

Oil Market Outlook

Nachspiel - cheaper oil but not cheap

The DNB oil story in pictures & graphs

The Stone Age Did Not End Due To A Lack Of Stones...

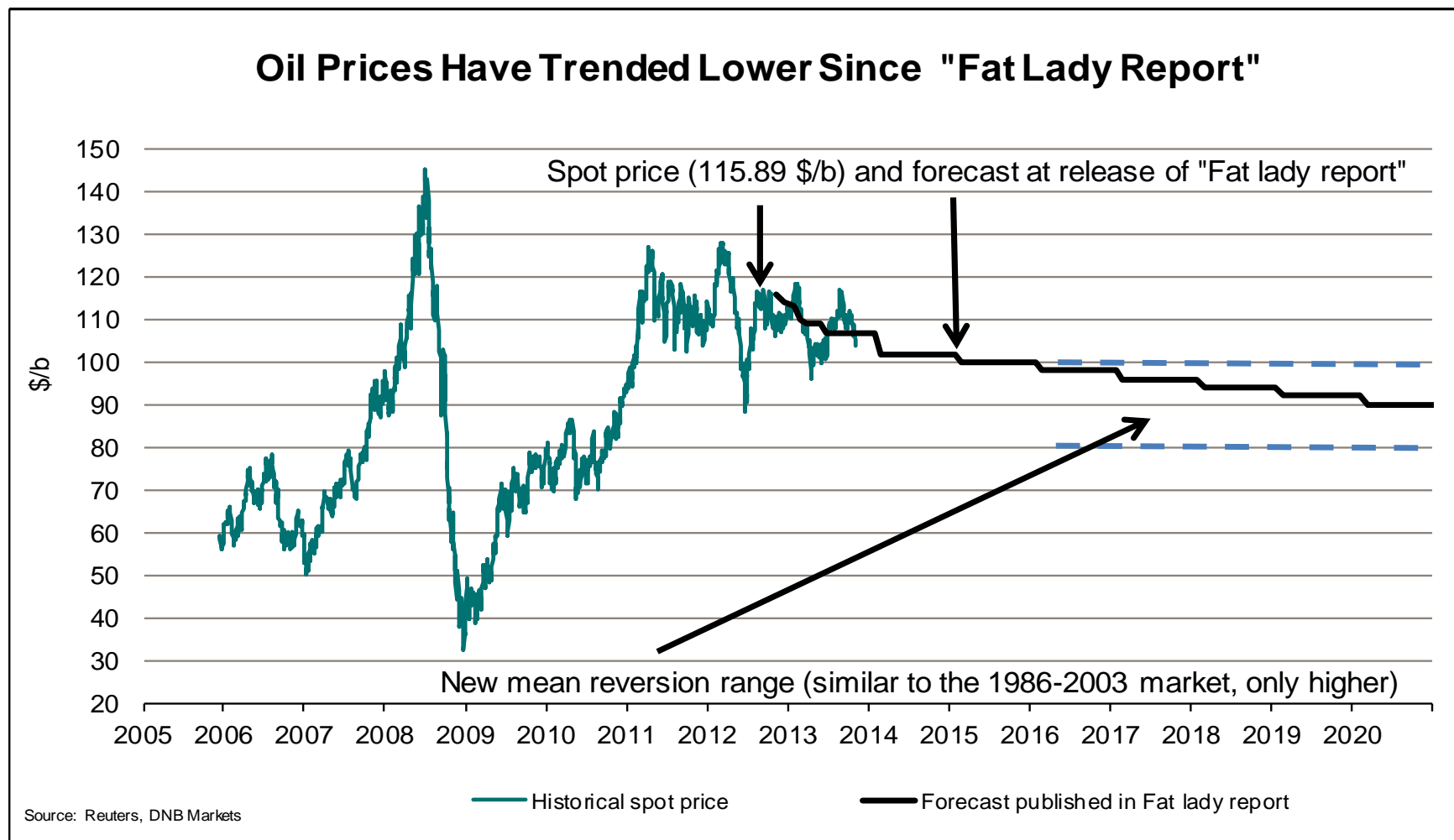
- And the oil age will end long before the world runs out of oil...



"I THOUGHT I'D HAND OUT SOME BUSINESS CARDS TODAY.
HOPEFULLY IN THE FUTURE WE DESIGNERS WILL INVENT A
SMALLER, MORE CREATIVE CARD."

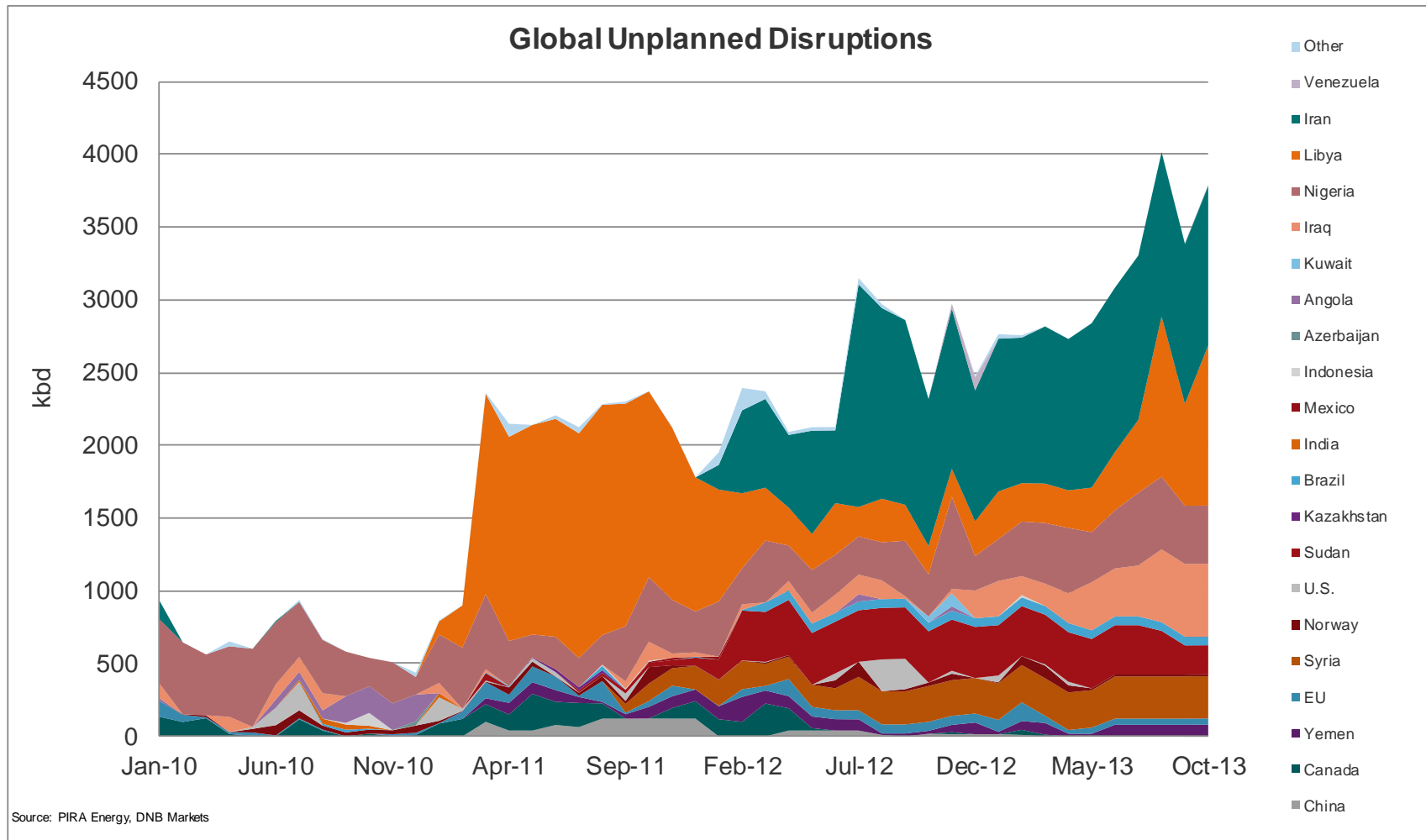
What Has Happened To Oil Prices Since "The Fat Lady Report"

- The market has continued to overshoot and undershoot, but has trended lower



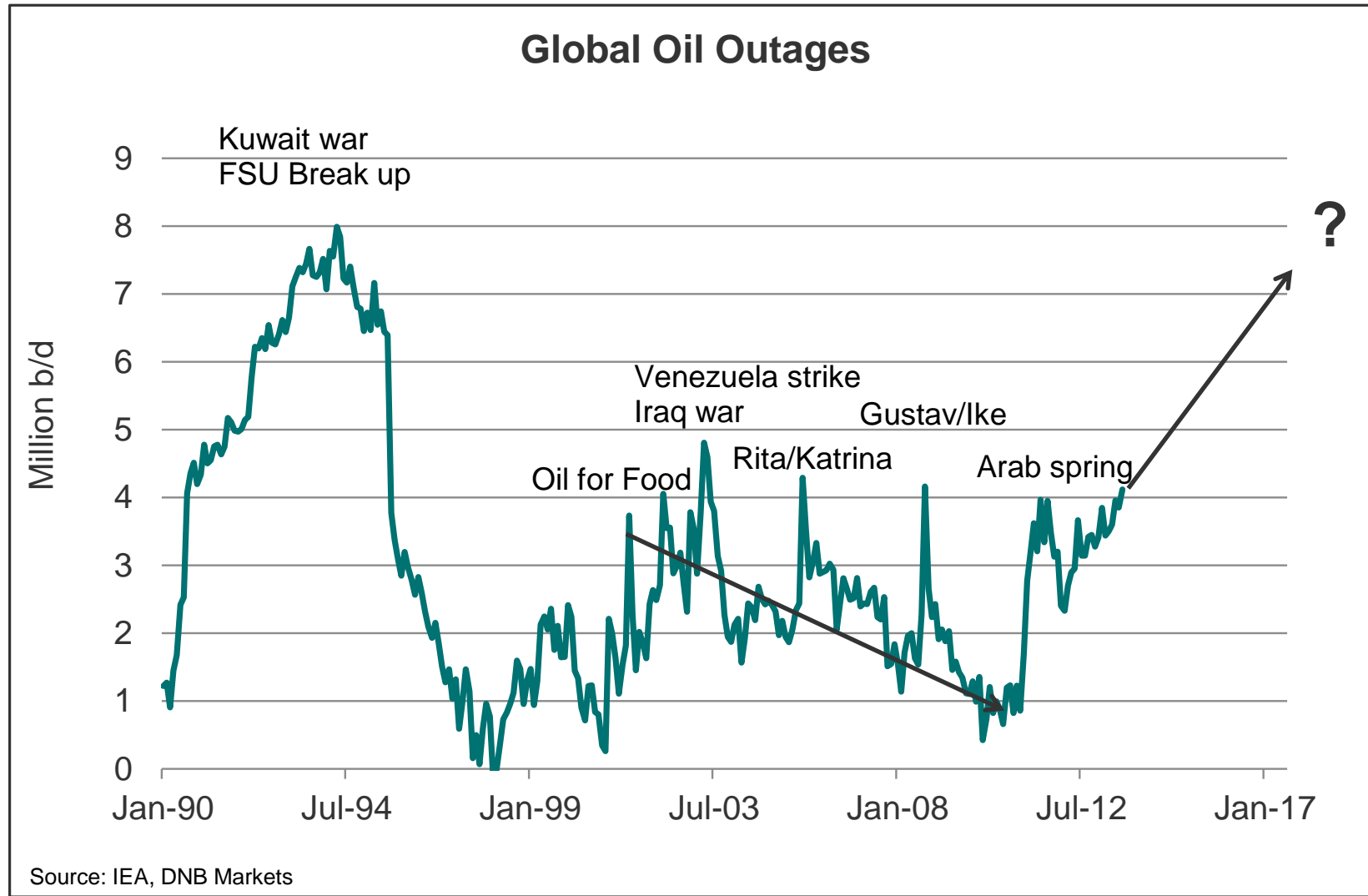
Global Supply Disruptions Have Been Growing

- Will unplanned outages continue at the current high level for the coming 5-years?? What happens if these barrels return?



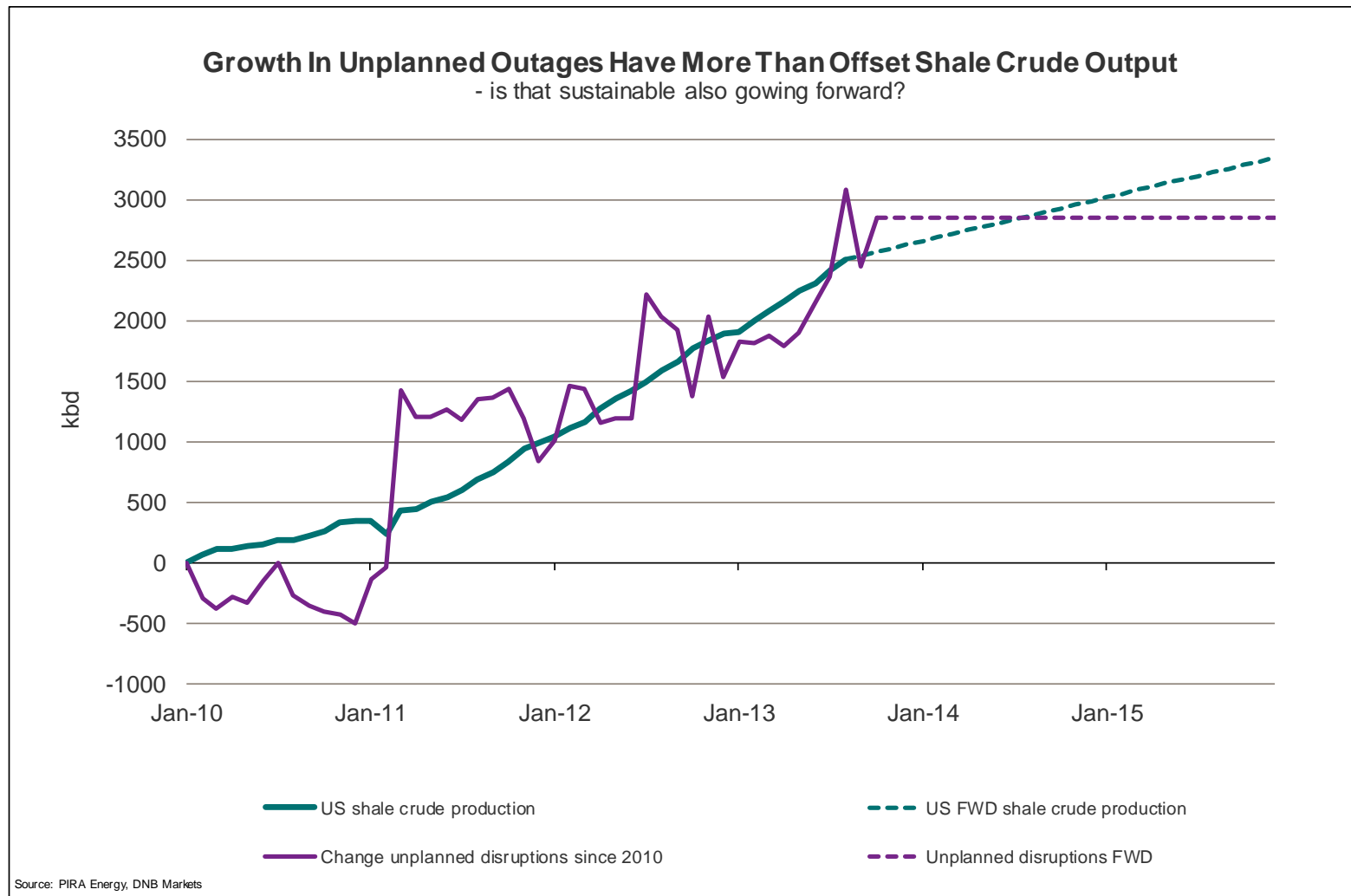
Global Unplanned Outages Are At A Historically High Level

- If you are bullish for the next three years the premise must be further increased outages in our opinion. Will that happen?



