencies





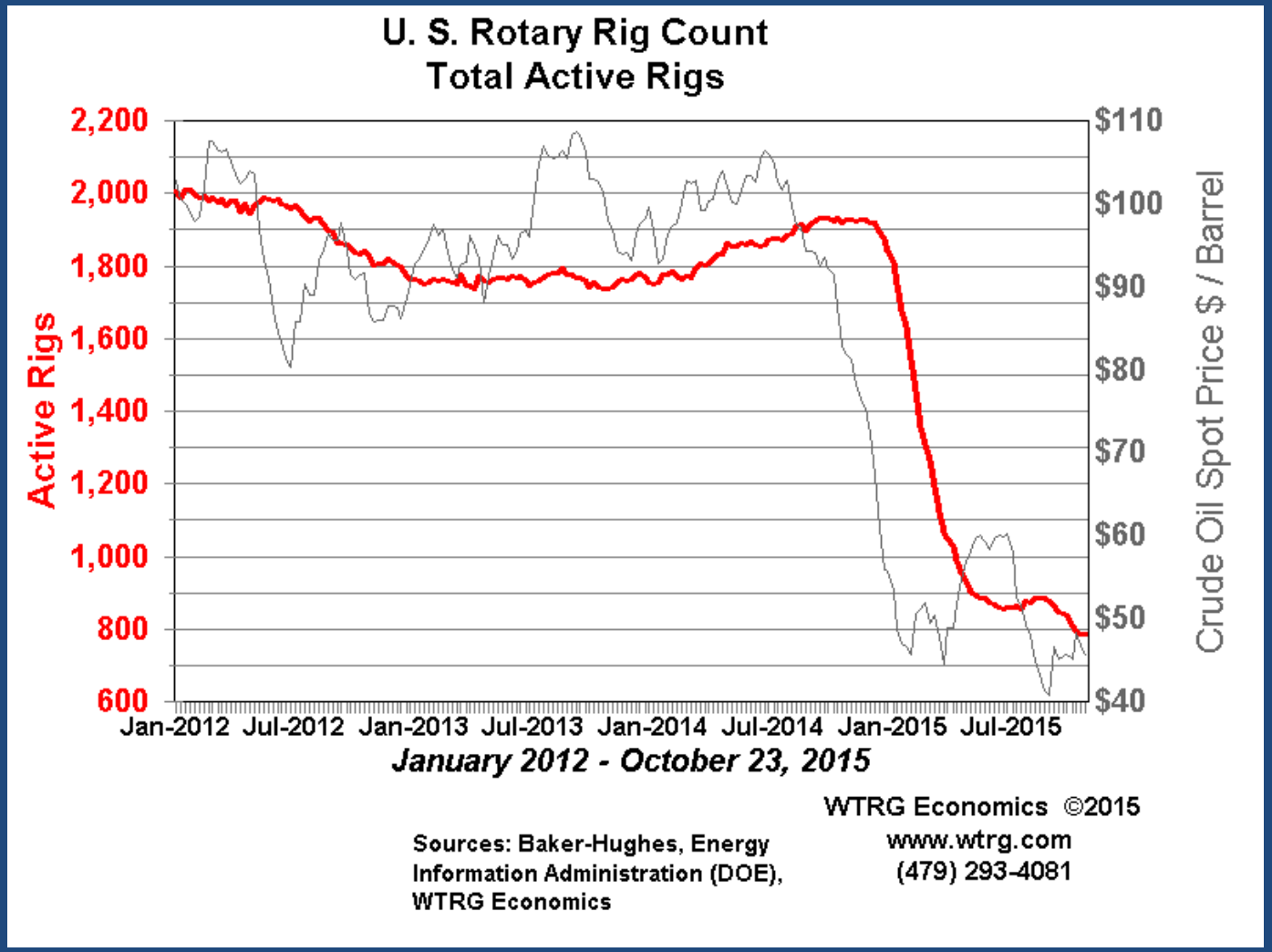
Unit Costs Are a Key Focus



	2008	2009	2010	2011	2012	2013
Reserve Replacement[1]	$1.64	$1.25	$0.93	$0.68	$0.68	$0.66
LOE[2]	$0.99	$0.82	$0.72	$0.60	$0.41	$0.37
Prod. taxes	$0.39	$0.20	$0.19	$0.14	$0.18[3]	$0.13
G&A[2]	$0.49	$0.51	$0.55	$0.56	$0.46	$0.42
Interest	$0.71	$0.74	$0.73	$0.69	$0.61	$0.51
Trans. & Gathering	$0.08	$0.32	$0.40	$0.62	$0.70	$0.75
Total	$4.30	$3.84	$3.42	$3.29	$3.01	$2.84

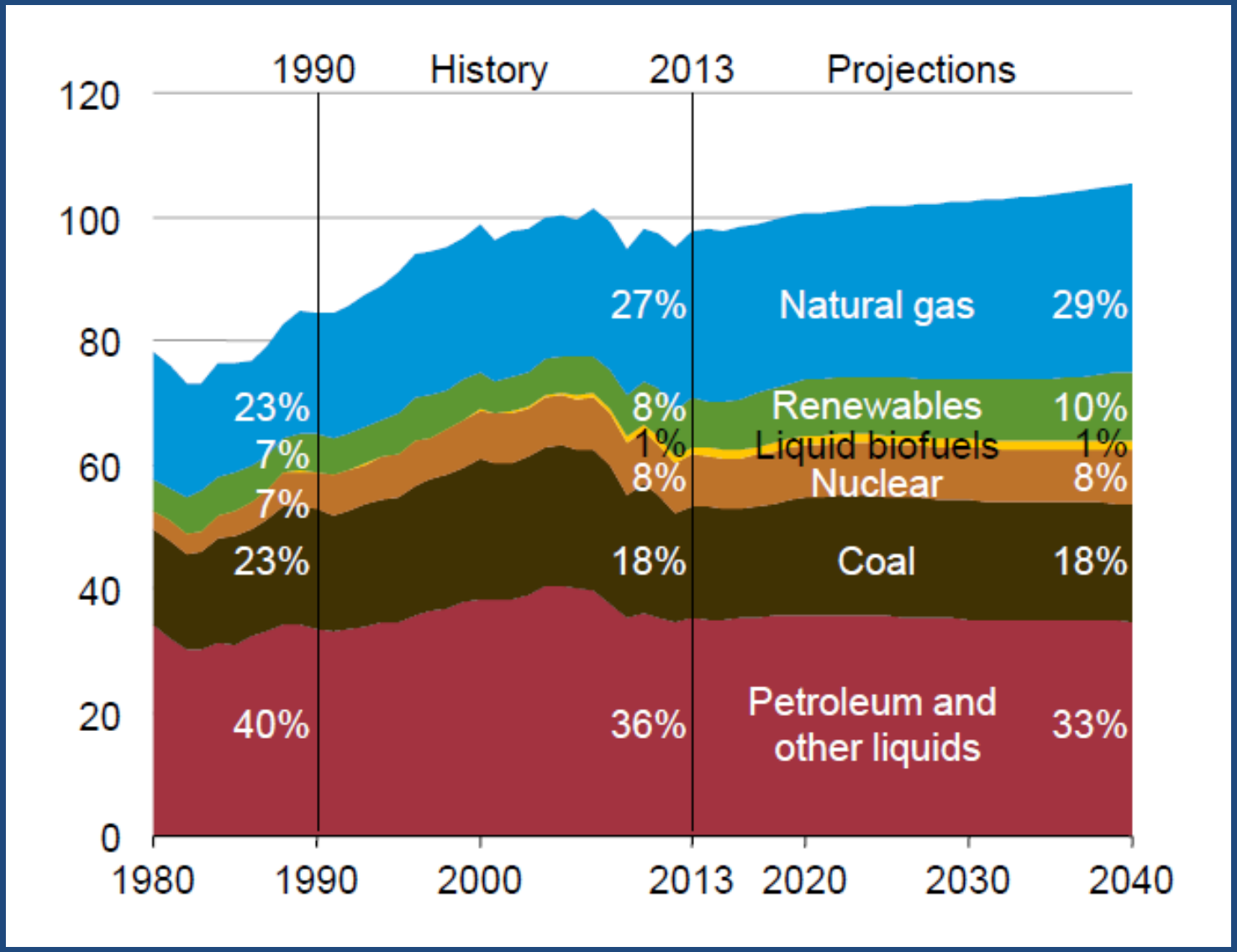
(1) Three-year average of unit bit F&D costs, excluding acreage. (2) Excludes non-cash stock compensation. (3) Excludes retroactive payments for P/L impact fee in 2012.

ACUTE PAIN IN OIL SERVICES



Jan. 15, 2016: Rig count @ 650 = 79% oil, 21% gas – 78% Horizontal (down 1026 from year ago)

PRIMARY ENERGY CONSUMPTION
BY FUEL IN THE REFERENCE CASE, 1980-2040 (Quadrillion BTU)



Source EIA 2015

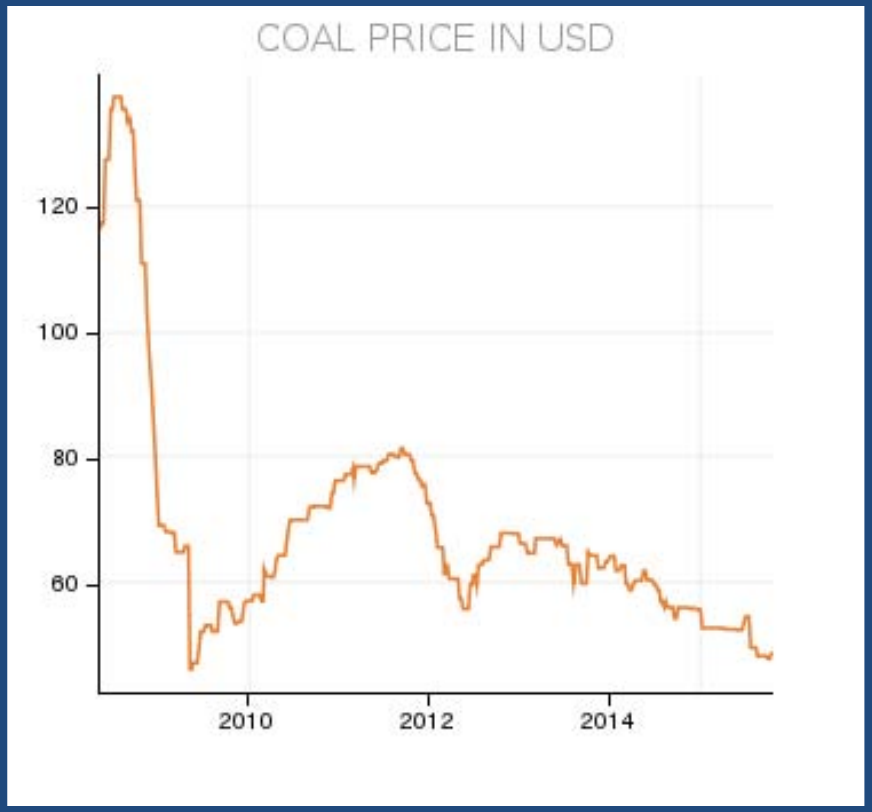
FOSSIL FUELS PROVIDE 80 % OF GLOBAL ENERGY

CANADIAN OIL SANDS

170 Billion Barrels Recoverable Reserves

Year	2008	2010	2015	2025
MMBO/day	0.1	1.5	2.2	3.7

COAL INDUSTRY WACKED HARD
(= EPA Clean Air Regs)



CENTRAL APPALACHIAN COAL PRICE $/SHORT TON @ 1-15-16 = $42.25/ton

Major Coal Companies Patriot Coal, Alpha Natural Resources, Walter Energy and Arch Coal file for Bankruptcy

Coal currently supplies 39% of USA Electricity Generation, down from 53% in 1997

ENVIRONMENTAL ISSUES WITH COAL

Emissions of SO_2, NO_x, Hg, Soot

Acid rain
Smog – increase is health issues like asthma
Mercury pollution
Now..... CO_2 _ global warming, ocean acidification

Decline of coal due more to EPA Regulatory measures than macroeconomic factors:

Clean Air Act of 1970,
Cross-State Air Pollution Rule (CSAP)
EPA Mercury and Air Toxics Standards (MATS),
President Obama's Clean Power Plan of 2015

REDUCING OUR CARBON FOOTPRINT = RENEWABLE ENERGY

> Scale = less $

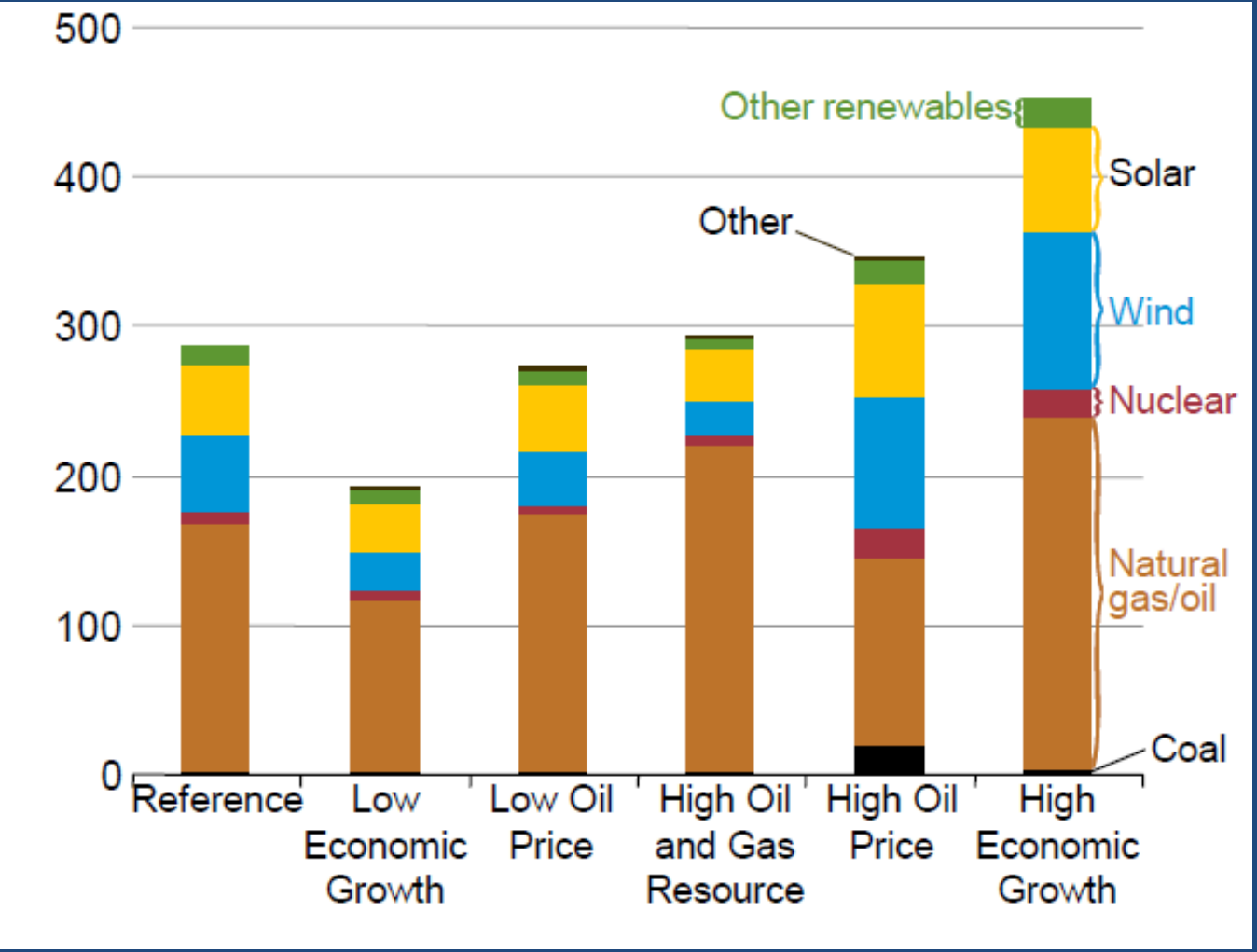
24 MW "run-of-river" Hydroelectric plant


GREEN ENERGY IS NOW
BIG BUSINESS!
2014 global investment in renewable energy
@ US$ 270.2 Billion
USA Employment in wind and solar industries
@ 258,000 vs coal @ 174,000

Nuclear is a good solution if not in earthquake zones, flood plains, or near Sea level!

..And a waste fuel site is Finally sanctioned.
(*Spent fuel can be recycled and/or stored safely*)

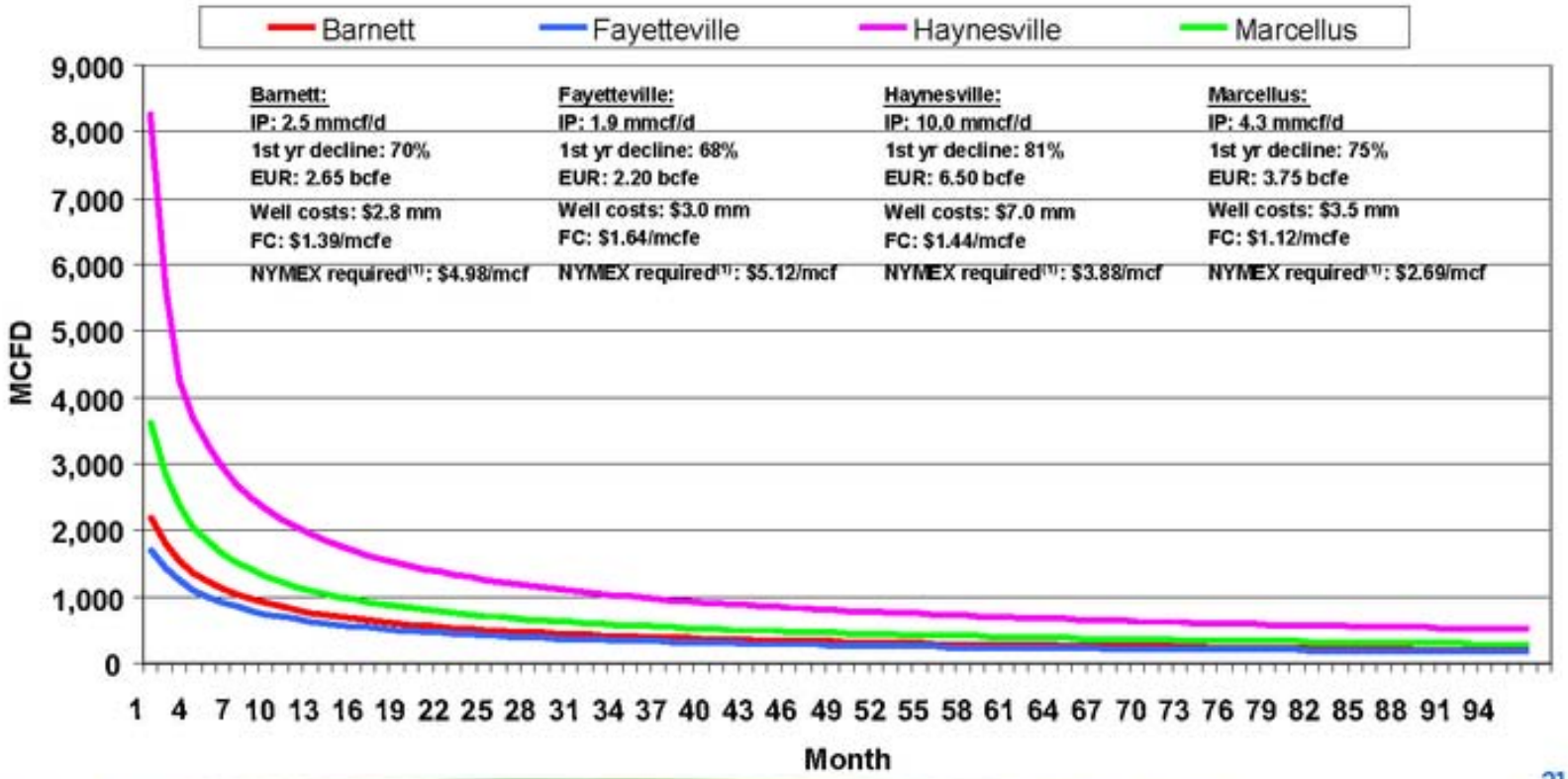
Cumulative Additions to Electricity Generation Capacity by Fuel in six cases 2013-2040



Source: EIA 2015


SO WHEN WIL THE ENERGY ECONOMY TURN AROUND?
And What will be the drivers?