Shale Crude Output Growth Has Been Offset By Outages

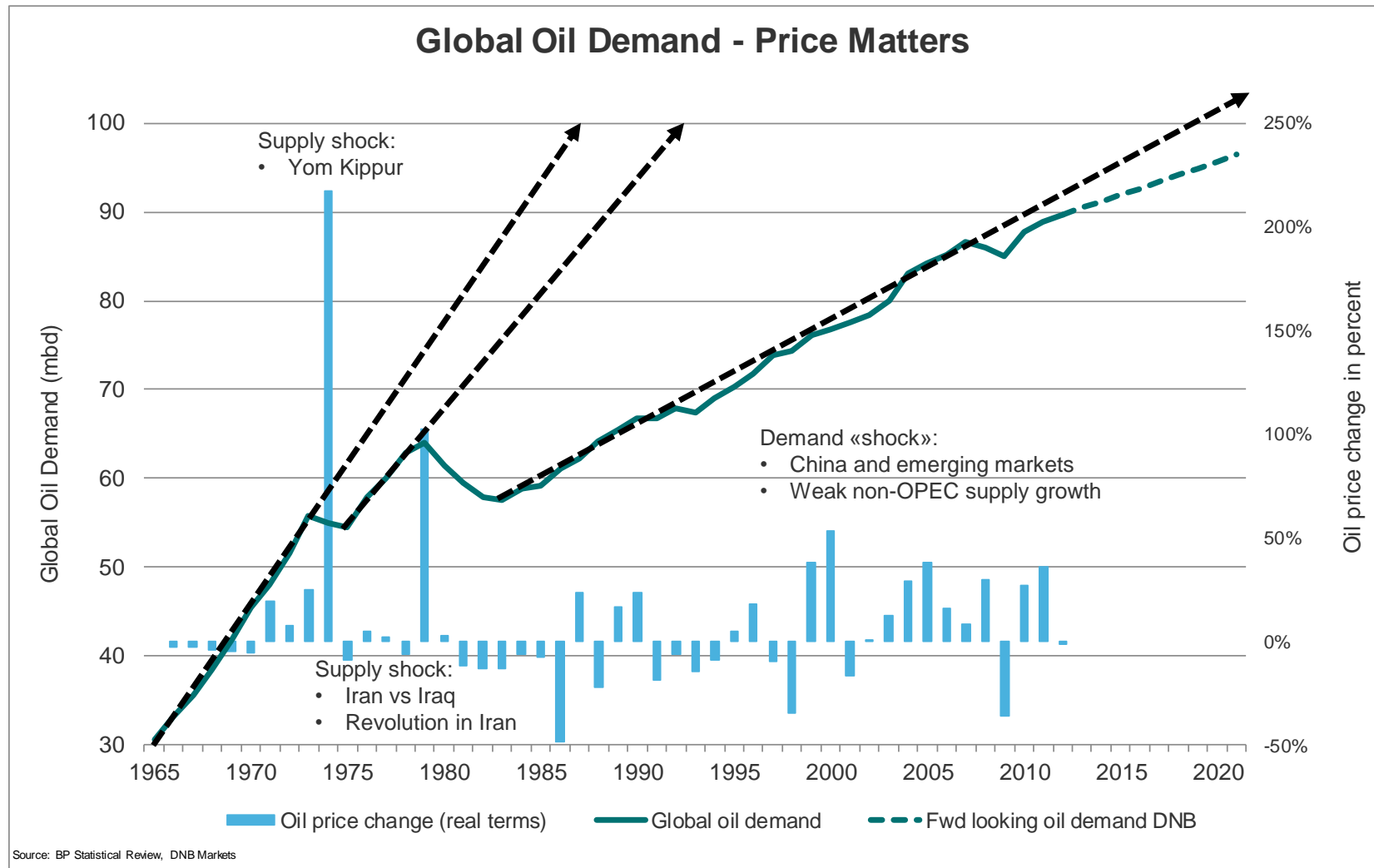
- Shale crude production growth is starting to catch up – What happens next three years with unplanned outages??



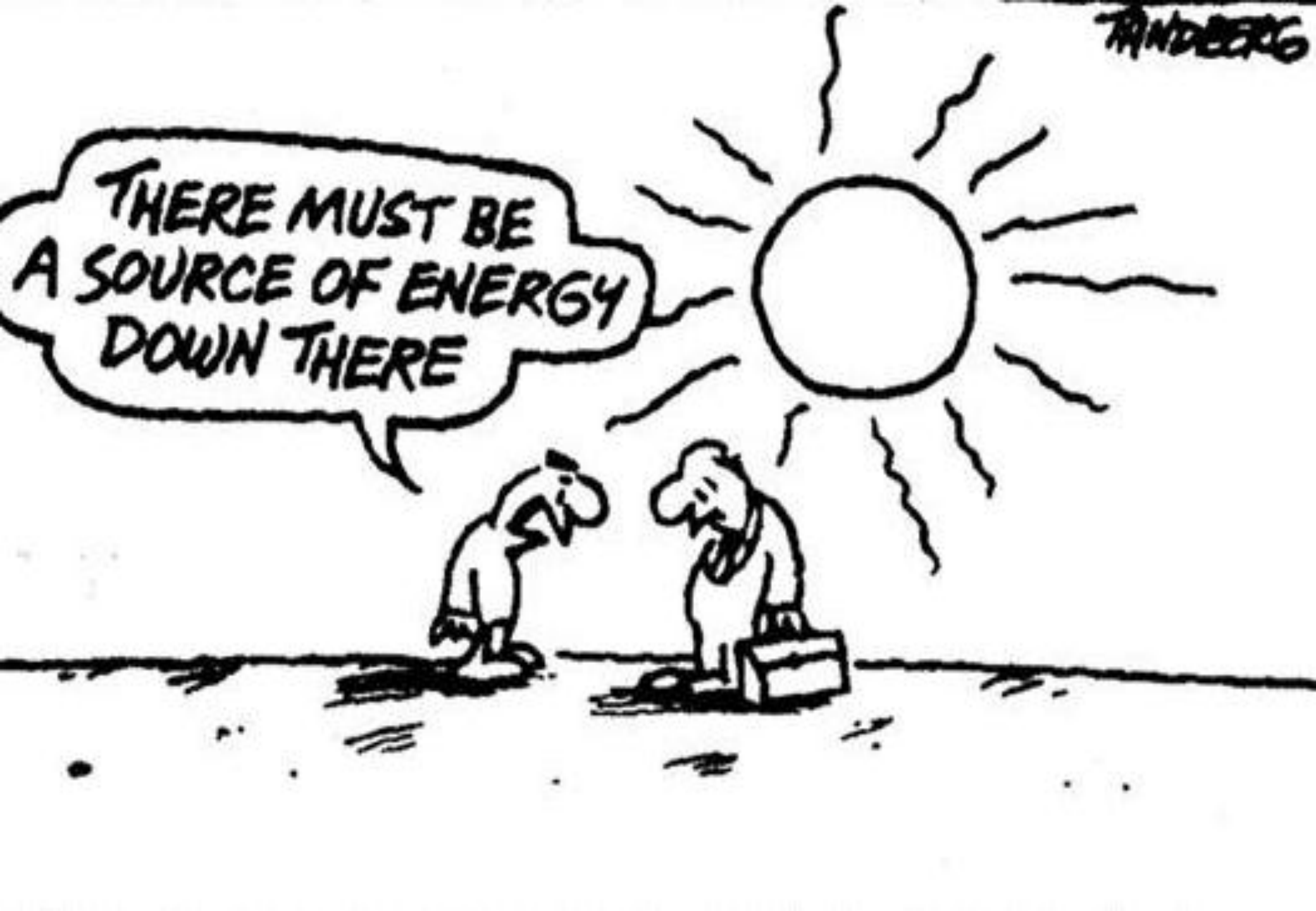
Demand

Trend Line Demand Growth Weakening On High Prices

- We do not believe the world is about to return to the latest 30-year long trend line oil demand path which started in 1983

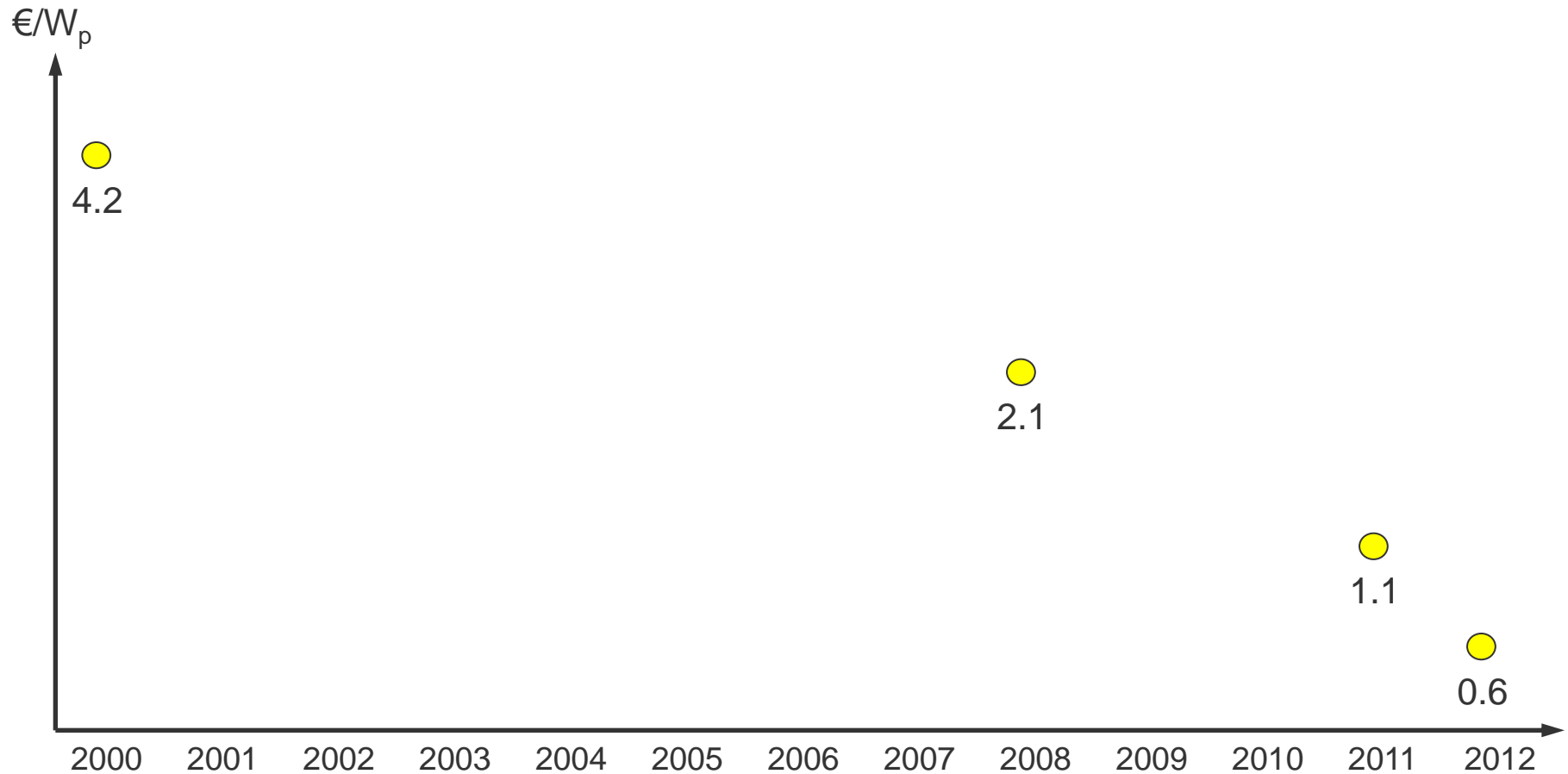


THERE MUST BE
A SOURCE OF ENERGY
DOWN THERE



Solar Module Cost Dropping Like A Warm Knife In Butter..

- What could this mean for the energy industry 5-10 years down the road??



Source: Institute for Energy Technology (Dr. Martin Kirkengen)