Major Shale Type Curves



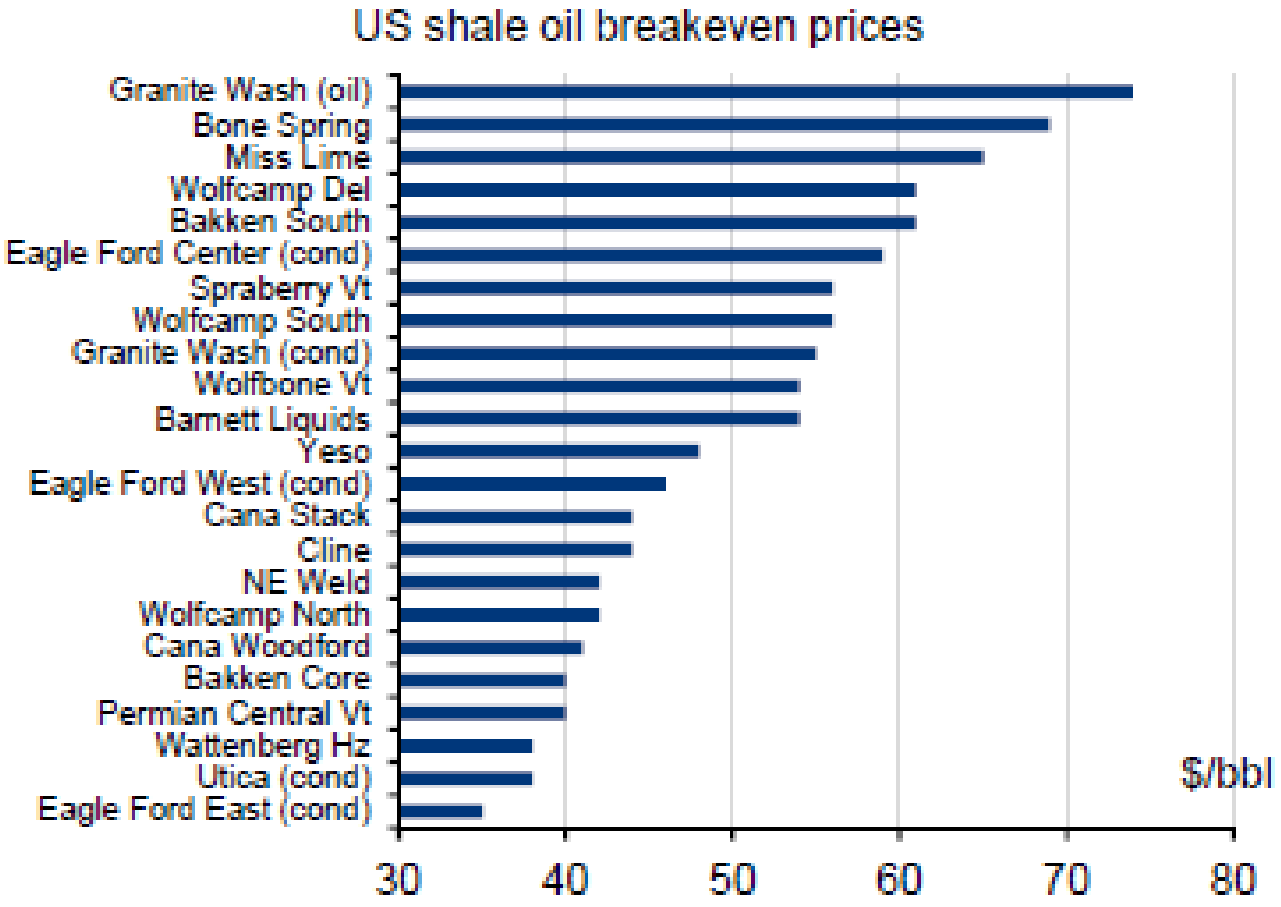
Chesapeake ENERGY

Pre-leasehold pro forma finding costs range from $1.12-$1.64/mcfe

(1) NYMEX natural gas price required to generate a pre-tax 10% rate of return

•Risk disclosure regarding unproved reserve estimates appears on page ii of the meeting presentation package

Chart 15: The highest cost producers in the Permian start to feel the pain by not being able to cover their costs



Source: BofA Merrill Lynch Global Commodities Research

USA PRODUCTION NOW IN DECLINE

Impact of price drop on drilling rig count

Week of 6/5/15Production peaked at 9.61 mmbo
Week of 1/08/16 @ 9.226 mmbo

There were a lot of wells
not completed or tied in!

But…..EIA does not project significant decline

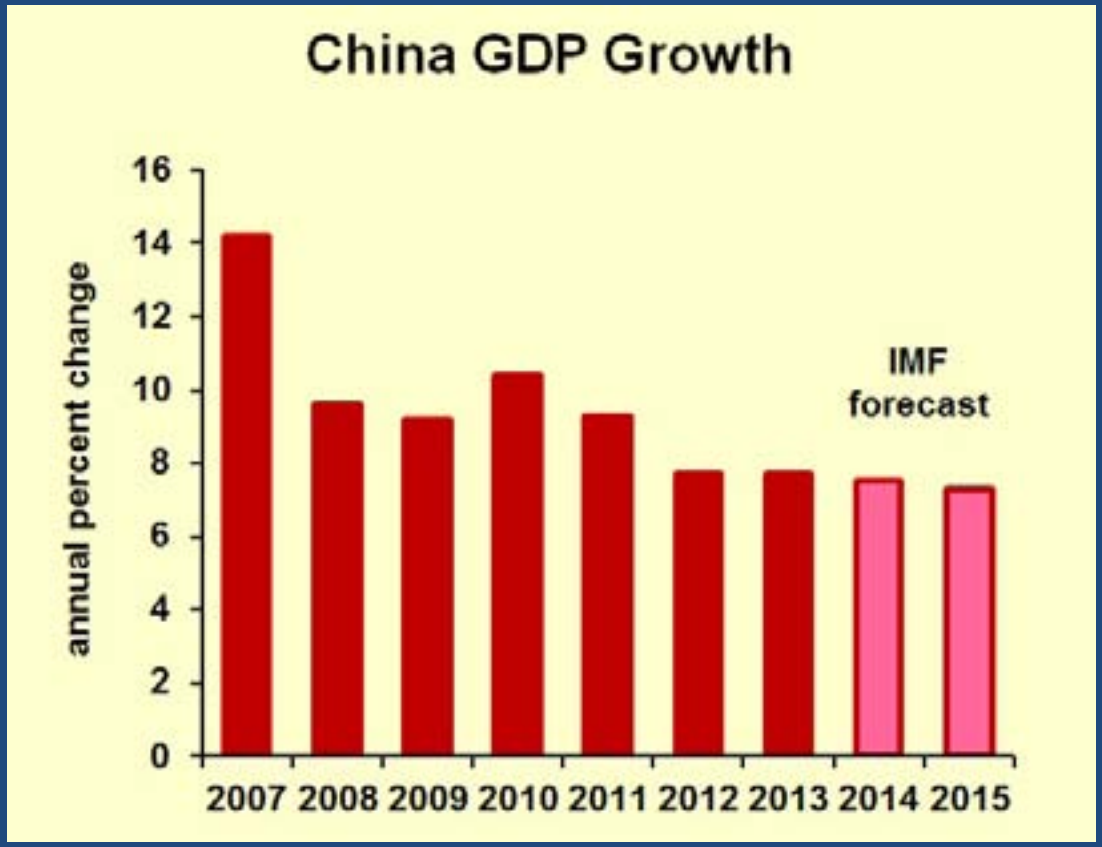
USA EXPORTS OF CRUDE AND NATURAL GAS WILL EASE STORAGE CRUNCH

LNG PROJECTs - Cheniere and Dominion

Congress approved export in 2016 Funding Bill

CHINA'S ECONOMIC GROWTH DECLINES TO 6-YEAR LOW

CHINA IS THE PRIME MOVER NOW ON GLOBAL GROWTH



Chinese auto sales Exceed USA!

But don't forget the other BRIC nations,
They have entered the consumer age too!

Increased demand for energy requires
A growing and healthy global economy.

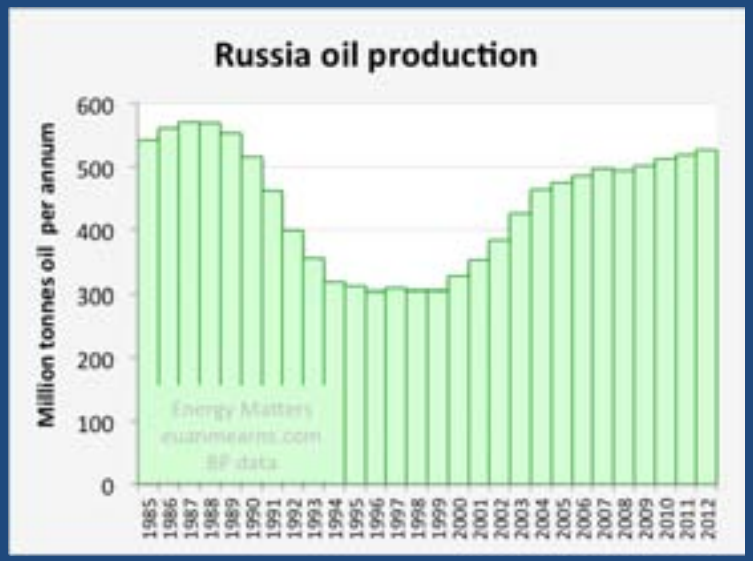
SAUDI ARABIA TO RUN OUT OF CASH IN LESS THAN 5 YEARS
$700 Billion "war chest" shrinking fast at $50/BO

OIL PRICE NEEDED TO BALANCE BUDGETS

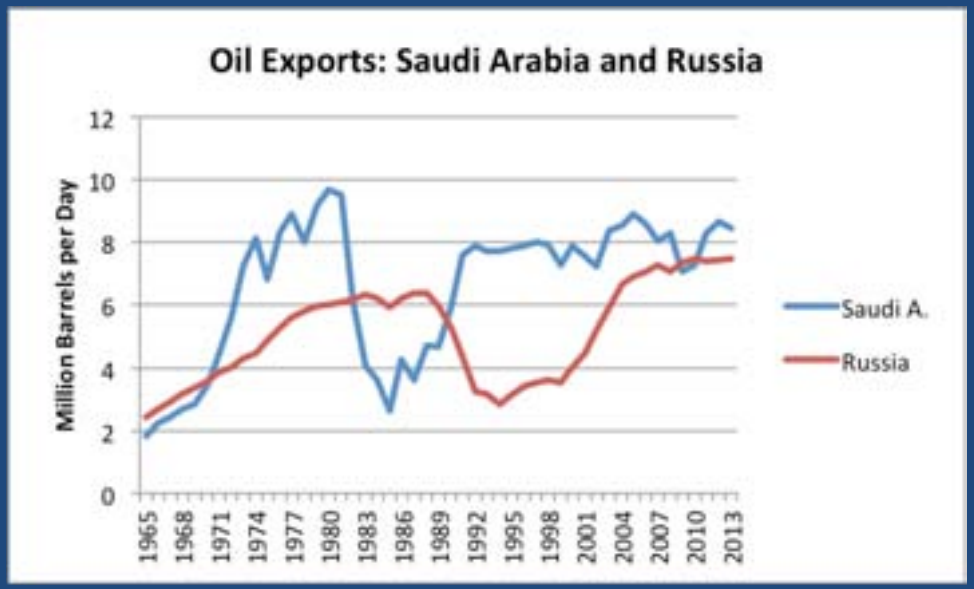
Saudi Arabia @ $106, Iraq @ $81, UAE @ $73, Iran@ $72,
Kuwait @$49 (IMF estimate)