Torbjørn Kjus – torbjorn.kjus@dnb.no – Telephone: +47 24 16 91 66

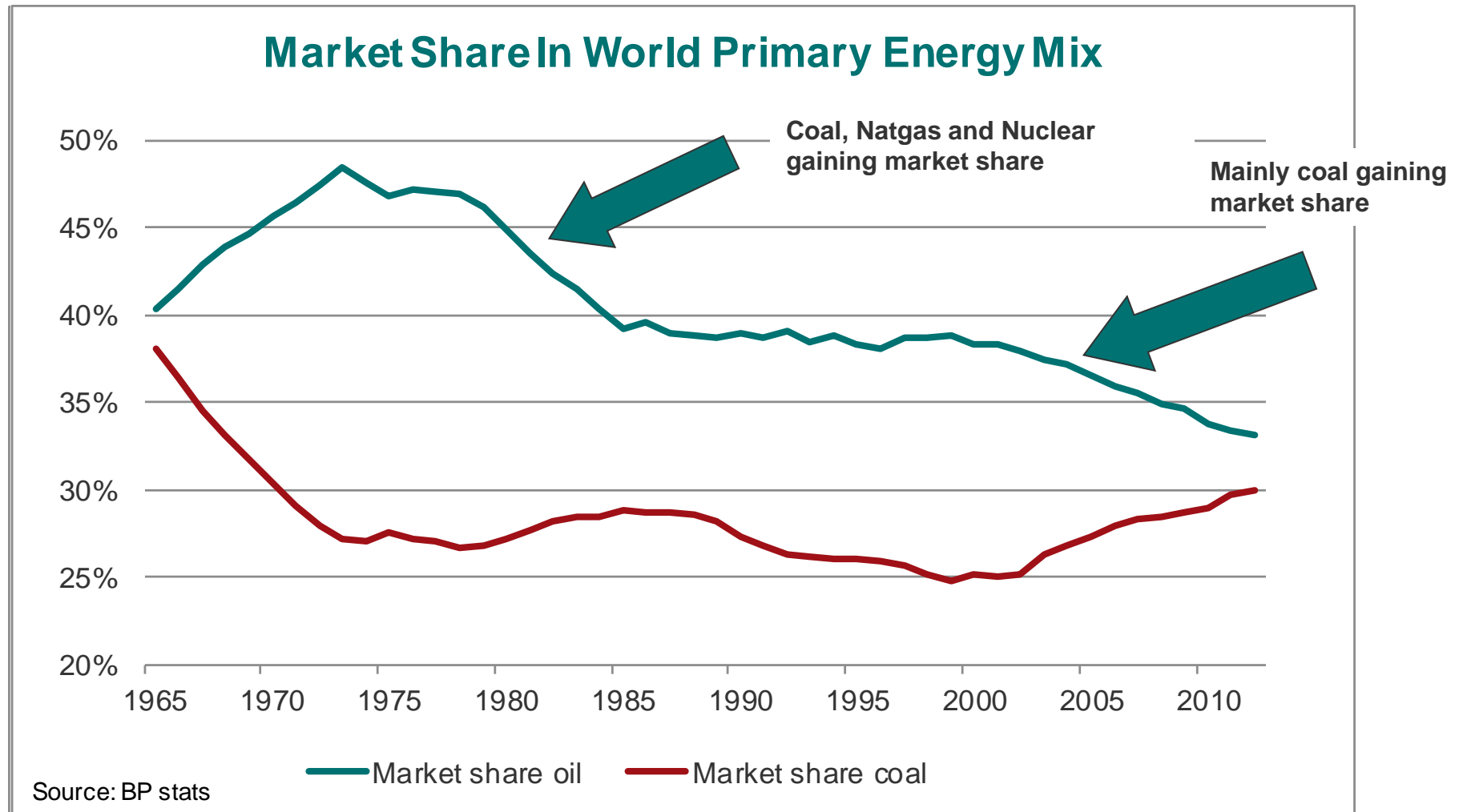
MARKETS

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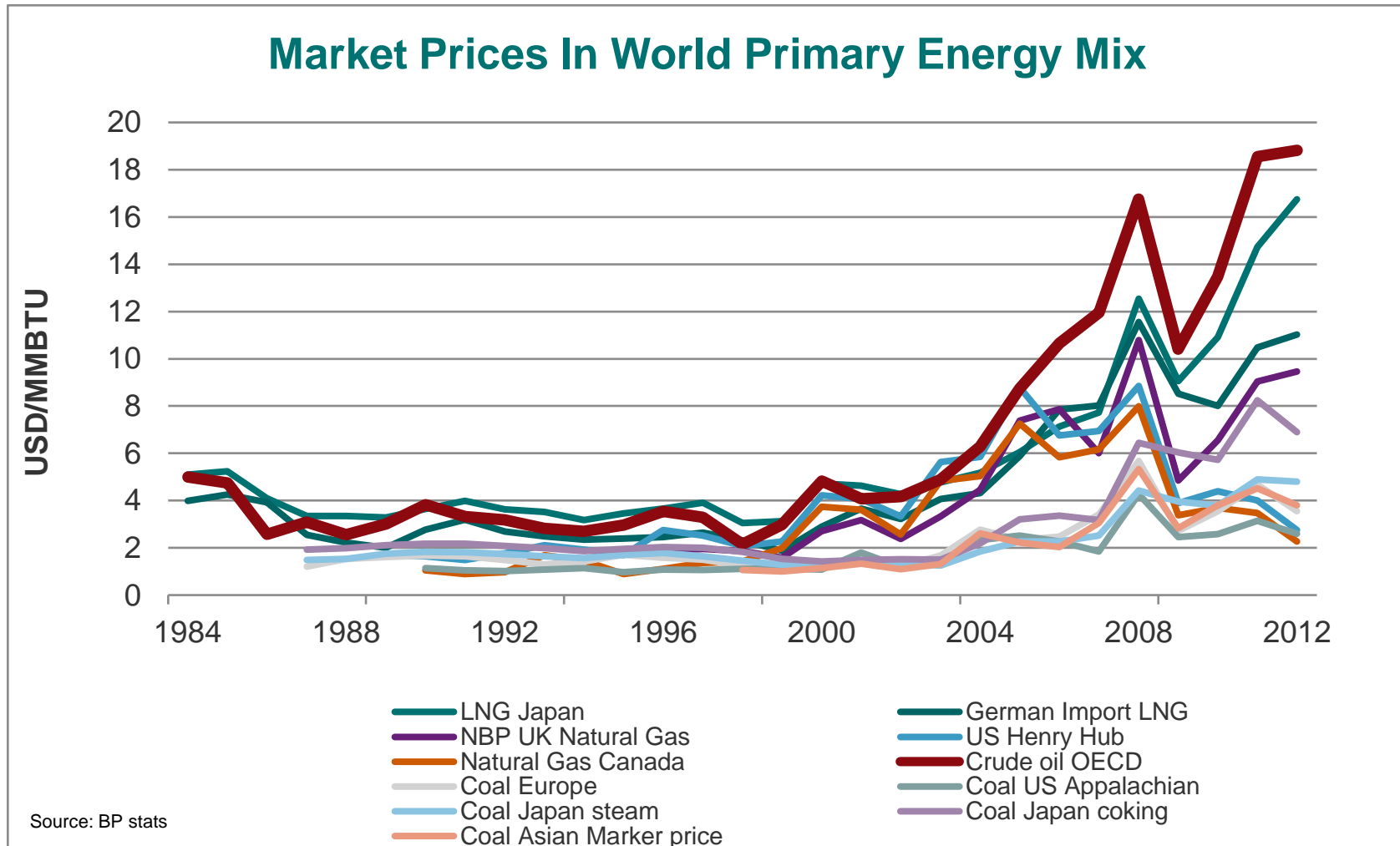
Oil's Market Share Of The Energy Mix Falls On High Oil Prices

- The same happened in the 1970's, and high oil prices are the primary reason



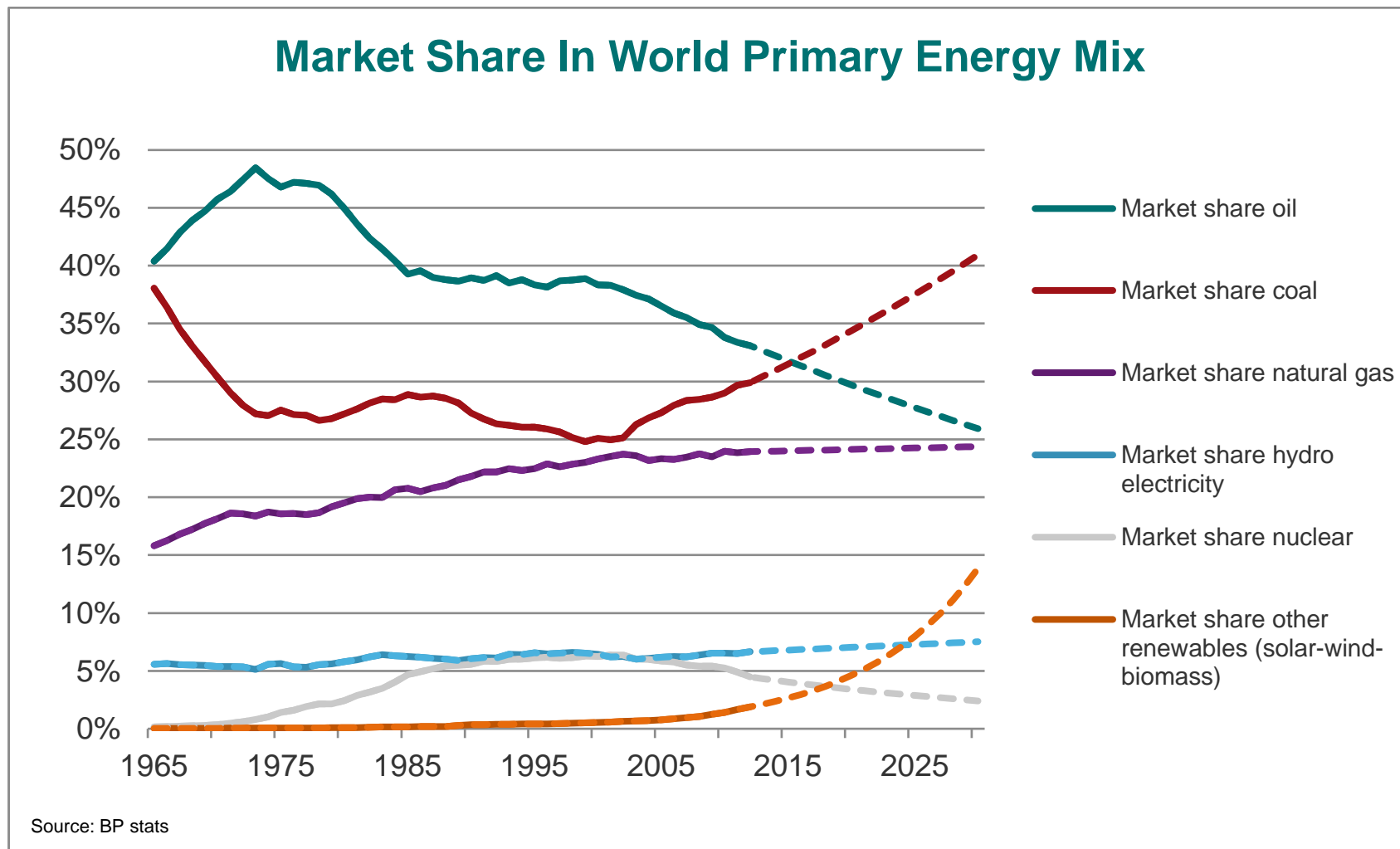
Oil Is Too Expensive – Coal Is Too Cheap

- When oil prices are running away from other energy prices it will initiate switching where possible



Oil, Coal & Natgas Is 90% Of The Worlds Primary Energy Mix

- Renewables is growing quickly (growth of 15% per year last 5 years) but from a very low base
- The world will be dependent on fossil fuels also the next ten years and something needs to happen to the coal consumption



The Huge US Oil-Gas Spread Provides Substitution Possibilities

-General Motors will soon produce dual fuel pick ups and trucks that can switch between gasoline and CNG

THE WALL STREET JOURNAL.

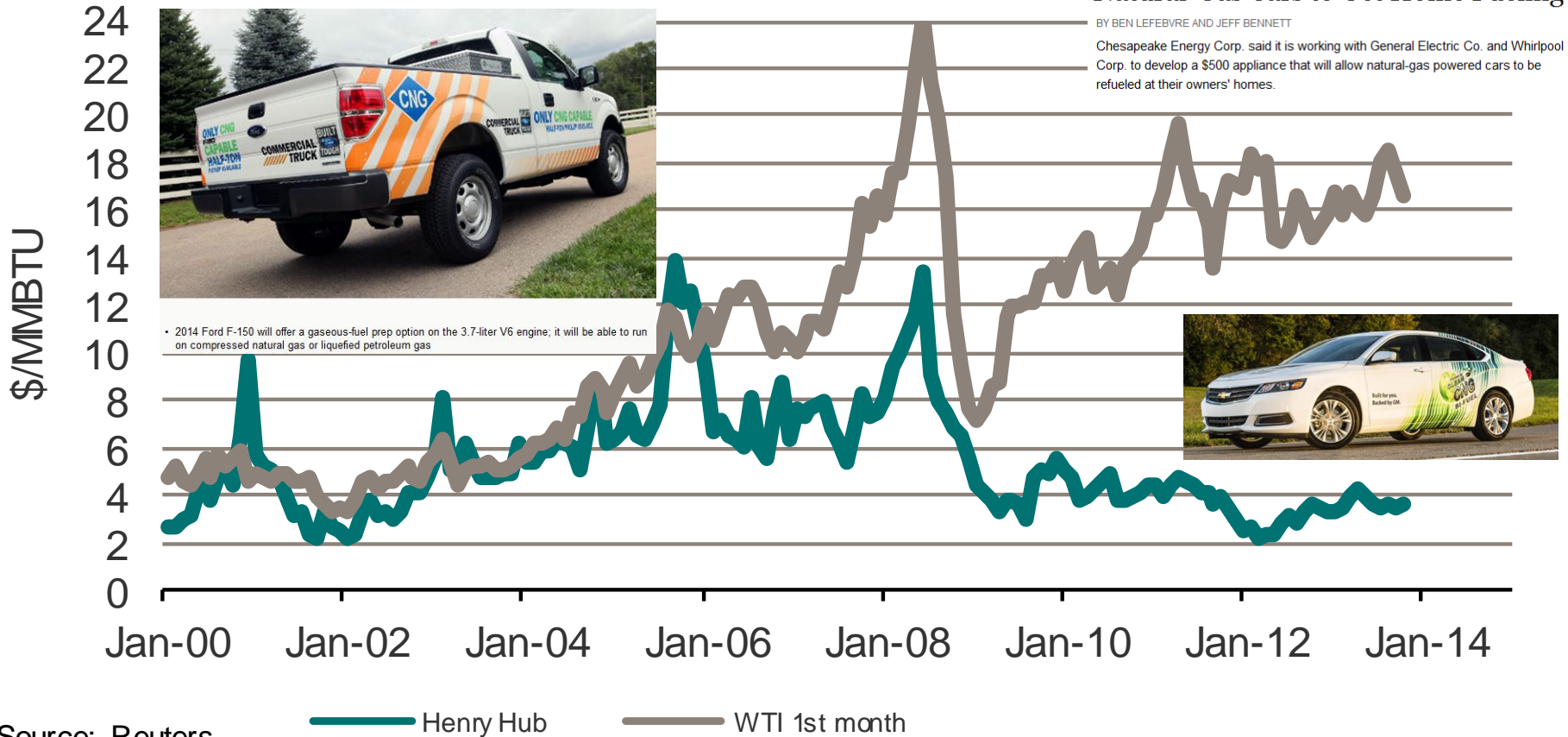
EUROPE EDITION Tuesday, November 13, 2012 As of 6:14 PM EST

Natural-Gas Cars to Get Home Fueling

BY BEN LEFEBVRE AND JEFF BENNETT

Chesapeake Energy Corp. said it is working with General Electric Co. and Whirlpool Corp. to develop a \$500 appliance that will allow natural-gas powered cars to be refueled at their owners' homes.

WTI & Henry Hub



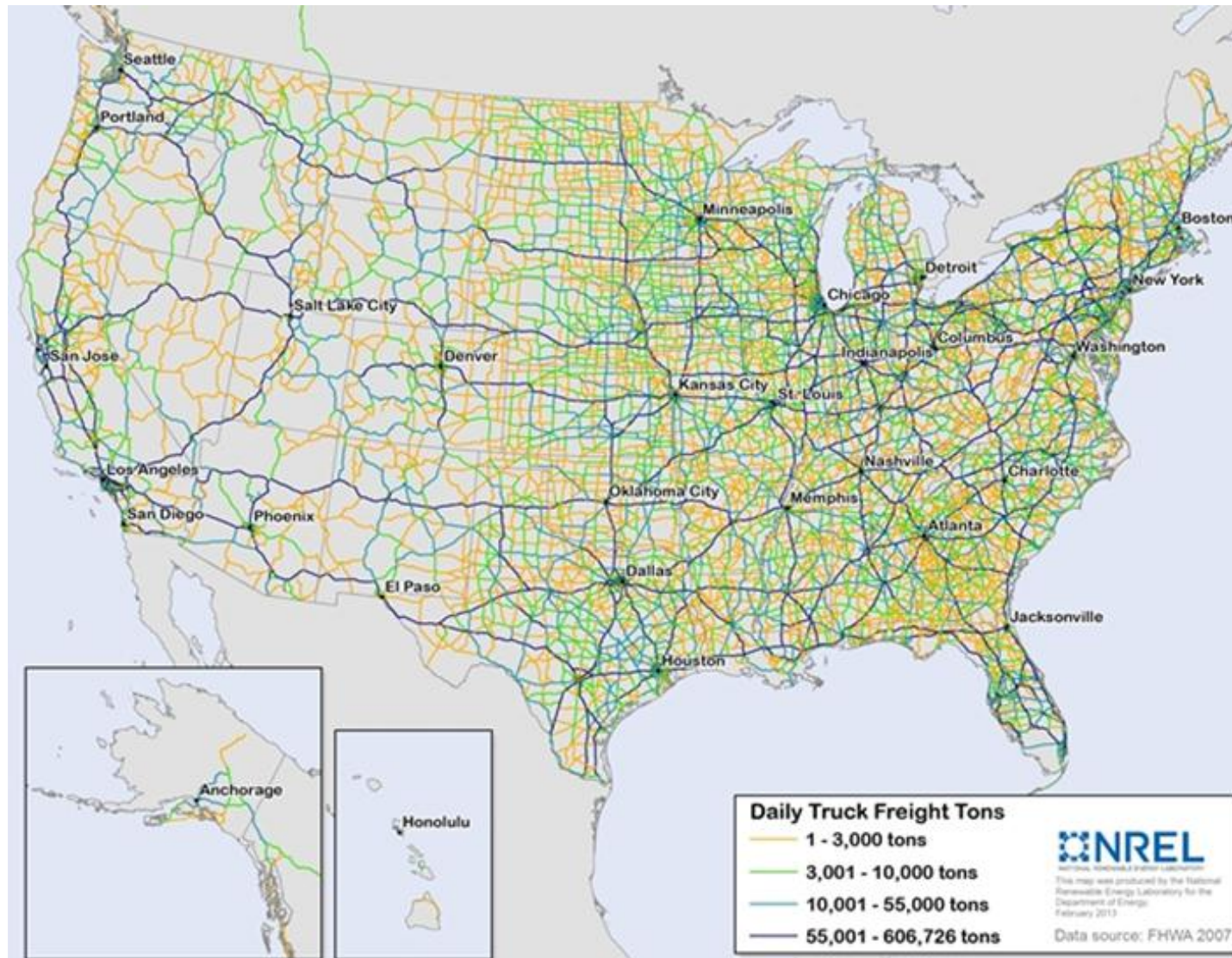
Key Economic Impacts Relative to the Zero Exports Case

Impact (2016-2035 Averages)*	LNG Export Case (Change from Zero Exports Case)		
	ICF Base Case (up to ~4 Bcfd)	Middle Exports Case (up to ~8 Bcfd)	High Exports Case (up to ~16 Bcfd)
Employment Change (No.)	73,100-145,100	112,800-230,200	220,100-452,300
GDP Change (2010\$ Billion)	\$15.6-\$22.8	\$25.4-\$37.2	\$50.3-\$73.6
Henry Hub Price (2010\$/MMBtu)	\$5.03	\$5.30	\$5.73
Henry Hub Price Change (2010\$/MMBtu)	\$0.32	\$0.59	\$1.02

Source: ICF estimates. Note: * Includes direct, indirect, and induced impacts

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LNG Infrastructure Only Needed Where The Traffic Is



LNG Trucking Corridor Already On It's Way

- On highway diesel demand is about 2.4 million b/d in the US - Railroad demand for diesel is about 230 kbd
- Clean Energy is building 150 LNG filling stations in 2012/13 – Shell to build 100 new locations as well