OIL PRICES =
WHAT THESE MEN DO
TO RESOLVE THEIR DIFFERENCES

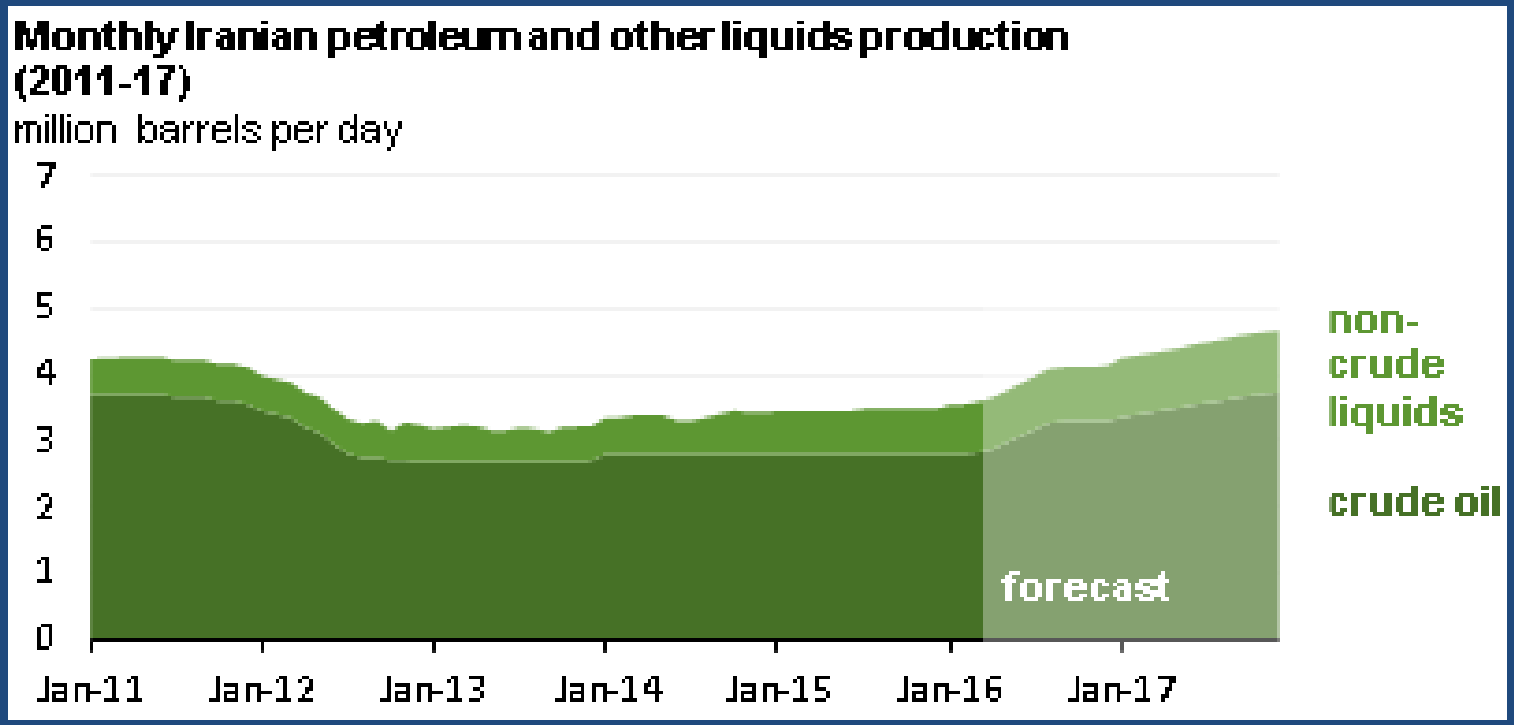
WILL OPEC AND RUSSIA REDUCE OUTPUT ???



Russian production is flat out as GDP declines.



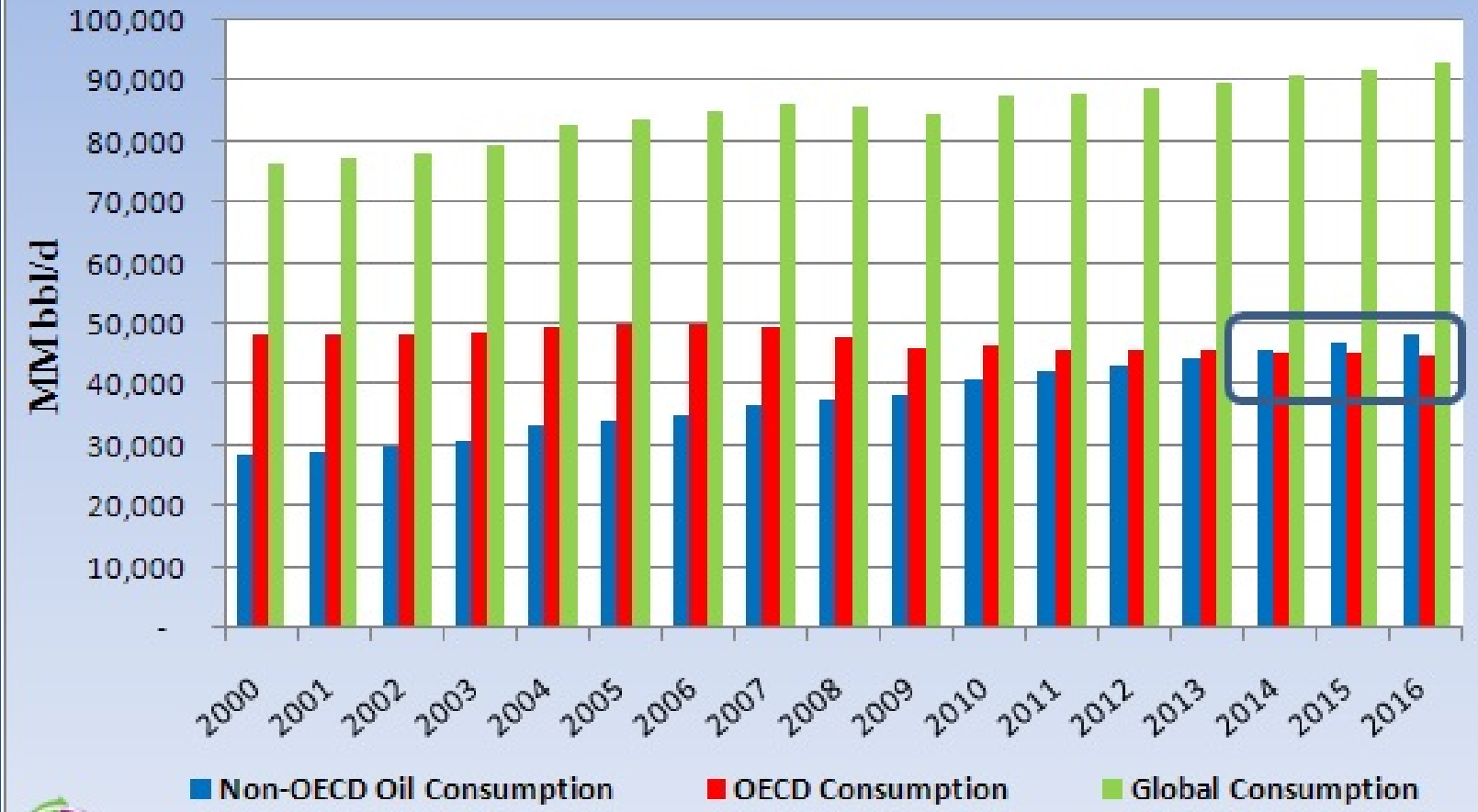
IRANIAN OIL PRODUCTION



Source: EIA

Iran = ? +1-2 mmbo/day exports into an already Glutted market.

By 2014 Non-OECD Consumption will Surpass OECD Demand



EnergyTrends INSIDER

FUEL EFFICIENCY STANDARDS

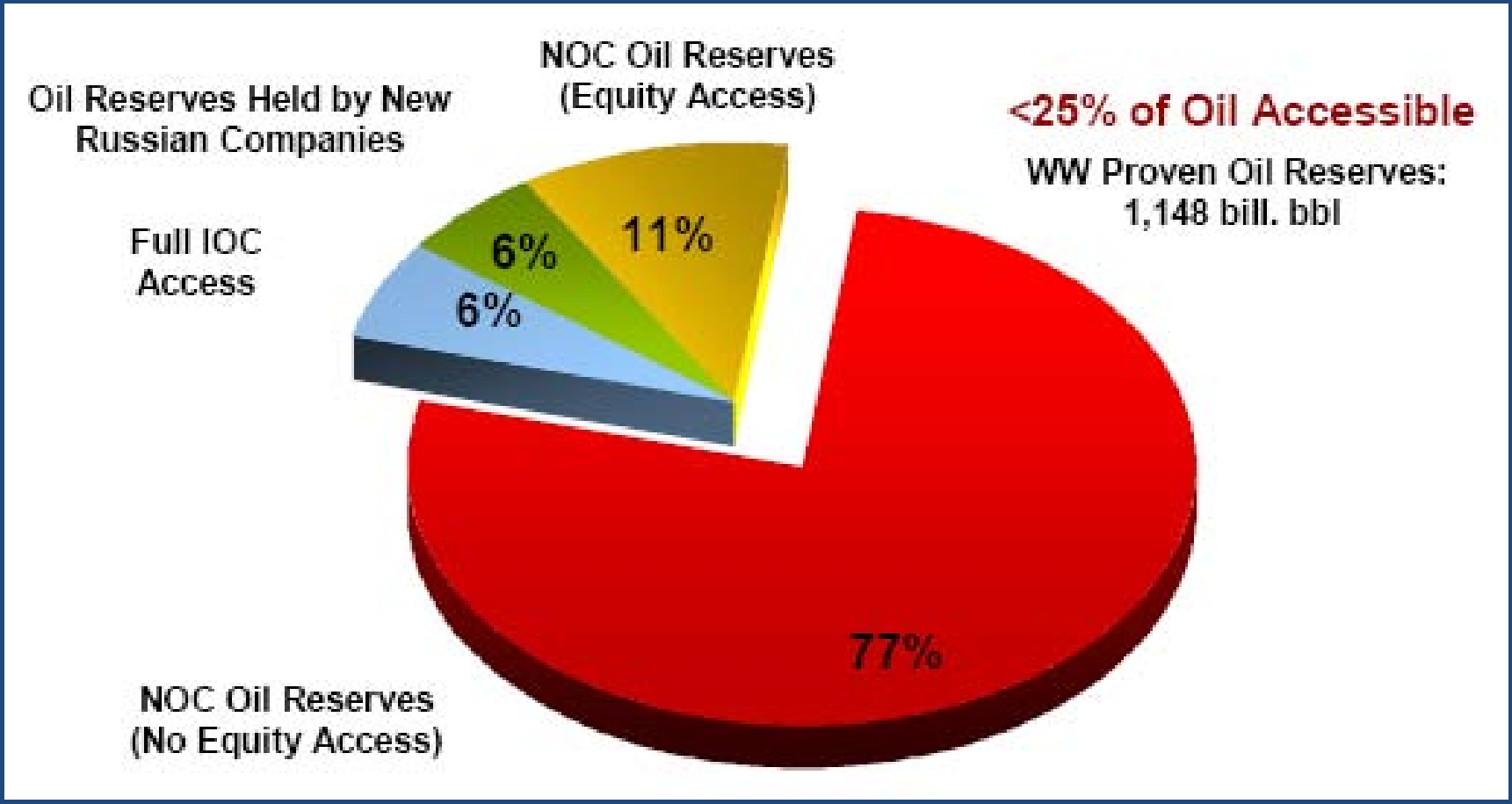
Sixty-four percent of a barrel of crude oil is refined to gasoline and diesel fuel.

Over the next 15 years, U.S. fuel economy standards will almost double to a fleet average of 54.5 miles per gallon.

This will have a significant impact on demand.

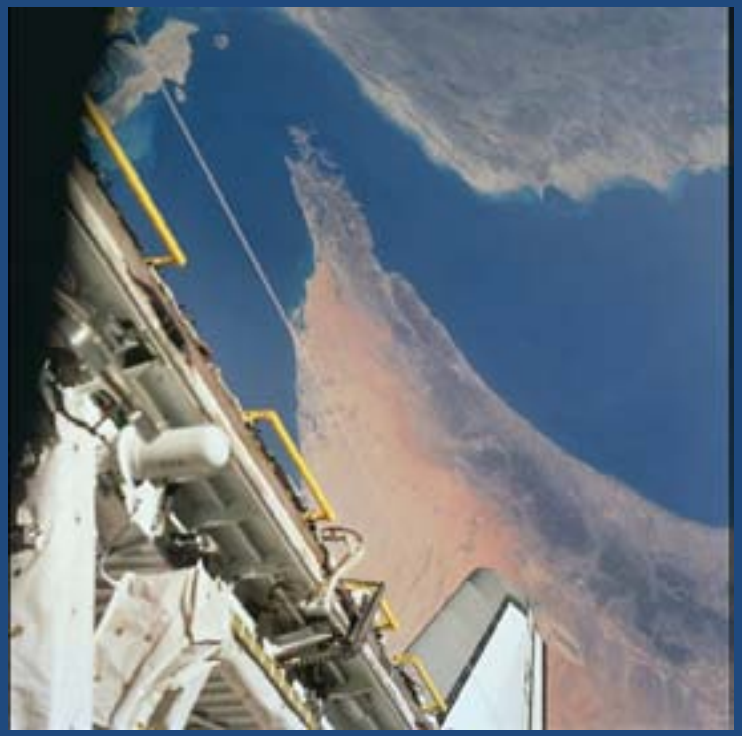
Global petroleum demand will be moderated by Greater fuel efficiencies. Electric cars?

Control of Proven Oil Reserves



Source: AAPG after PFC Energy

CLOSING OF THE STRAIT OF HORMUZ
= Price Volatility on Steroids!



35% of global petroleum moved by takers (= 20% of total crude sales) passes through the straits daily.

Narrowest point = 29 miles!

Iran is watching (but so is the USN).

Supply / demand Vulnerability… The Weather

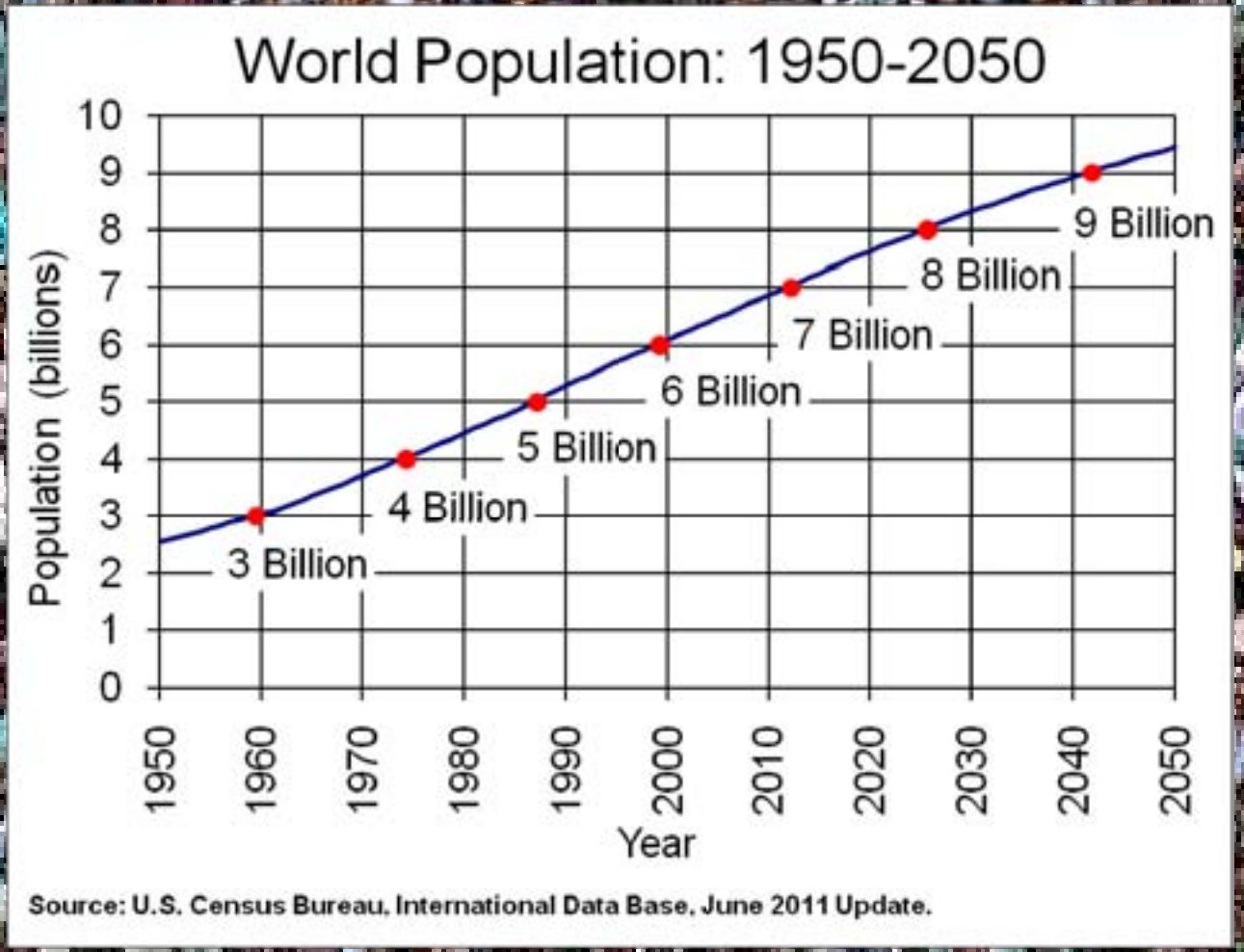
Hurricane Katrina Knocked out 700,000 BO and 3.6 Bcf per day Gulf production
Domestic oil and gas prices spiked as a result

ENERGY AND CLIMATE CHANGE

Cheap and abundant fossil fuels
have energized America
And the world's economies.


However, we now know that
there is an environmental price.....
The business model must
change for the
good of planet earth.

THIS IS THE GREATEST FACTOR DRIVING GLOBAL CHANGE

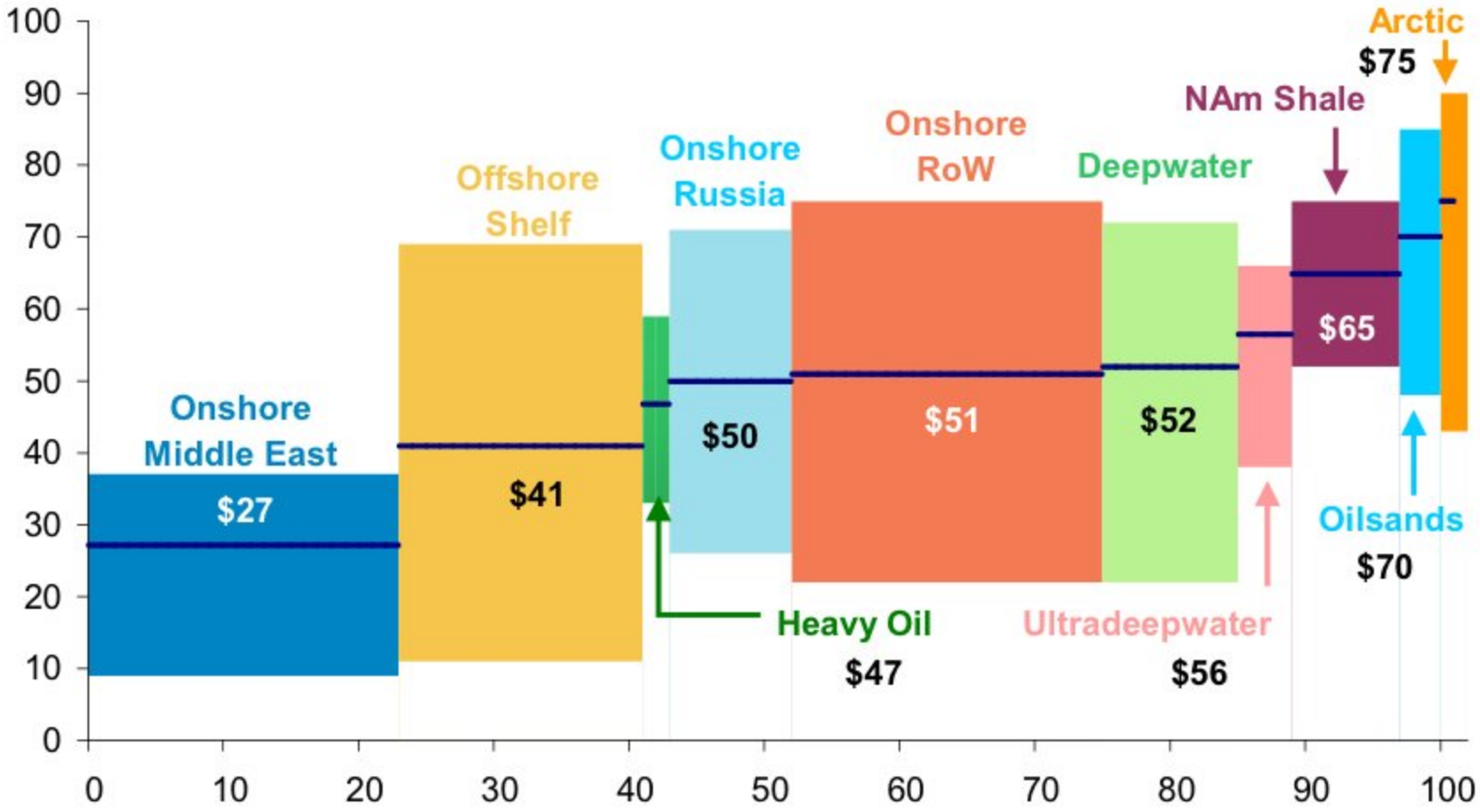


7.3 Billion @ Jan 1, 2016 !

MAGNUM PHOTOS

Crude Cost of Production Rises as Demand Grows

(x-axis: total liquids production; y-axis: avg Brent-equivalent breakeven price*, $/bbl)



Source: Rystad Energy, Morgan Stanley Commodity Research estimates

SUPPLY CHALLENGES

Global oil production decreases 3.5 MMBO/day/year through natural decline. This must be replaced to stay even with demand!

THE FUTURE OF THE GLOBAL OIL INDUSTRY

There are huge remaining oil and gas resources discovered, and yet to be discovered, but…….. there are

Significant challenges for balancing supply and

demand growth.

CHALLENGES….
Beyond the Rocks

- Hostile Operating Environments
- Geopolitical Environments
- Regulatory Environments
- Commodity Price Volatility
- Capital & Operating Cost Volatility
- Lack of trained professionals may delay projects
- Energy Policy conflicts

EIA FORECASTS

The future is so uncertain and volatility so severe, that EIA has multiple case scenarios