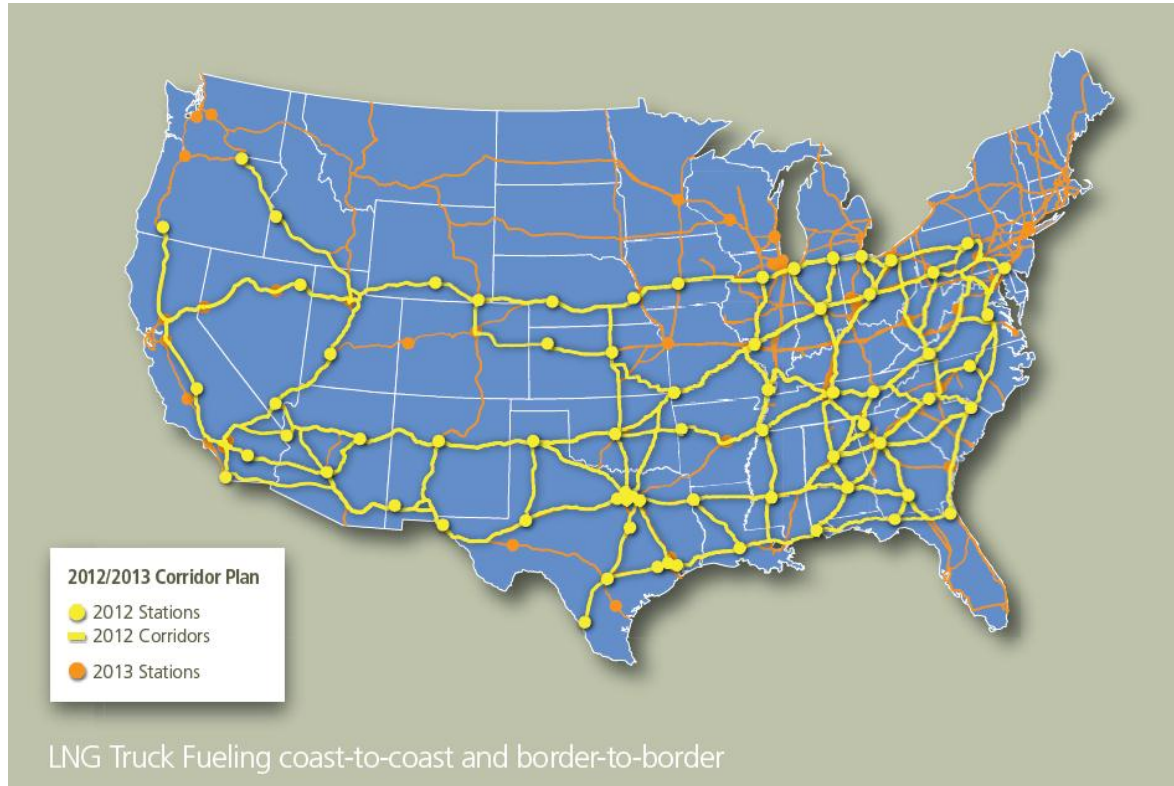
6/13/2012 @ 12:42AM | 7,862 views

Shell Investing \$300M To Fuel LNG-Powered Trucks

Oil giant Royal Dutch Shell is set to invest more than \$300 million to build out a series of liquefied natural gas filling stations at America's biggest chain of truck stops.

According to James Burns, Shell's manager of LNG transportation fuels, the oil and gas giant will pay the costs of setting up 200 LNG pumps at 100 locations in the [Travel Centers of America](#) chain. Burns

Burns says Shell will entice truck fleets to buy LNG-powered trucks and to pump their LNG by selling long-term contracts that guarantee the price they pay for the natural gas derived fuel will be at least 30% cheaper than diesel (on an energy-equivalent basis) for the lifetime of their trucks. "They can lock in their fuel savings for however long they keep that truck," which is often as long as five years.



3/27/2013

Volvo Trucks and Shell Announce Global LNG Fuel Collaboration

by Brandon Borgna

Volvo Trucks and Shell today announced a formal agreement to collaborate and coordinate activities supporting the wider use of Liquefied Natural Gas (LNG) as a fuel for heavy-duty commercial vehicles.

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Payback In Just One Year With The New LNG Engines

- With a 40.000 USD higher purchasing price for the new 11.9l LNG-engine the payback time is only one year...

	CWI 11.9L Spark Ignition		15L HPDI Single Tank	
LNG Truck Premium	\$40,000		\$70,000	
LNG Fuel Cost Savings				
Per DGE	\$2.15	\$2.00	\$2.15	\$2.00
Annual	\$37,000	\$40,000	\$37,000	\$40,000
LNG Net Additional First Year Cost				
LNG Net Cost	\$3,000	Break Even	\$33,000	\$30,000
Payback Period (Years)				
Payback Yrs.	1.1	1.0	1.9	1.7

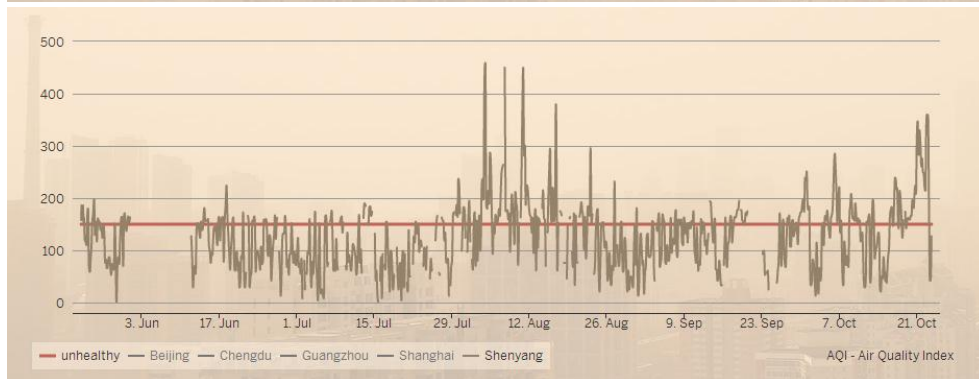
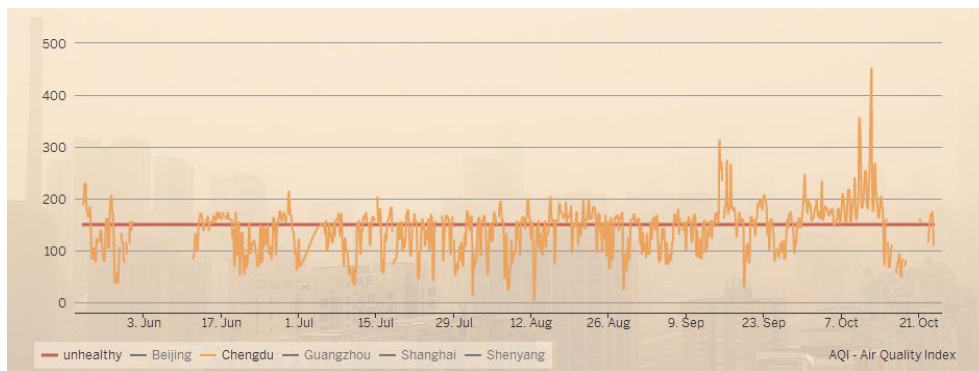
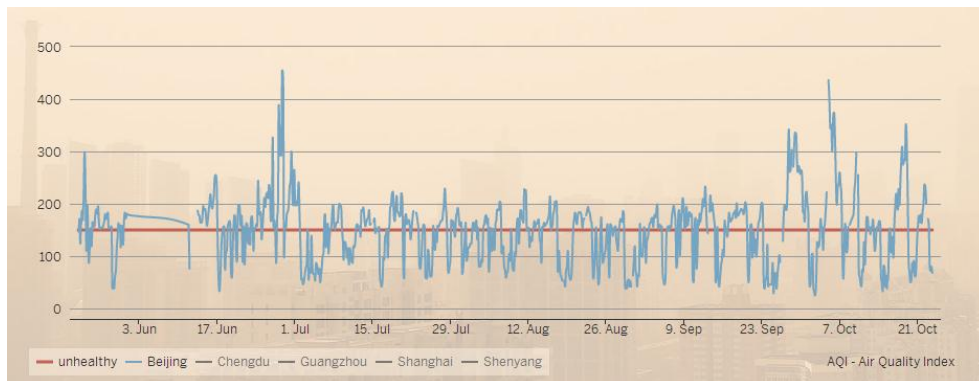
Per DGE difference reflect \$5/MMBtu versus \$4/MMBtu Henry Hub gas prices.

Source: PIRA Energy

MARKETS

Chinese Air Pollution Getting Out Of Control

- An index above 150 is “unhealthy”, above 200 is “very unhealthy”, above 300 is “hazardous”



China's LNG refilling station construction boom

China witnessed an LNG refuelling station construction boom in the first three quarters of this year, in line with the government's policy to increase cleaner fuel use in transportation.

Sources have said that by the end of September, China had 1,700 LNG refilling stations in operation, up from 1,325 by the end of the second quarter.

The three regions and provinces with the largest number of stations are Xinjiang, Hebei and Guangdong.

The ramp-up in station construction has been spurred on by government calls to prioritise gas use so as to meet vehicle emission targets for 2015 set out in the country's Clean Air Act. The bulk of the

stations being built are by the country's top three state-owned majors – China National Petroleum Corp. (CNPC), Sinopec Group and China National Offshore Oil Corp. (CNOOC). CNPC itself intends to add 5,000 LNG stations across the country by 2015, including 248 in central China's Henan Province.

By the end of 2012, the number of LNG-fuelled vehicles on China's roads had reached 80,000 units, up from 38,500 units in 2011.

In Guangzhou, Guangdong Province's capital, local authorities plan to retrofit 6,500 LPG-fuelled buses over the next eight years to run on LNG, with 1,600 of that number slated to be switched over

this year.

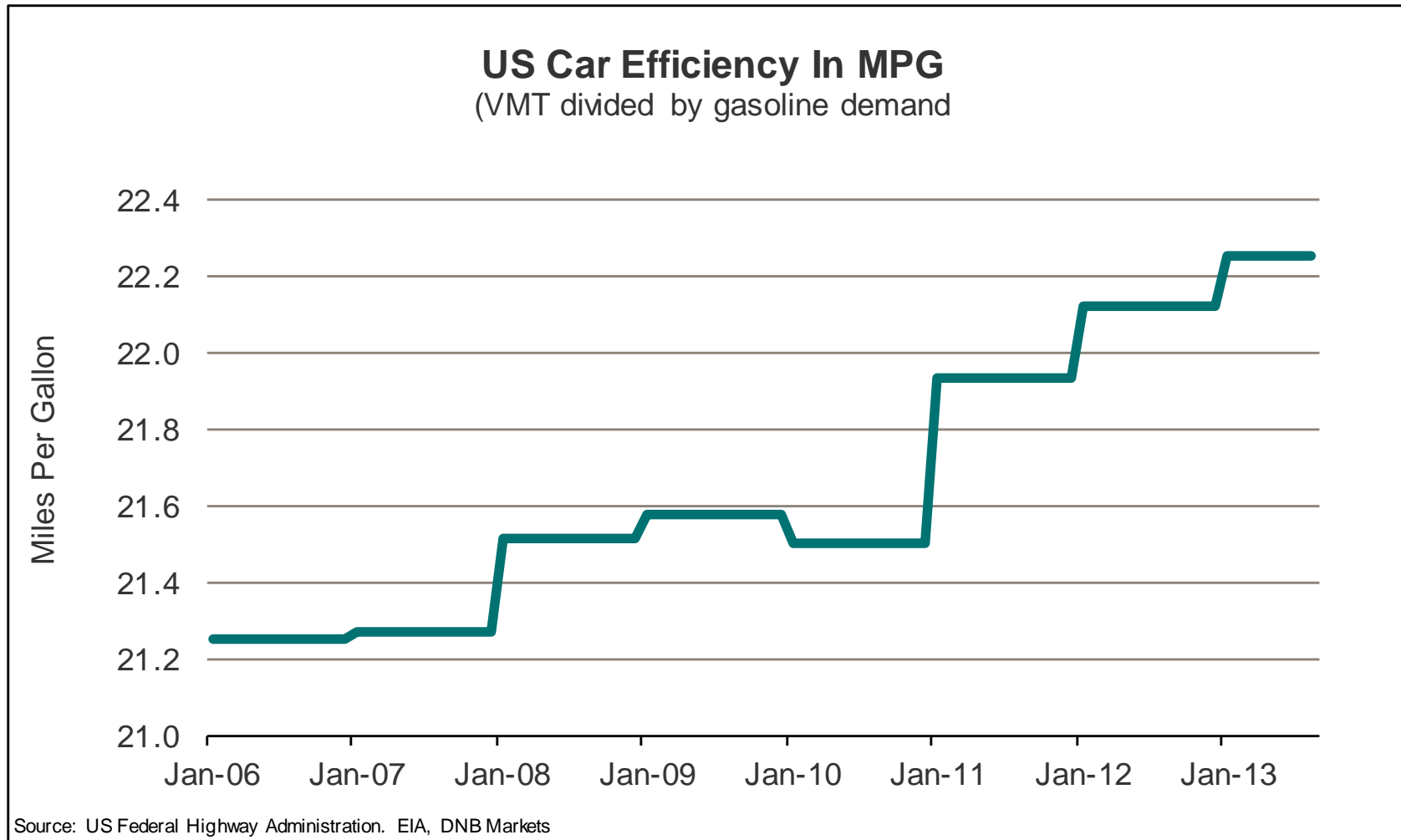
China's gas demand was growing by 20% per year until 2011, with growth slowing to 10.6% in 2012 as a result of an economic restructuring that slowed some of the country's industrial development. According to the country's 12th Five-Year Plan (2011-15), China's gas demand will reach 230 billion cubic metres by 2015.

In addition to imports, for LNG refuelling stations will source a significant portion of their supply from trains operated by independent investors and distributors such as ENN and Xinjiang Guanghui. ■

MARKETS

Efficiency Improvements In The US Car Fleet Now Visible

- And remember; this is only the start – Much larger effects will kick in during the coming years



US Fuel Efficiency Standards To Significantly Improve By 2025

-CAFE-standards to reach 49.6 MPG by 2025

The formal proposal follows President Obama's agreement with 13 major automakers, announced in July, to gradually boost these vehicles' fuel economy to the equivalent of 54.5 miles per gallon -- up from the current standard of 27.3 mpg. Last year, the administration finalized rules to hike the standard to 35.5 mpg by 2016.



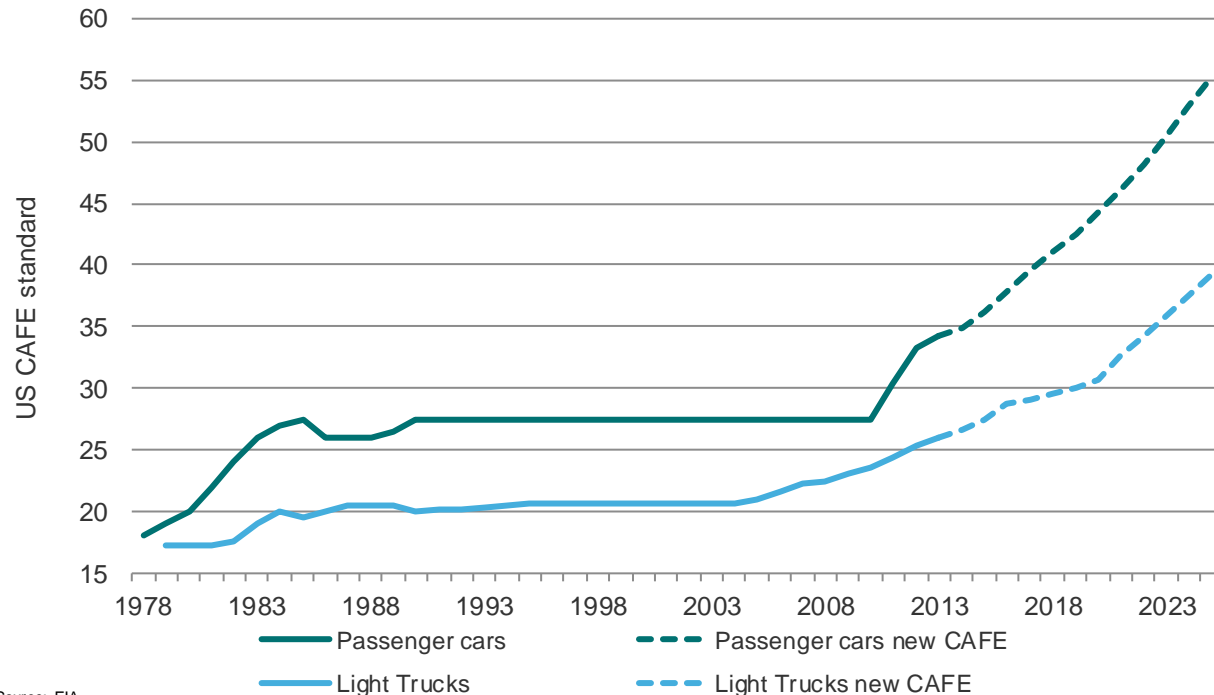
By Brendan Smialowski, Getty Images

Source: EPA/Department of Transportation Corporate Average Fuel Economy Standards; Final Rule – July 2010

TABLE I.B.2-1—AVERAGE REQUIRED FUEL ECONOMY (mpg) UNDER FINAL CAFE STANDARDS

	2011-base	2012	2013	2014	2015	2016
Passenger Cars	30.4	33.3	34.2	34.9	36.2	37.8
Light Trucks	24.4	25.4	26.0	26.6	27.5	28.8
Combined Cars & Trucks	27.6	29.7	30.5	31.3	32.6	34.1

US Corporate Average Fuel Efficiency Standards



Source: EIA

Source: Annual Energy Outlook – EIA April 2013

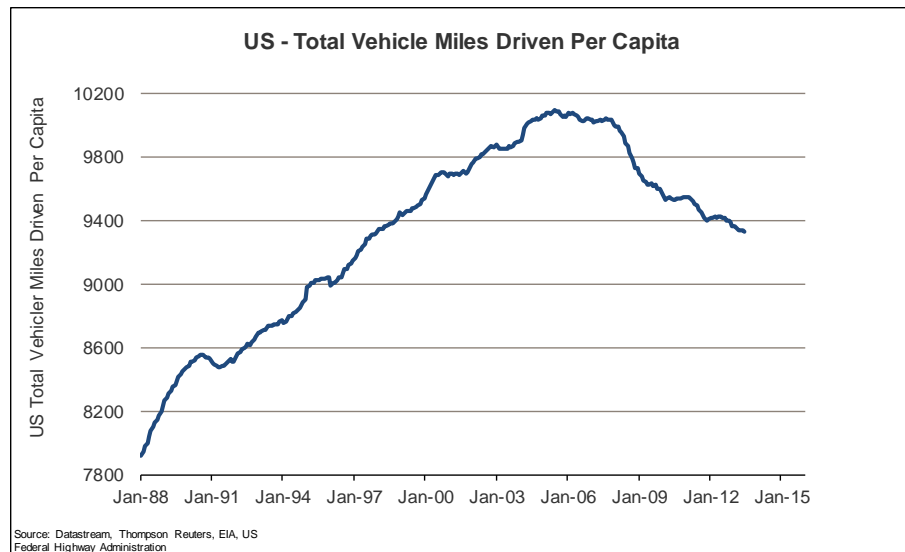
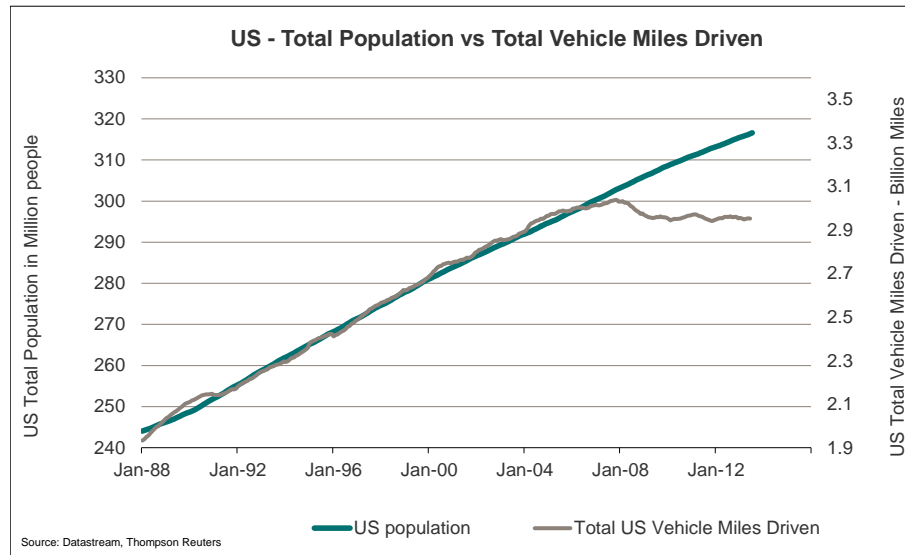
Table 1. NHTSA projected average fleet-wide CAFE compliance levels (miles per gallon) for passenger cars and light-duty trucks, model years 2017-2025, based on the model year 2010 baseline fleet

Model year	Passenger cars	Light-duty trucks	Combined
2017	39.6	29.1	35.1
2018	41.1	29.6	36.1
2019	42.5	30.0	37.1
2020	44.2	30.6	38.3
2021	46.1	32.6	40.3
2022	48.2	34.2	42.3
2023	50.5	35.8	44.3
2024	52.9	37.5	46.5
2025	55.3	39.3	48.7

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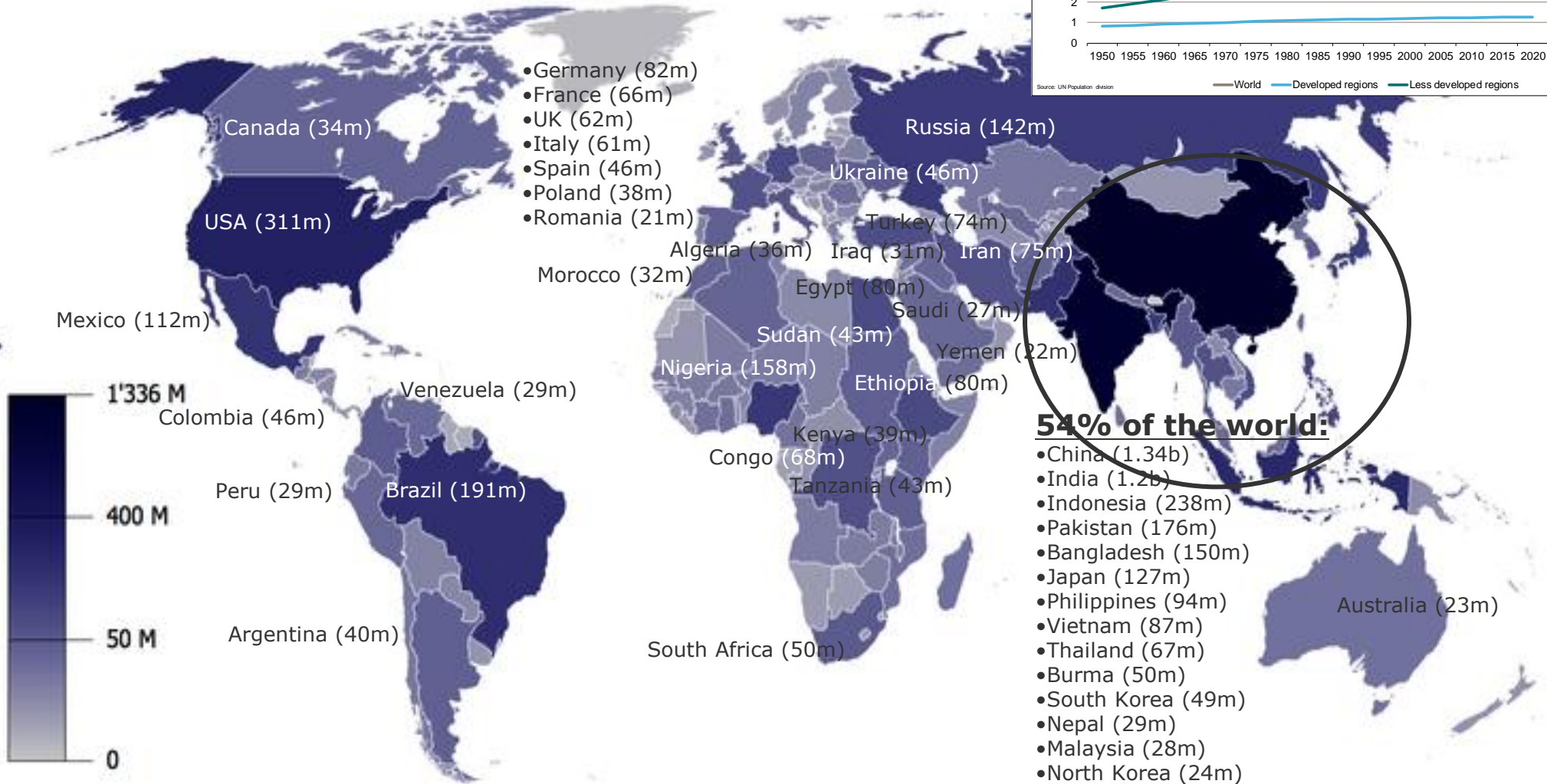
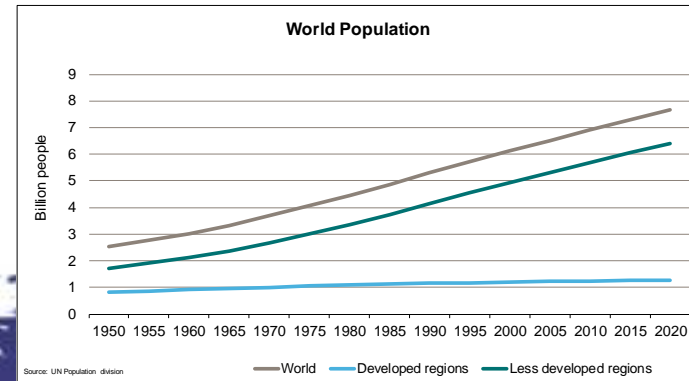
The American Population Continues To Grow

- But total driving length is still stalling – Driving per capita is collapsing; why?



World Population By Country

(Sources 2009-2011)



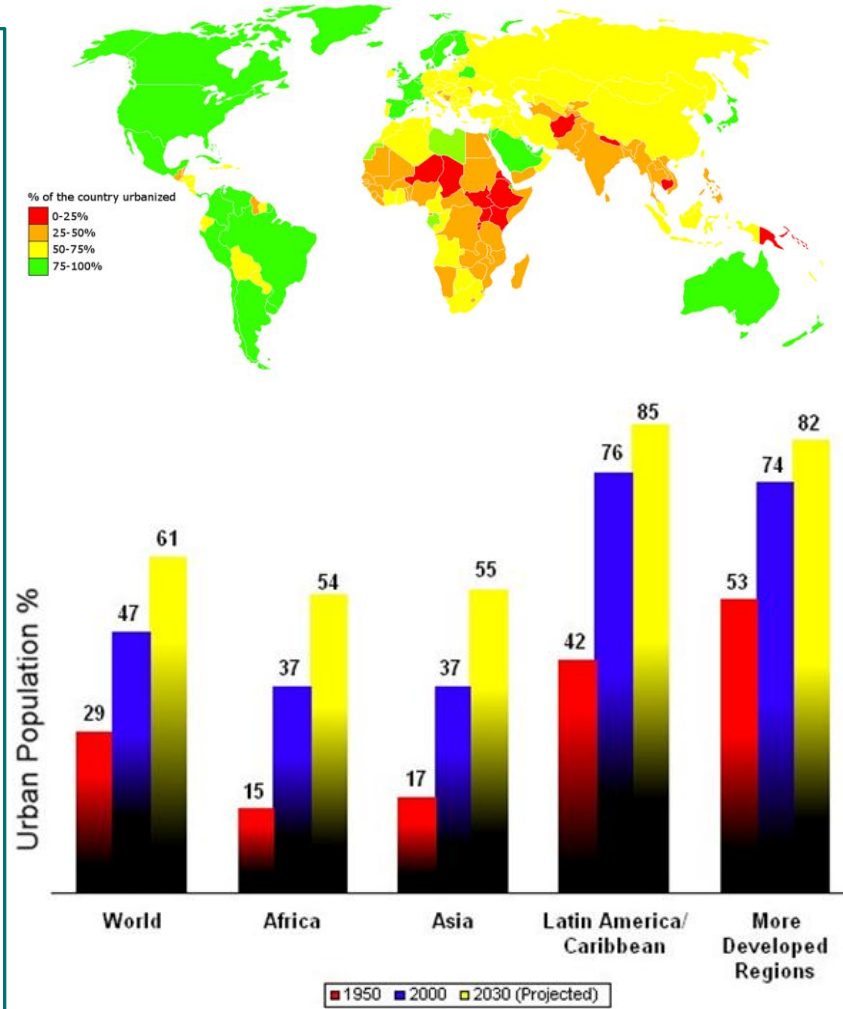
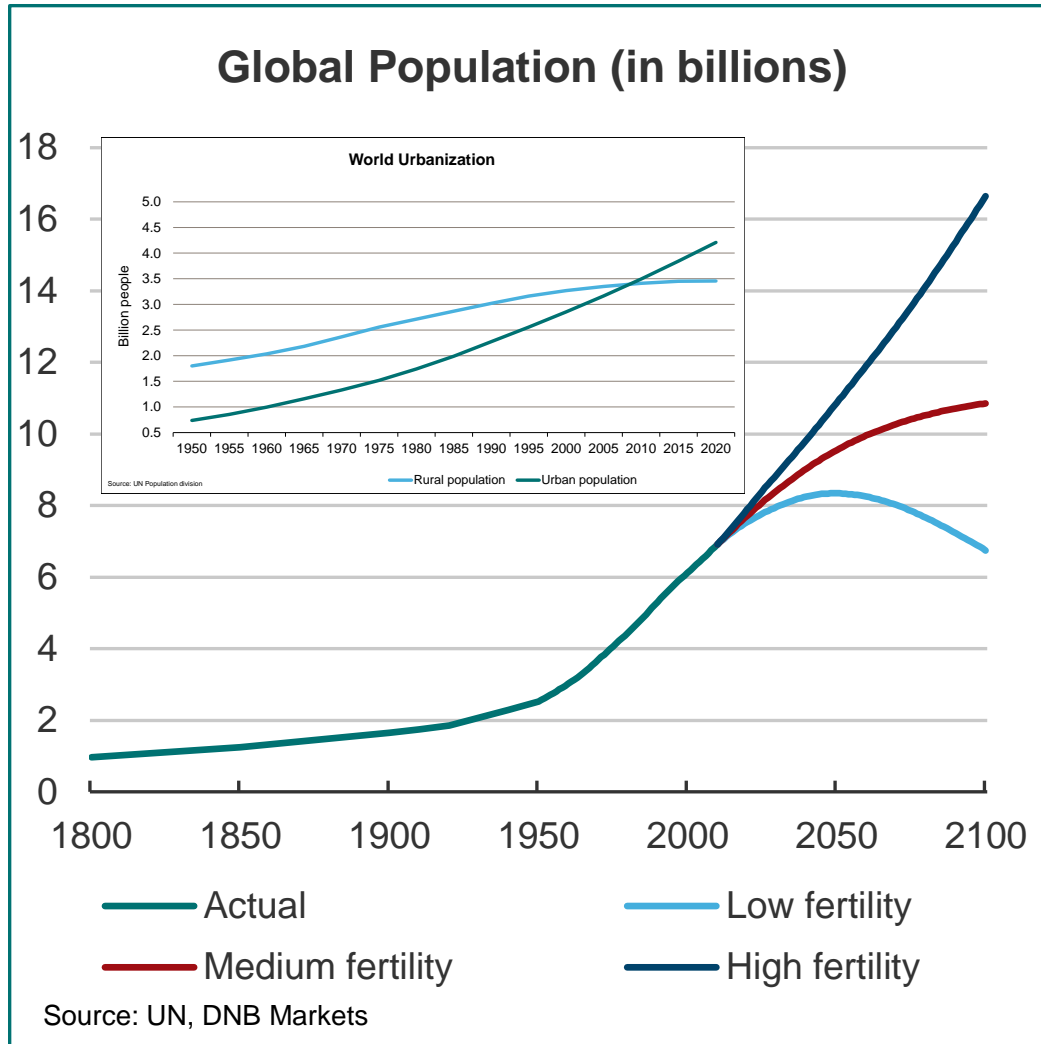
- Germany (82m)
- France (66m)
- UK (62m)
- Italy (61m)
- Spain (46m)
- Poland (38m)
- Romania (21m)

- Russia (142m)
- Ukraine (46m)
- Turkey (74m)
- Algeria (36m)
- Iraq (31m)
- Iran (75m)
- Morocco (32m)
- Egypt (80m)
- Saudi (27m)
- Sudan (43m)
- Yemen (22m)
- Nigeria (158m)
- Ethiopia (80m)
- Kenya (39m)
- Congo (68m)
- Tanzania (43m)
- South Africa (50m)

- Canada (34m)
- USA (311m)
- Mexico (112m)
- Venezuela (29m)
- Colombia (46m)
- Peru (29m)
- Brazil (191m)
- Argentina (40m)