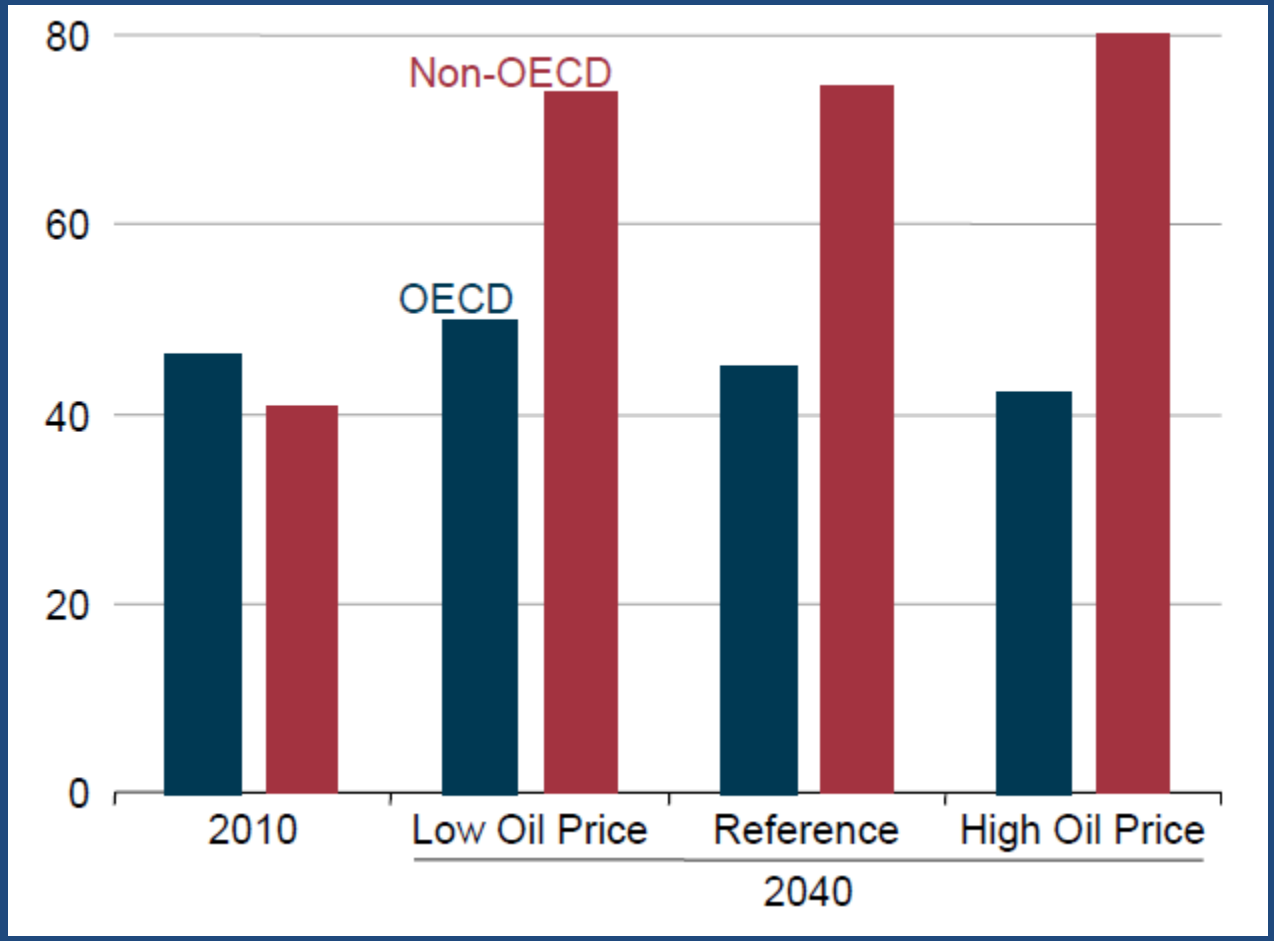
2015 EIA REFERENCE CASE

Crude Oil increases from $$56/BO in 2015 to $80 in 2020 then increases to $141 in 2040

Natural Gas price increases from $3.69/mmbtu in 2015 to $7.85 in 2040

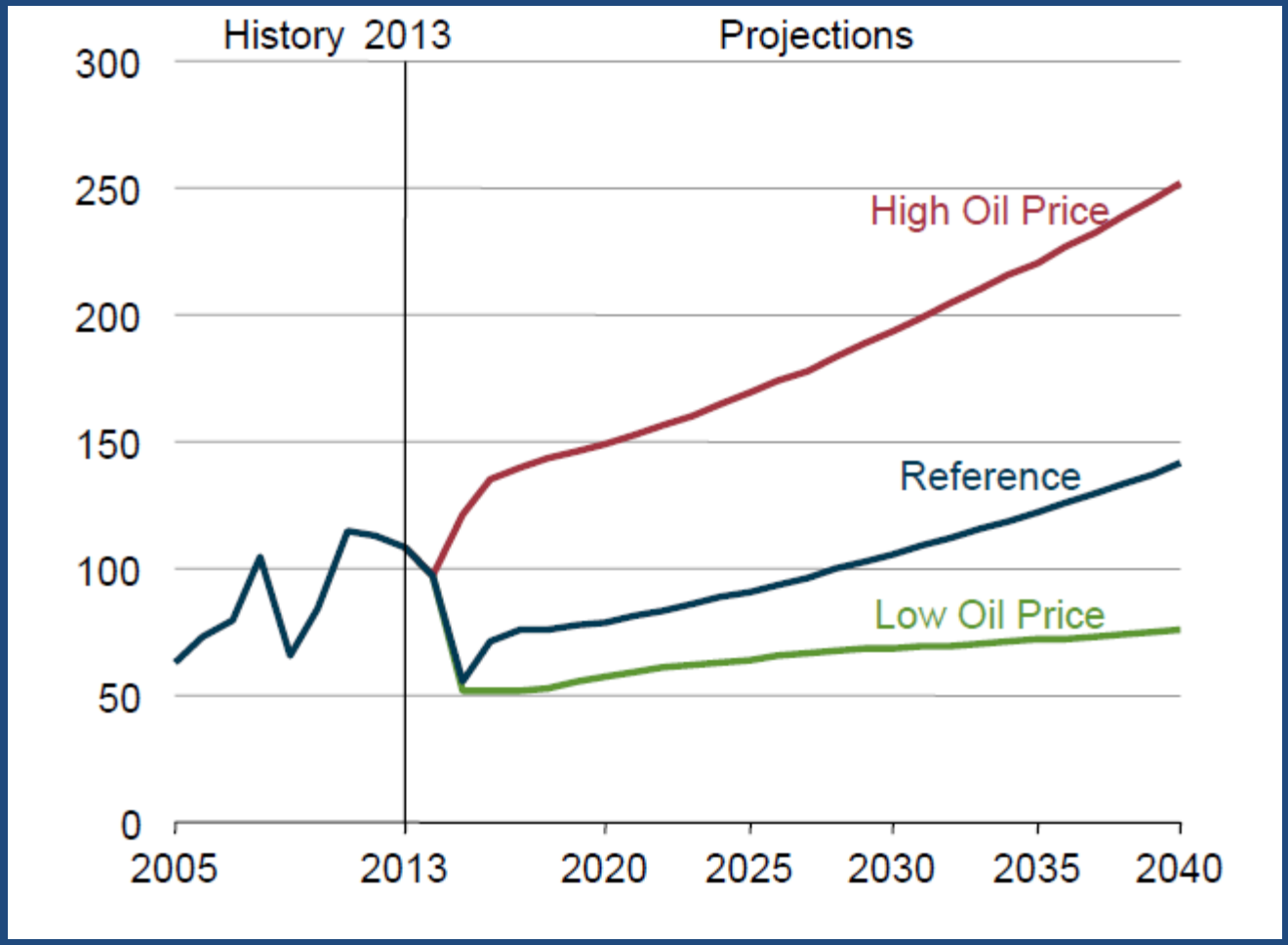
Jan. 12, 2016 Revision: Forecast WTI @$37/bbl in April 2016