The World Population & Urbanization Continue To Grow

- Both these factors create increased energy demand

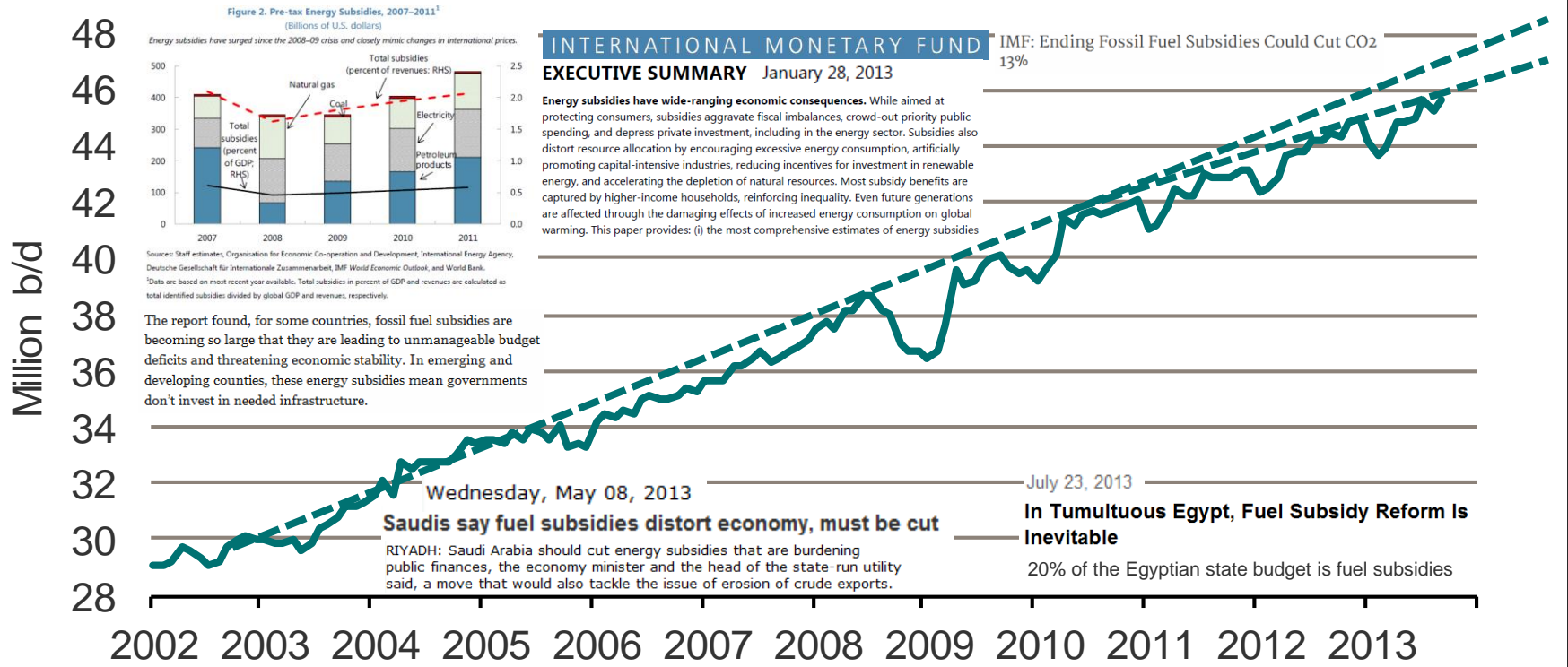


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Non-OECD Oil Demand Will Continue To Grow

- We do however expect the growth rate to decrease in the current decade

Non-OECD Oil Demand



Source: IEA

- 2012 Sep 13: India cut fuel subsidies, implementing gradually since Jan 2013
- 2013 April: China reform end user prices
- 2013 May 08: Saudi say fuel subsidies must be cut, distorts economy
- 2013 June 22: Indonesia cut fuel subsidies
- 2013 July 14: Vietnam fuel subsidy fund almost exhausted
- 2013 Sep 3: Malaysia cut fuel subsidies
- 2013 Brazil – Petrobras has increased diesel prices by 10% and gasoline by 7%

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Petroleum Subsidies Have Supported Oil Demand In Non-OECD

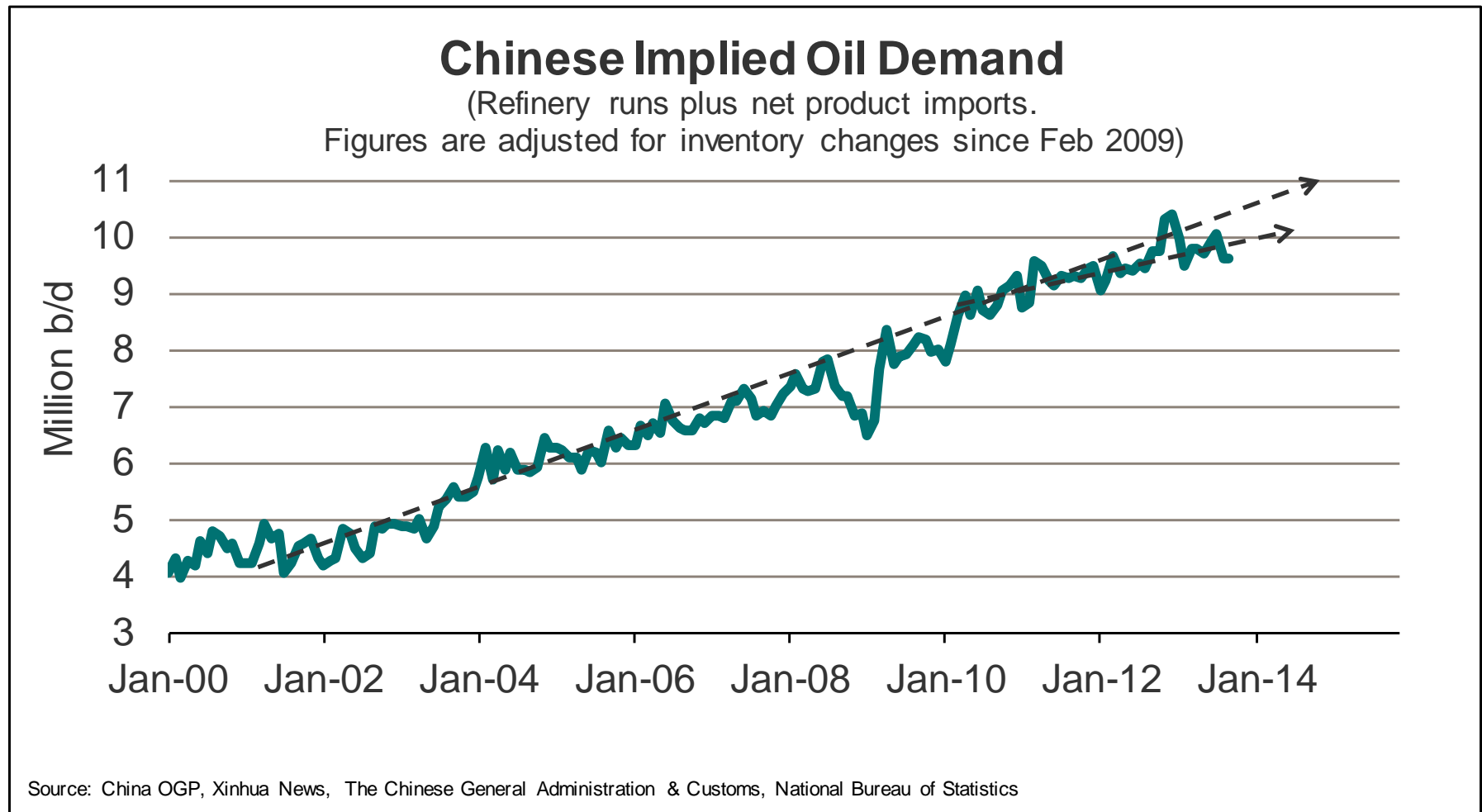
- Emerging Markets economies heavily subsidize oil prices for their consumers, but some large countries are now forced to cut back

Country	% of Government Revenues	Population Million	Oil demand kbd	Country	% of Government Revenues	Population Million	Oil demand kbd
FSU				MENA			
Armenia	2.1	3		Algeria	10.8	37.3	396
Azerbaijan	1.9	9		Bahrain	19.0	1.2	
Georgia	2.0	5		Egypt	30.6	83.6	756
Kazakhstan	2.3	17		Iran	17.0	79	1721
Kyrgyzstan	10.4	5		Iraq	12.7	31.1	777
Turkmenistan	31.8	5		Jordan	8.1	6.2	139
Emerging Asia				Kuwait	4.6	2.6	459
Bangladesh	7.6	153	106	Libya	16.6	1.8	269
Bhutan	1.4	0.7		Morocco	2.4	32.3	297
Brunei	3.8	0.4	18	Oman	7.3	3.1	184
India	6.8	1270	3427	Qatar	3.2	1.9	229
Indonesia	14.5	246	1636	Saudi Arabia	14.0	26.5	3026
Malaysia	5.7	29	746	Sudan	7.3	34.2	98
Myanmar	9.4	60	27	Tunisia	2.4	10.8	86
Pakistan	1.0	179	453	UAE	1.4	5.3	699
Sri Lanka	8.0	21	106	Yemen	19.0	24.8	138
Thailand	0.7	67	1310	Africa			
Latin America				Angola	2.7	21	129
Antigua	2.4	0.1		Cameroon	8.9	20	38
Bolivia	6.6	10.3	72	Congo	2.8	75.5	16
Ecuador	15.4	14.7	263	Equatorial G.	0.9	0.7	
St. Kitts	0.6	0.1		Ethiopia	1.1	83	54
St. Lucia	0.7	0.1		Ghana	3.2	25	79
Trinidad	7.5	1.3		Madagascar	1.0	22	
Venezuela	15.8	29.7	709	Nigeria	4.8	166	336

Source: IMF, IEA, Wikipedia

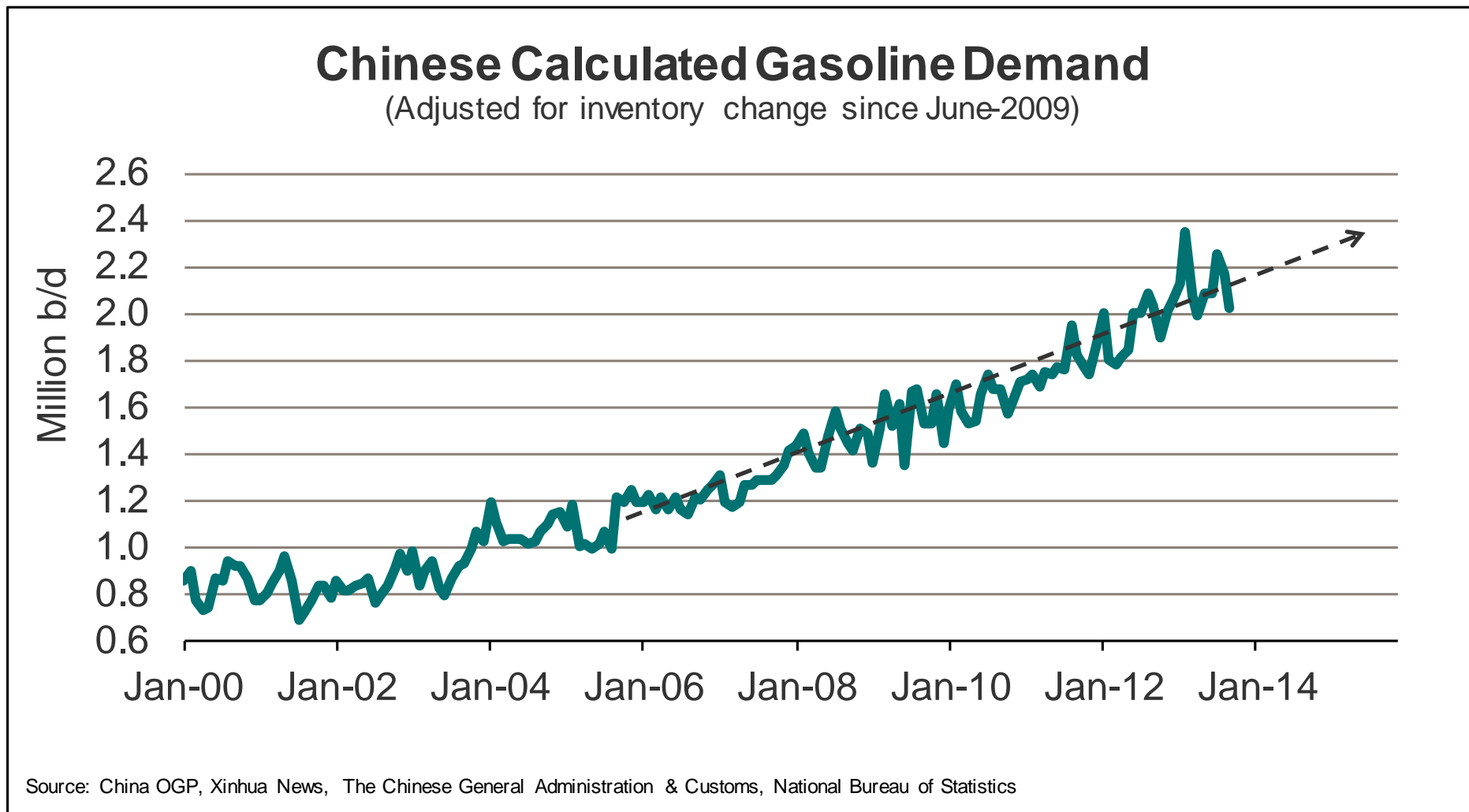
Chinese Growth In Oil Demand Stalling??

- Where is the accelerating growth in Chinese oil demand??



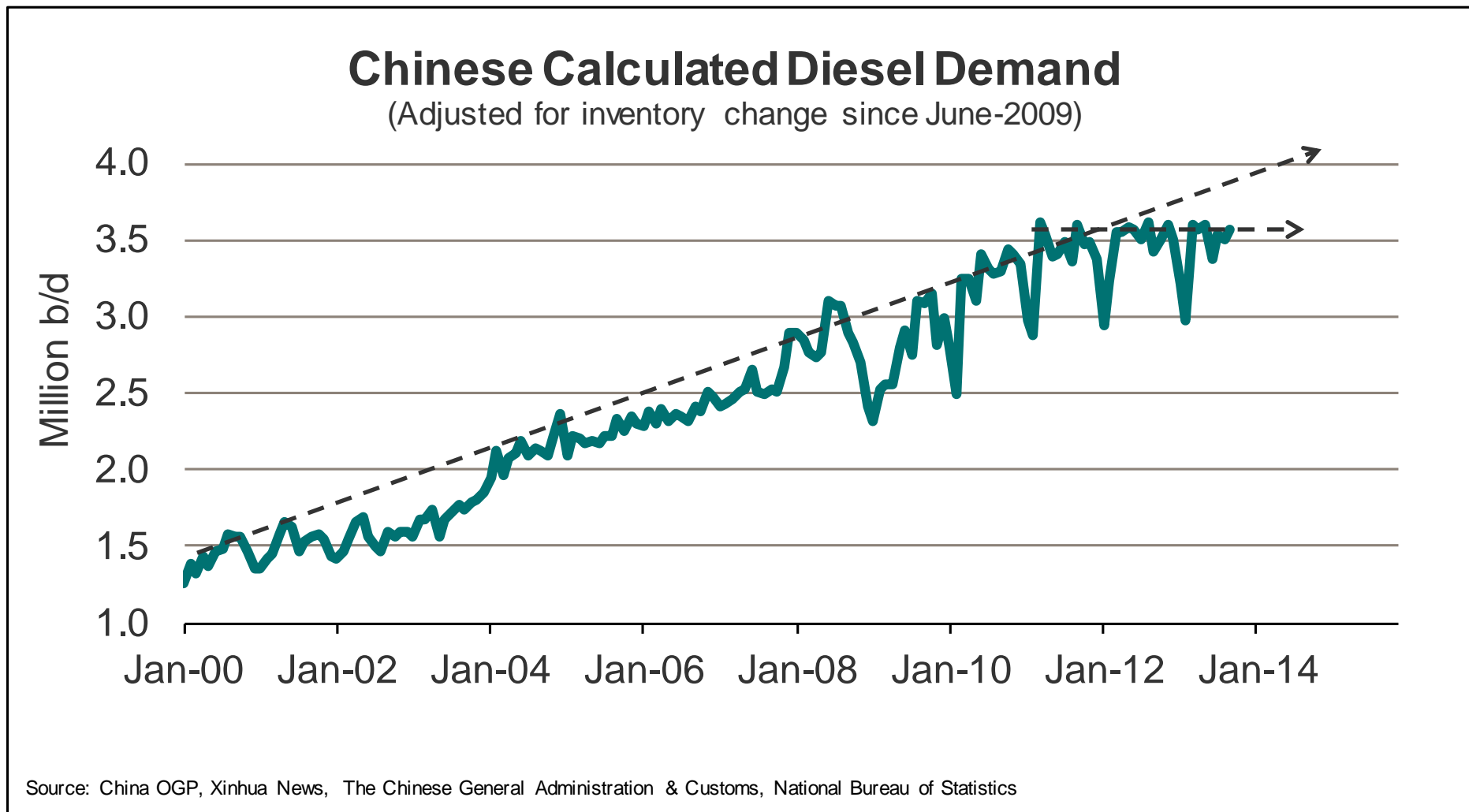
Chinese Oil Demand Growth To Favor Personal Consumption

- Gasoline demand is performing



Chinese Oil Demand Growth To Favor Personal Consumption

- Diesel demand is not performing



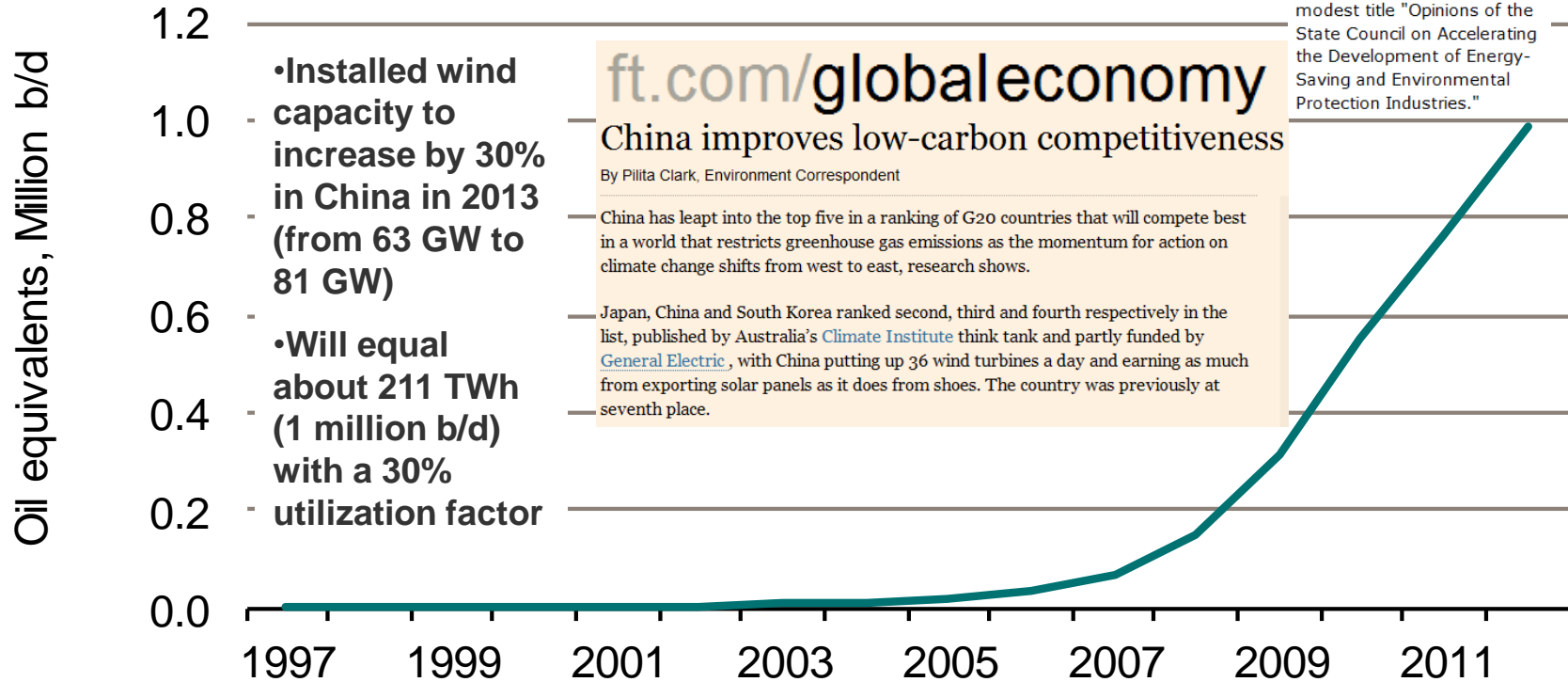
Look What The Chinese Have Done With Wind Power

- Increase from zero to 1 million b/d (211 TWh) in 5 years. Total German electricity consumption is about 600 TWh...

SPiegel ONLINE INTERNATIONAL

'Liconomics': China's Green Revolution Arrives

Chinese Wind Power Output (assuming 30% utilization rate)



But that's where, on Sunday, August 11, the government released a guideline with the modest title "Opinions of the State Council on Accelerating the Development of Energy-Saving and Environmental Protection Industries."

China makes fresh promises on air pollution, pledges support for solar

SHANGHAI, June 15 (Reuters) - China's cabinet approved new measures to combat air pollution on Friday, in the latest step by China's new leadership to address the country's enormous environmental problems, with pollution a key source of rising social discontent in China.

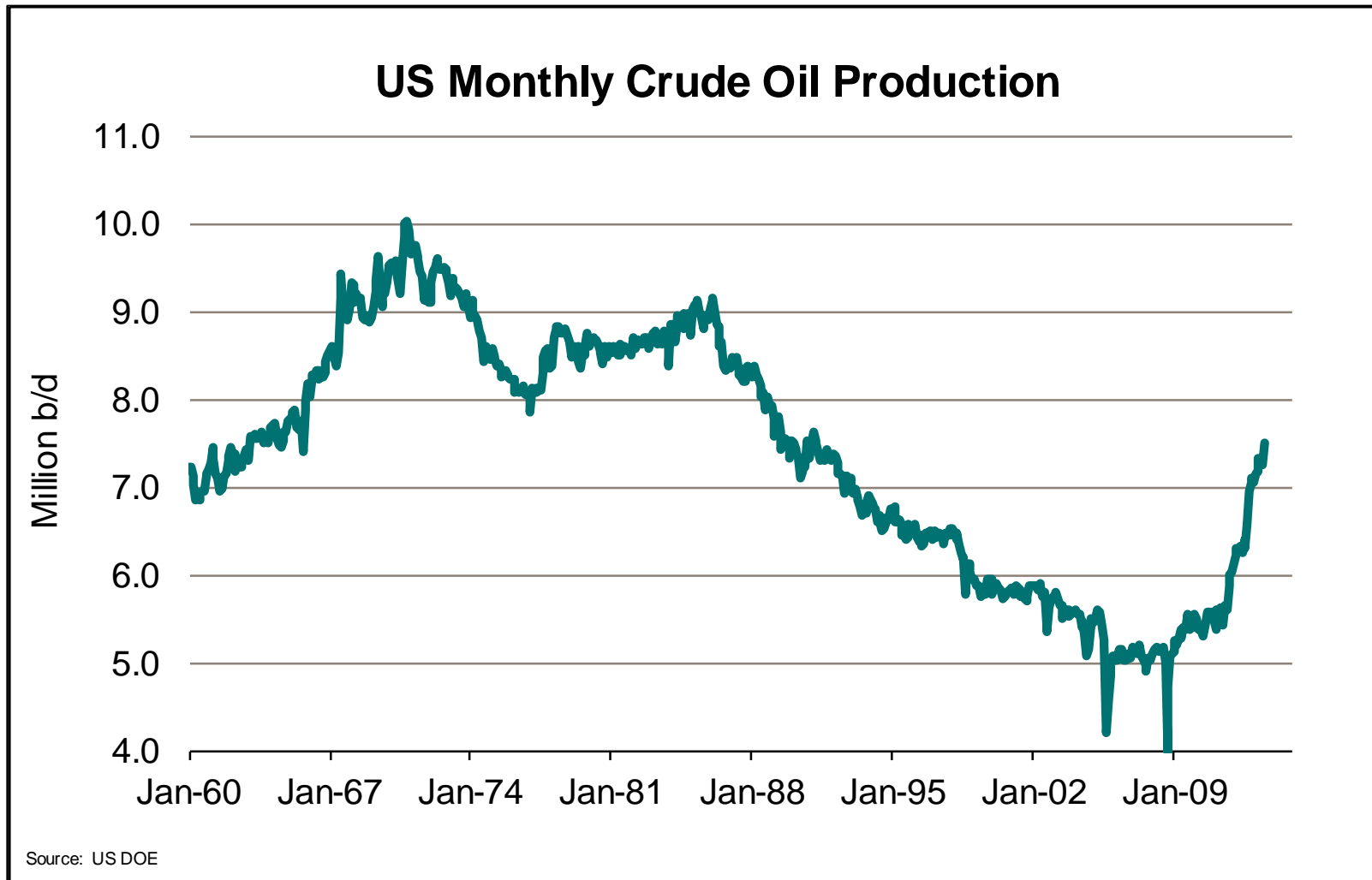
Source: BP stats, Global Wind Energy Council

MARKETS

Supply

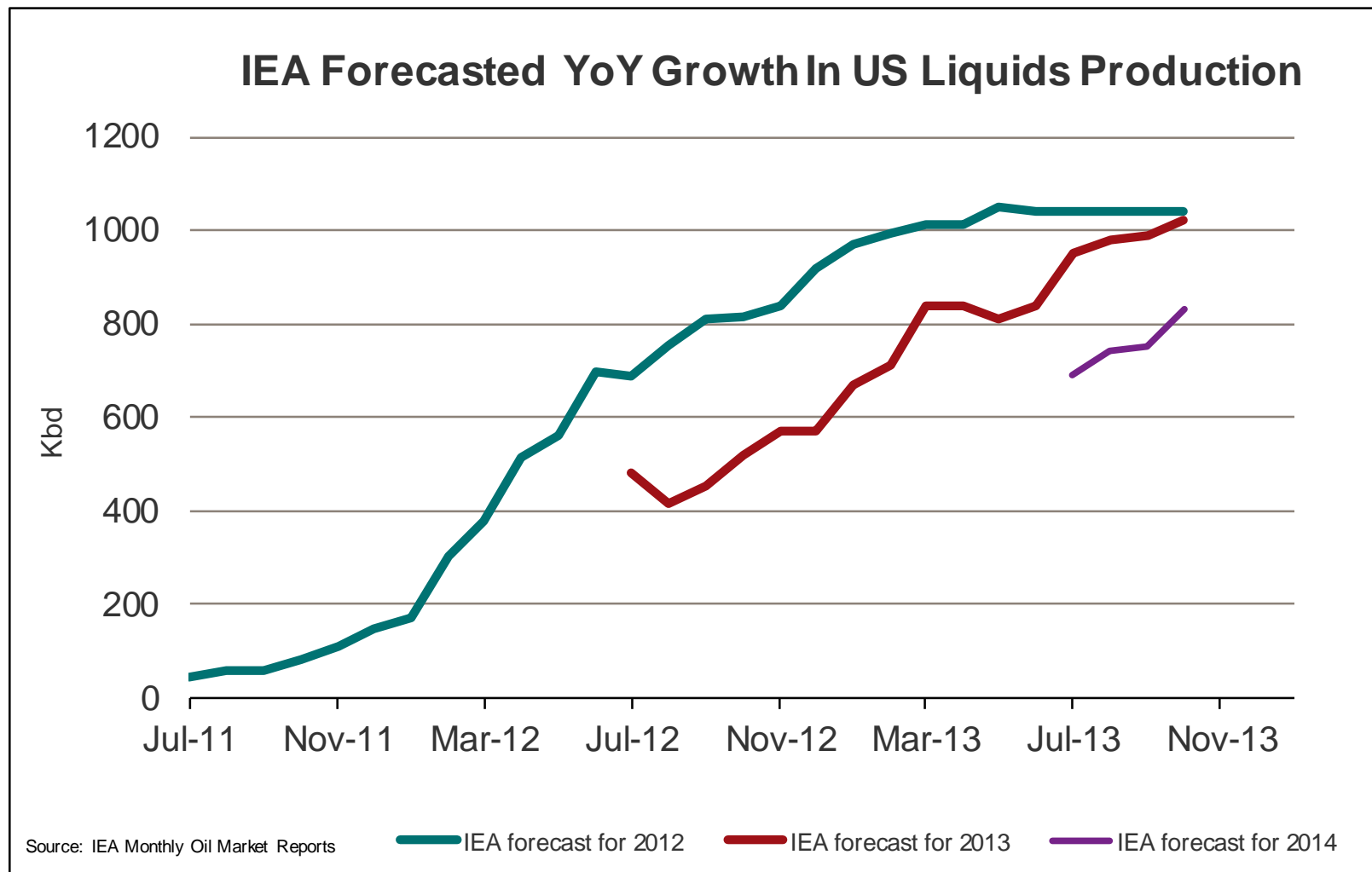
US Crude Production Back On The Rise – The Shale Revolution

- After more than 20 years of steep production decline, US production is rising again



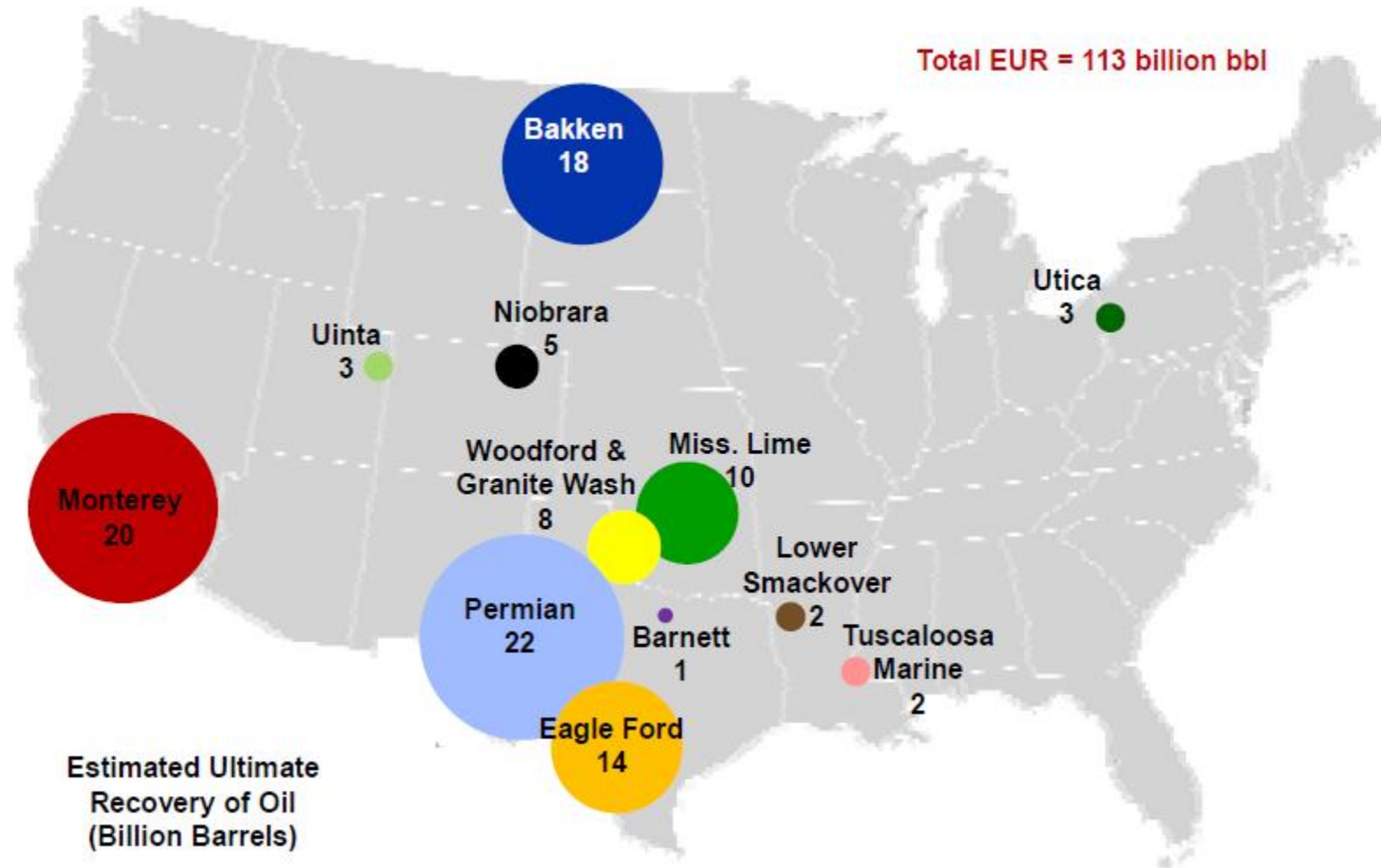
IEA's Forecasts For US Production Growth Were Far Too Low