World Petroleum Consumption- Three Cases
Mmbo/day



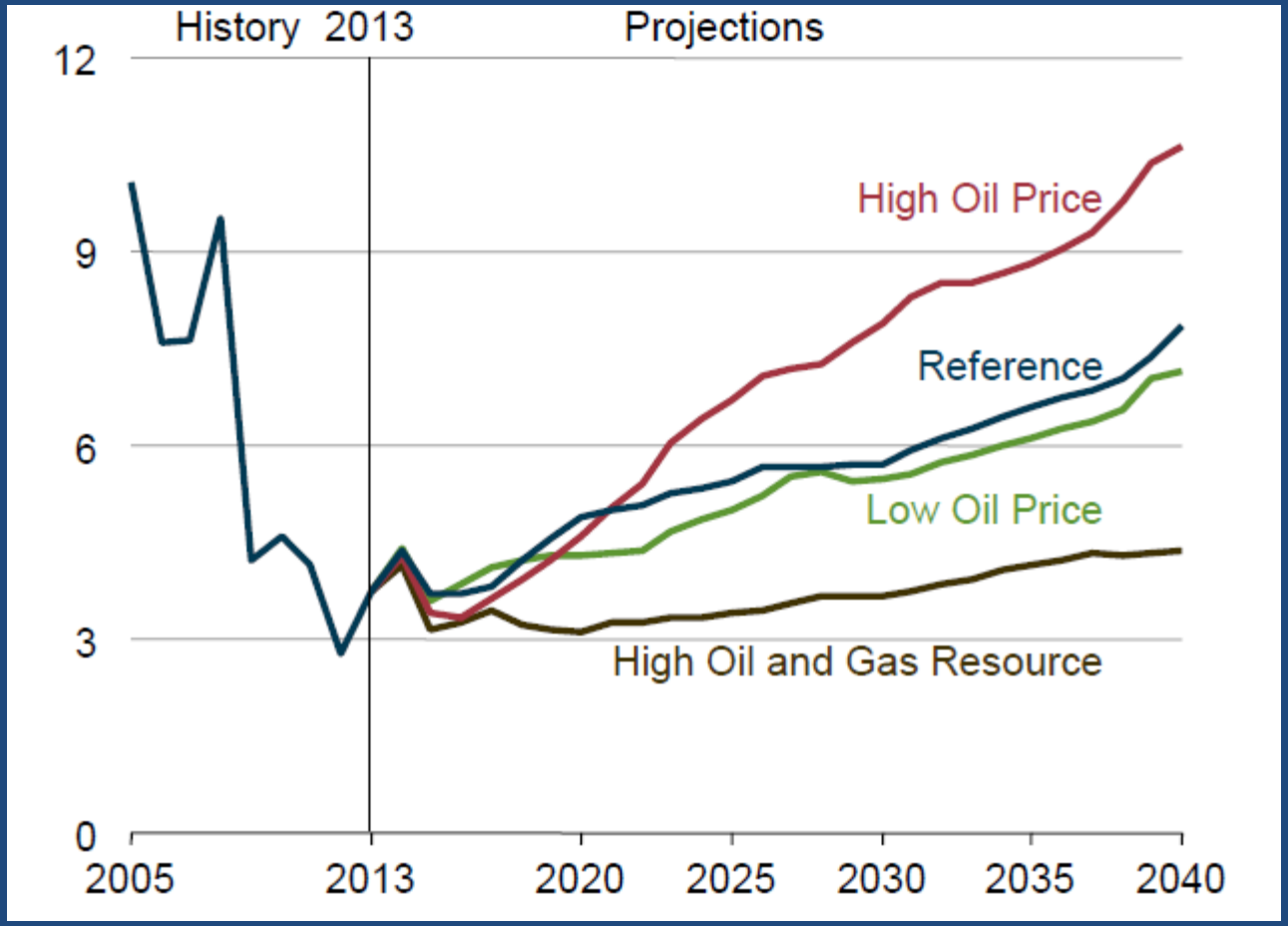
EIA 2015

North Sea Crude Oil Prices in Three Cases 2005-40 ($2013/BO



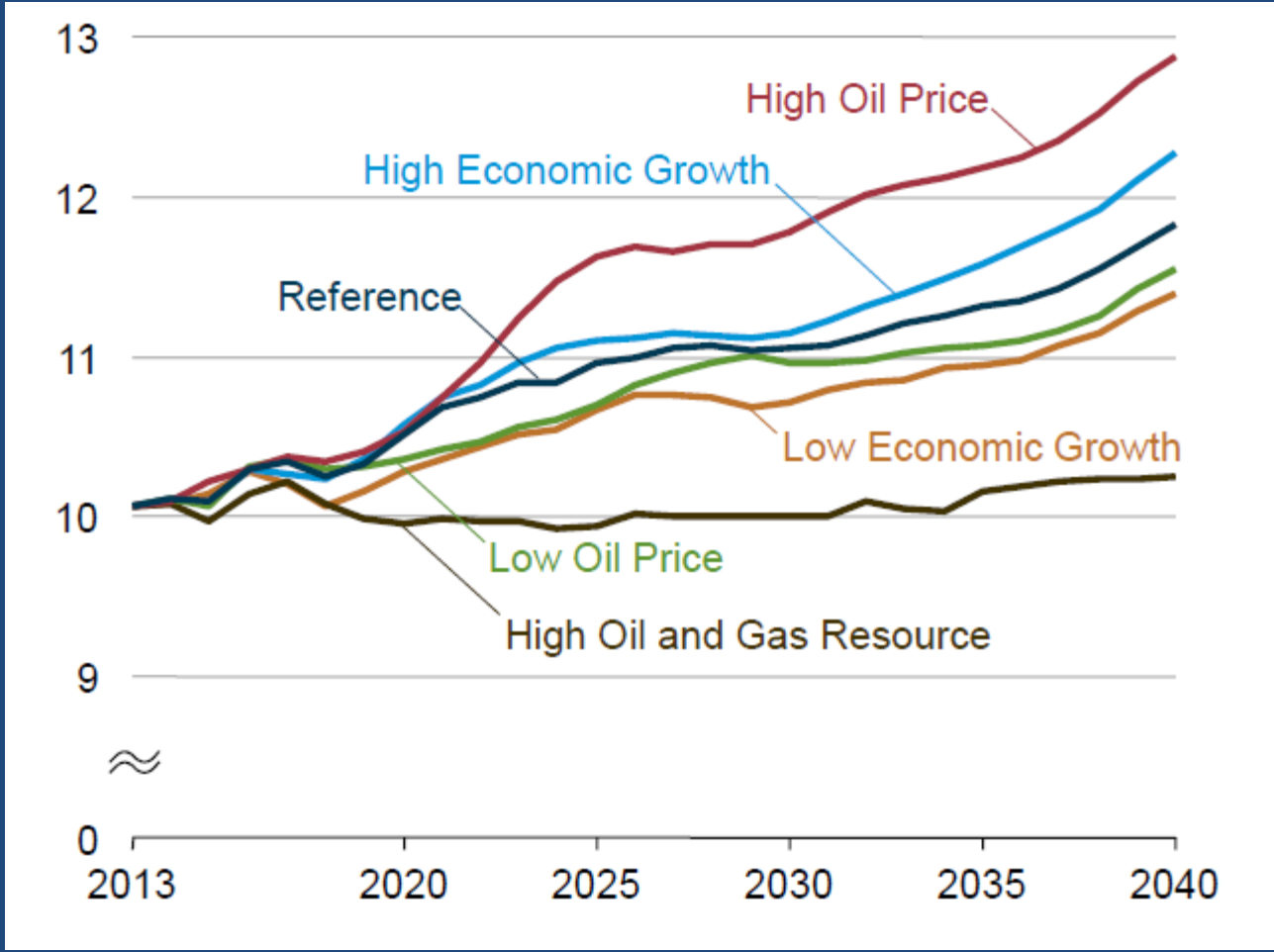
Source: EIA 2015

Average Henry Hub Spot Prices for Natural Gas in Four Cases 2005-40 (2013 $/mmbtu)



Source: EIA 2015

Average Retail Electricity Prices in Six Cases 2013-40 (2013 cents/kwh)



Source: EIA 2015


WHAT IS SKIP'S
PRICE FORECAST?

There are simply to many variables at play to have any confidence in future price forecasts.

$20 or $70 ?????

But…… $30-40/barrel is simply unsustainable economically and politically.

Will OPEC blink? Russia? US Producers? When???

Will OPEC allow Venezuela and Nigeria to go bankrupt?

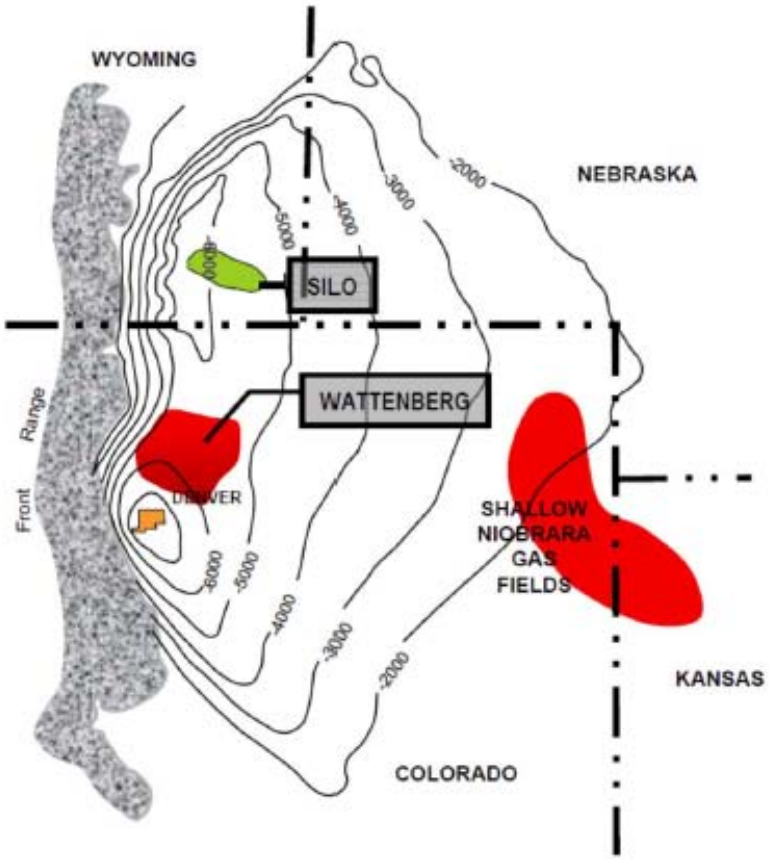
Prices will rise sharply if Saudi Arabia and Russia cut Production by just 5%.

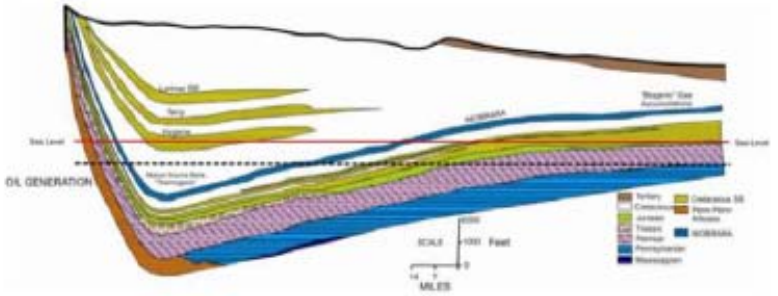
Prices will continue to fall if Iran also floods the market.

This too will pass,
markets will be back in balance
by year-end 2016, if not sooner.


WHAT DOES A
NEW DRILLING DEAL
LOOK LIKE
IN THIS
PRICE ENVIRONMENT ?
(... and that has deteriorated since
we did the analysis in October)

Denver-Julesburg Basin Structure

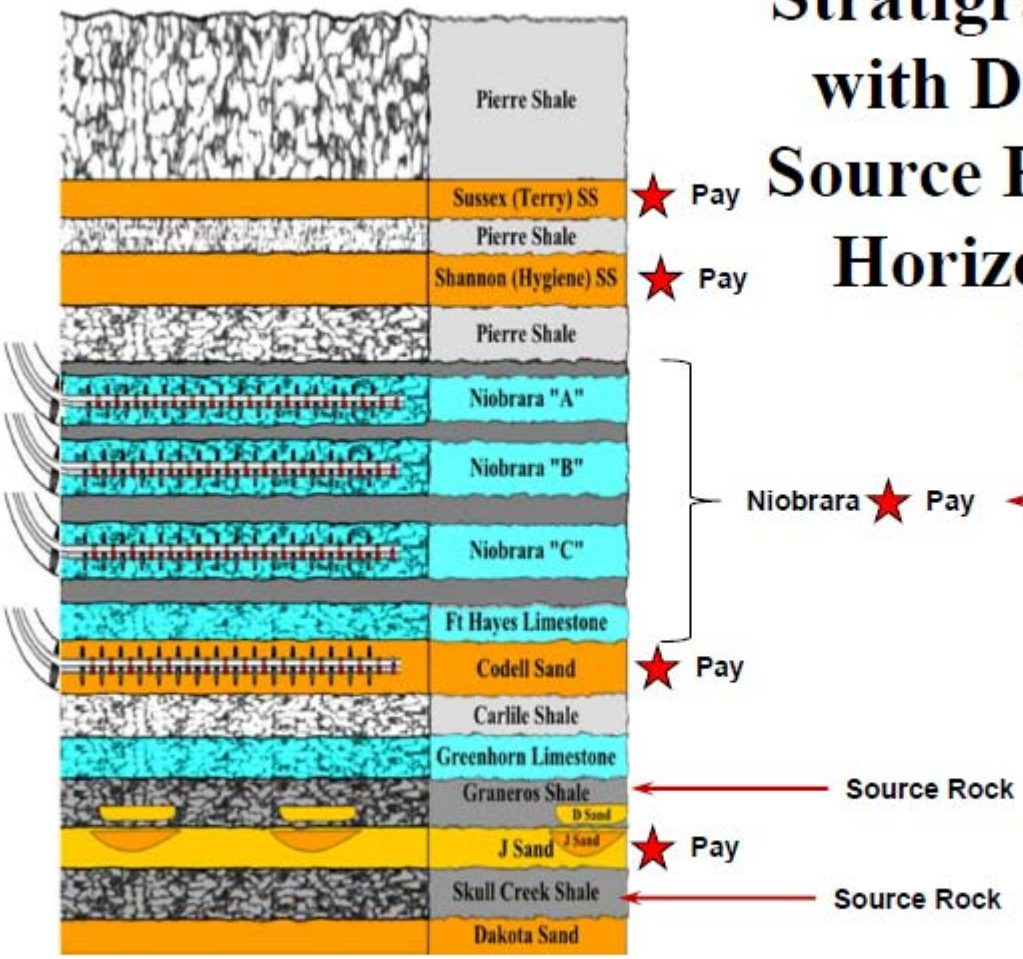




Stephen A. Sonnenberg
Colorado School of Mines

Figure 2

Stratigraphic Column with DJ Pay Zones, Source Rocks and and Horizontal Target Zones

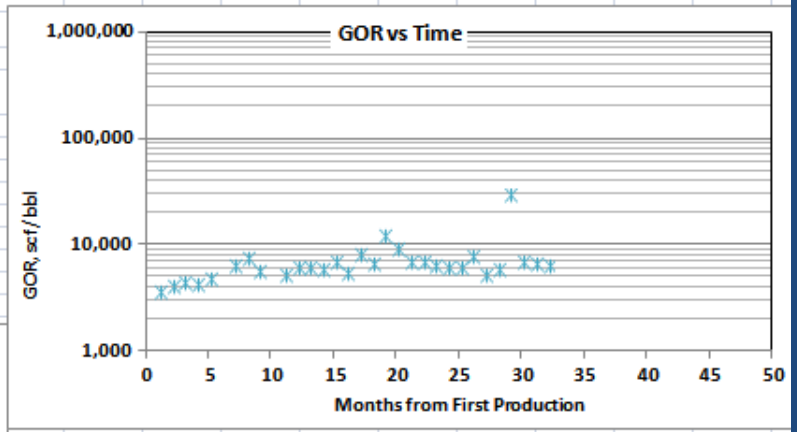


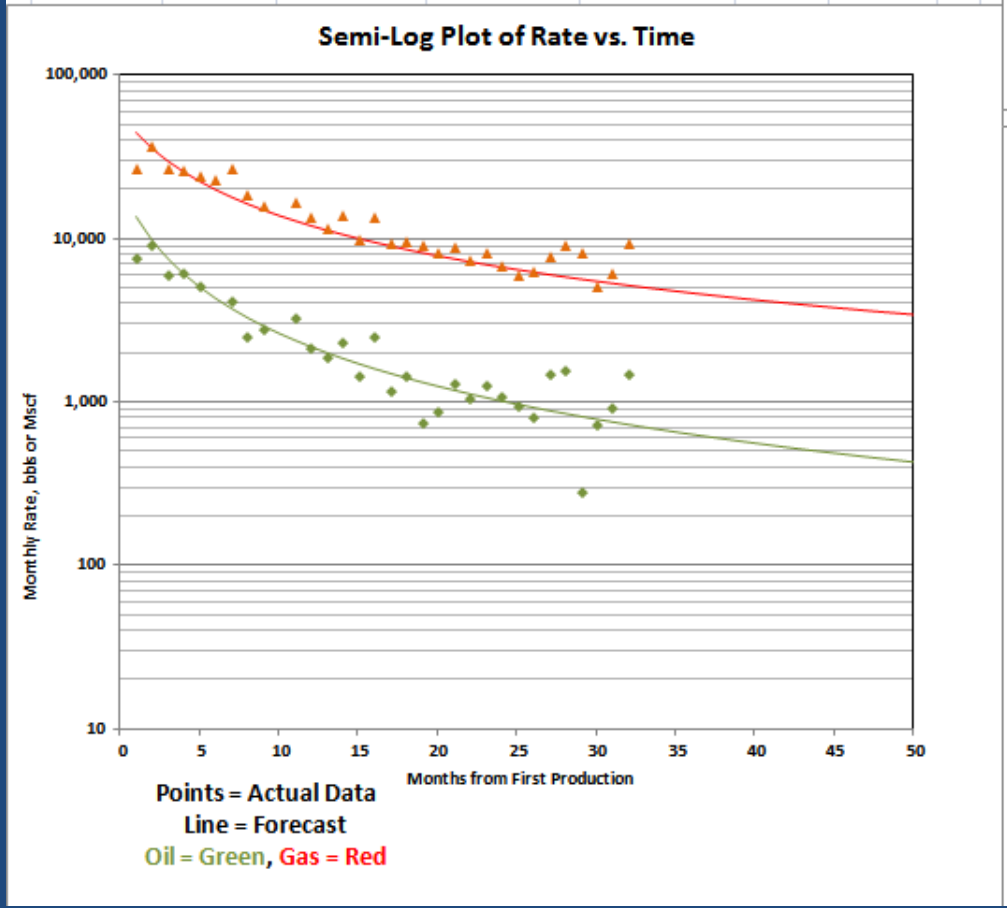
Example of Decline Curve Analysis

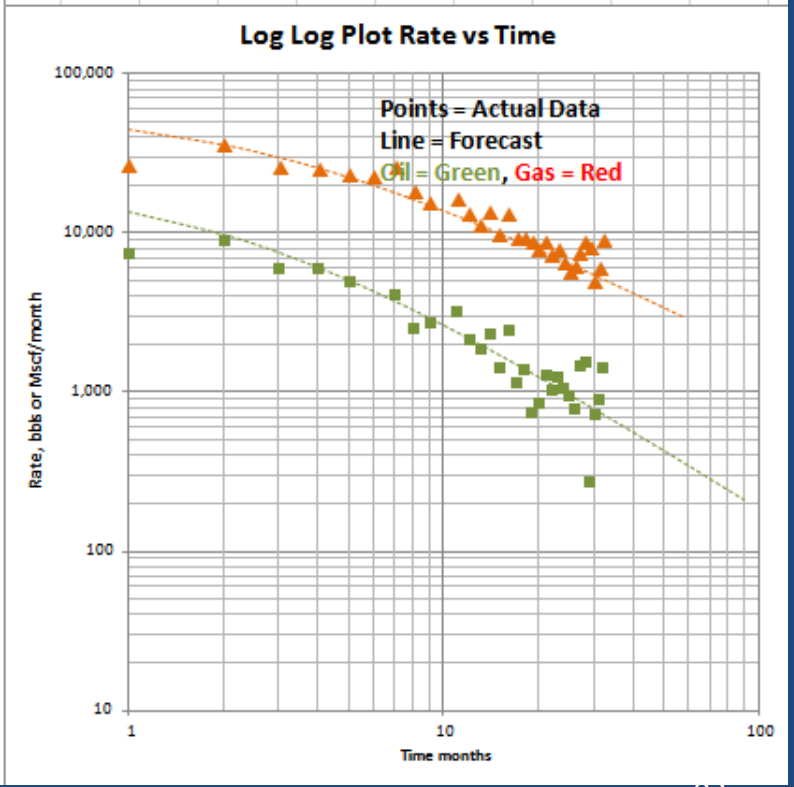
35769 Lorenz F 22-69HN

GOR = 5,824 scf/bbl
based on cumulative

No Terminal Decline	Terminal Decline = 8%	No Terminal Decline		
Oil, bbl				
Remaining Reserve =	38,566	38,863	Di =	4.5
Cumulative Production =	73,765	73,765	b exponent =	0.8
EUR =	112,331	112,628		
Gas, Mscf				
Remaining Reserve =	375,417	427,664	Di =	3.0
Cumulative Production =	429,641	429,641	b exponent =	1.0
EUR =	805,058	857,305		







PRICE DECK USED FOR AMMONITE ANALYSIS 10-15-15

NYMEX Prices on 10/15/15			Low Price Case		High Price Case	
Year	Oil, WTI, $/bbl	Gas, Henry Hub, $/MMBtu	Oil, WTI, $/bbl	Gas, Henry Hub, $/MMBtu	Oil, WTI, $/bbl	Gas, Henry Hub, $/MMBtu
2016	$ 50.86	$2.85	$ 50.00	$ 2.75	$ 60.00	$ 4.00
2017	$ 53.79	$3.03	$ 50.00	$ 2.75	$ 70.00	$ 4.00
2018	$ 56.01	$3.09	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2019	$ 57.78	$3.14	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2020	$ 59.07	$3.26	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2021	$ 59.73	$3.40	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2022	$ 60.22	$3.56	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2023	$ 60.67	$3.71	$ 50.00	$ 2.75	$ 75.00	$ 4.00
2024	$ 61.00	$3.75	$ 50.00	$ 2.75	$ 75.00	$ 4.00

IRR for Single Niobrara Horizontal Well

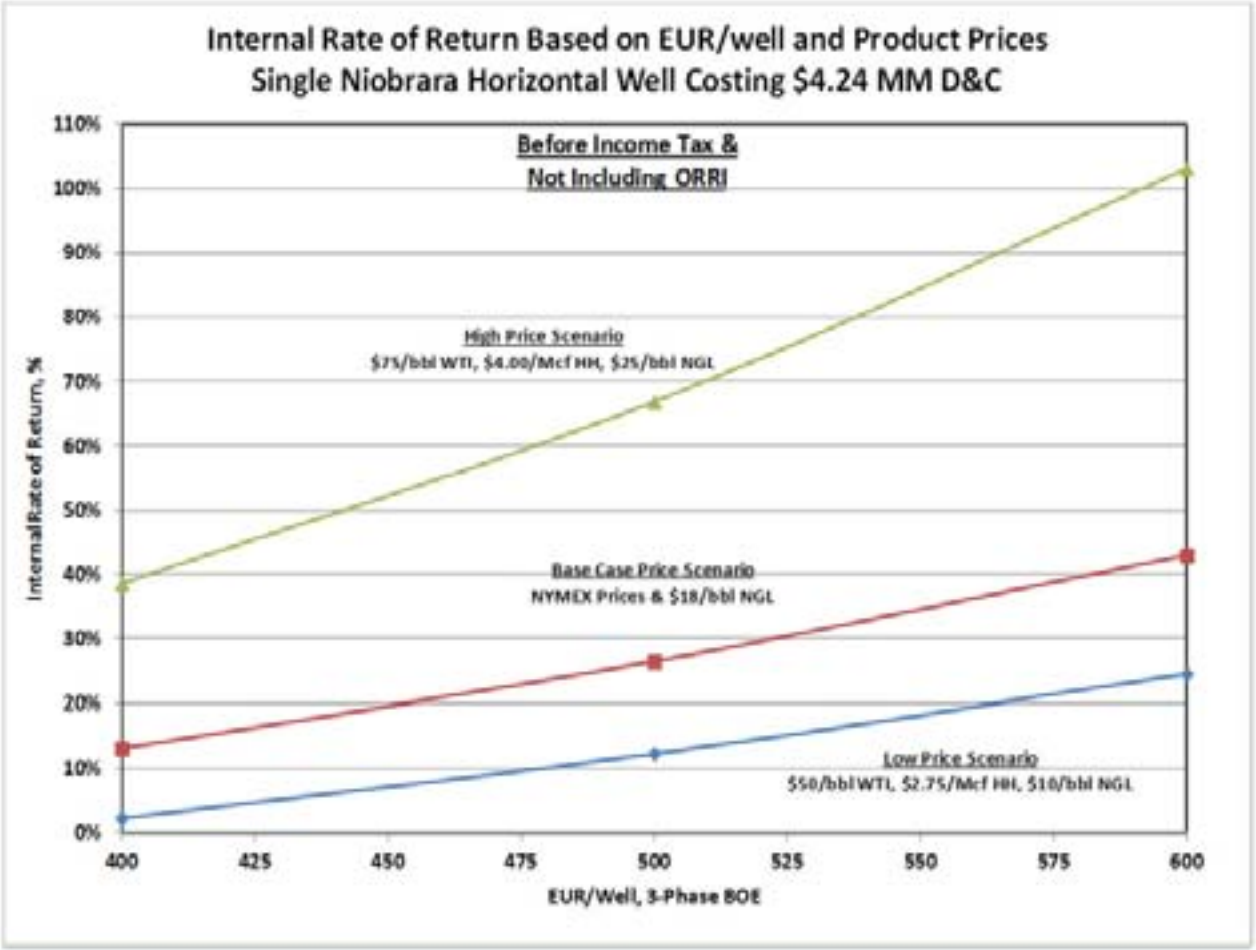


Figure 17


Thank you.
Any Questions ?

ABOUT THE AUTHOR

G. Warfield “Skip” Hobbs is a geologist and Founder and Managing Partner of Ammonite Resources, a firm of international petroleum and mining geotechnical and business consultants which has been headquartered in New Canaan, Connecticut since 1982. Hobbs holds a B.Sc. Degree in Geology from Yale College and a M.Sc. Degree in Petroleum Geology from the Royal School of Mines, Imperial College, London. He has served as an elected officer of the American Association of Petroleum Geologists, and from 2004-2012 served on the Executive Committee of the American Geological Institute, a federation of 50 geoscience professional societies representing over 250,000 members in every earth science discipline. He was AGI President in 2010-2011. Hobbs was a member of the Council of Scientific Society Presidents in Washington, D.C., from 2009-2012, where he served as Co-Chair of the Committee on Energy and the Environment. From 2000-2014 Skip was a Trustee of the New Canaan Nature Center and was president of the Nature Center from 2012-2014. He writes and lectures frequently on energy economics and energy policy, and on environmental issues. In his spare time Hobbs manages a family farm in Massachusetts.

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