- IEA's first take on 2012 US production growth was at 45 kbd - now 2012 growth is estimated to have been 1.04 million b/d



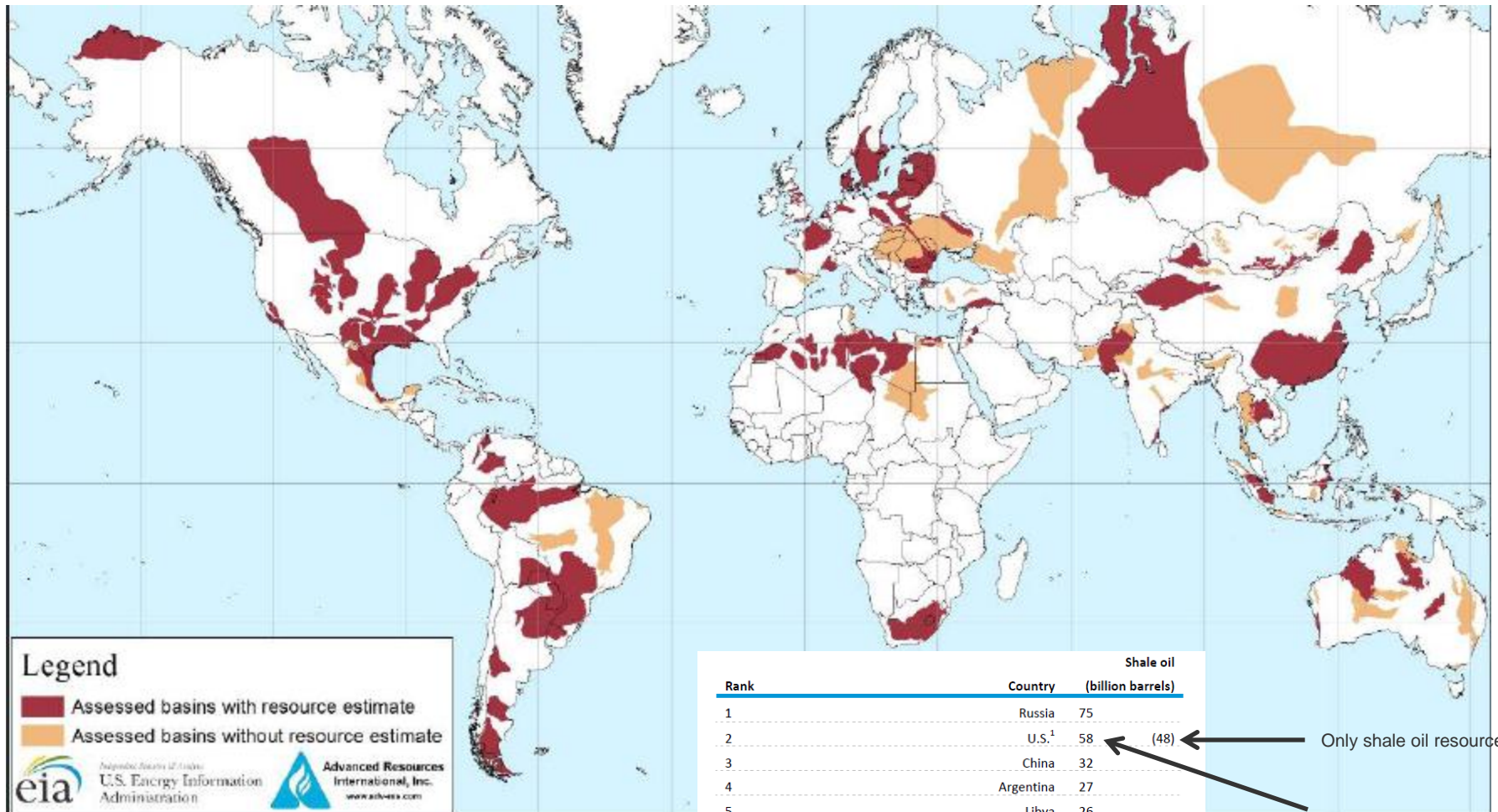
US Recoverable Shale Oil Reserves - 133 billion barrels

- Source: PIRA Study – Road to US energy independence (Since Sep 2012 the estimate is increased to about 133 billion barrels...)



First Estimate Of Global Shale Oil Resources Came June 10th

- Total recoverable shale oil resources estimated at 345 billion barrels (Middle East and Caspian not assessed)



Legend

- Assessed basins with resource estimate
- Assessed basins without resource estimate

Rank	Country	Shale oil (billion barrels)
1	Russia	75
2	U.S. ¹	58 (48)
3	China	32
4	Argentina	27
5	Libya	26
6	Australia	18
7	Venezuela	13
8	Mexico	13
9	Pakistan	9
10	Canada	9
	World Total	345 (335)

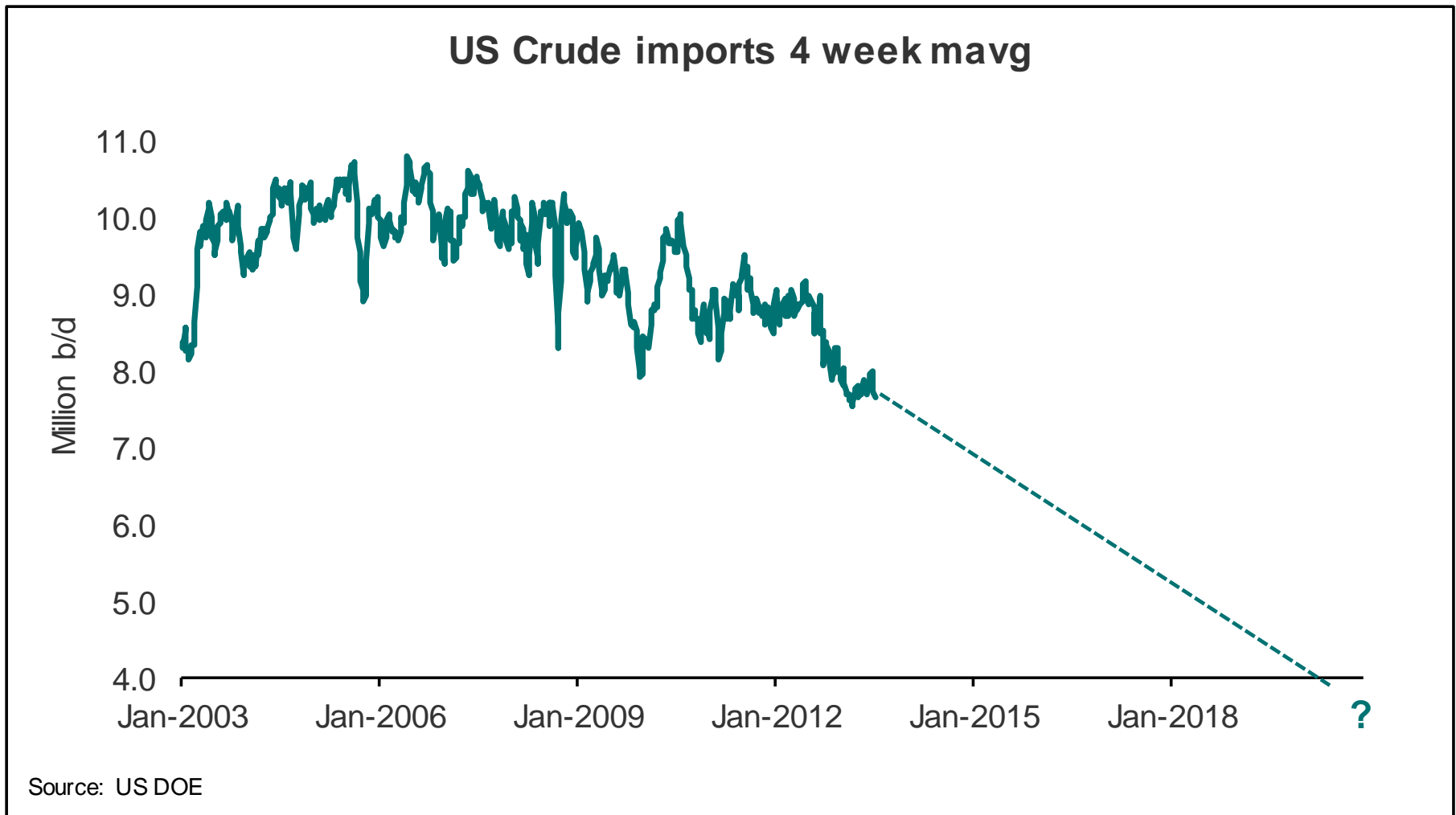
Only shale oil resources

Other tight oil included In addition to shale

¹ EIA estimates used for ranking order. ARI estimates in parentheses.

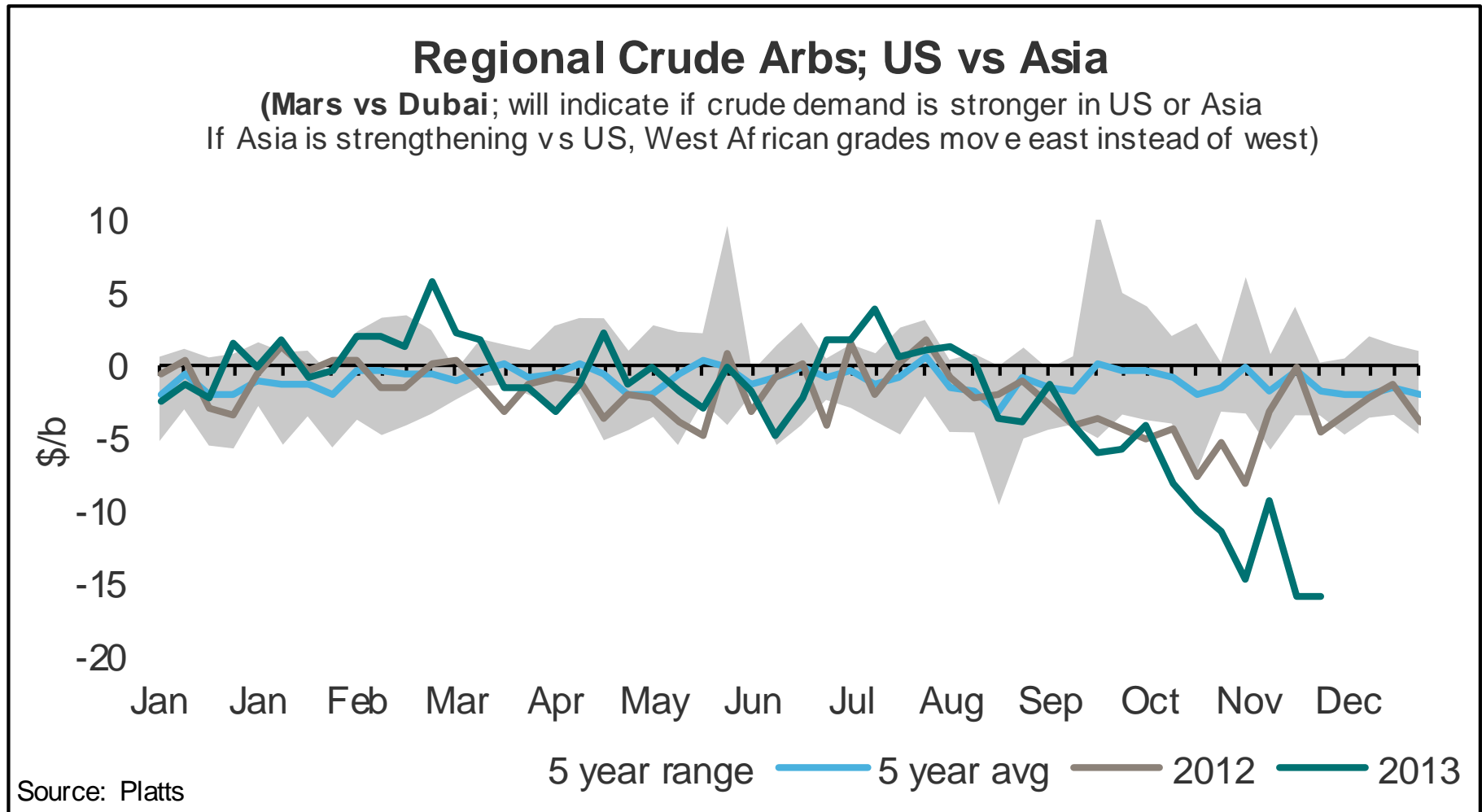
We Are Starting To See The Effect On US Crude Imports Now

- US crude imports has started to drop but this is just the beginning



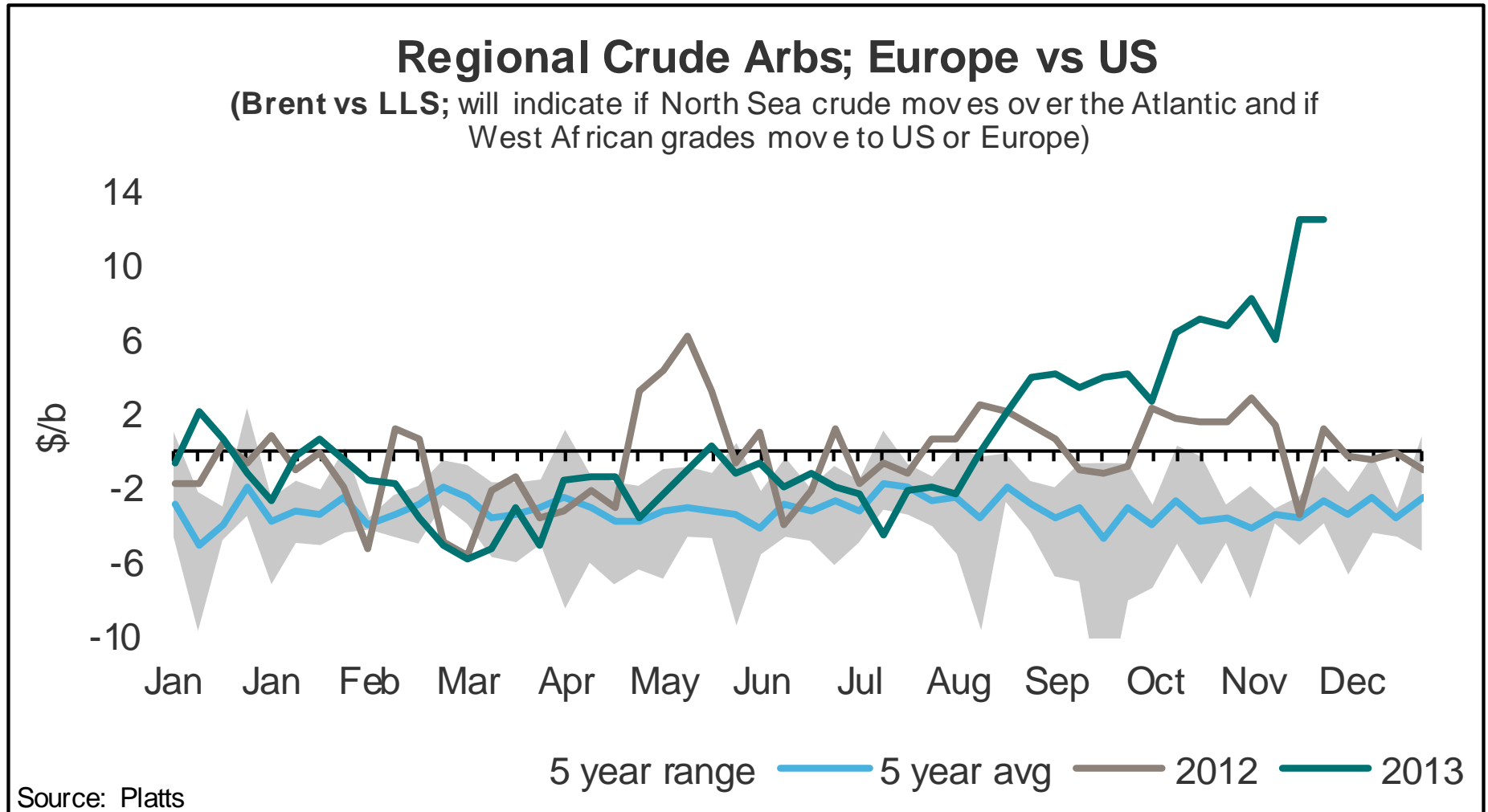
Swing Exporters Moving East Or West?

-Mars in the US GOM vs Dubai in Asia



Brent vs LLS Will Indicate If The US GOM Is Over Supplied

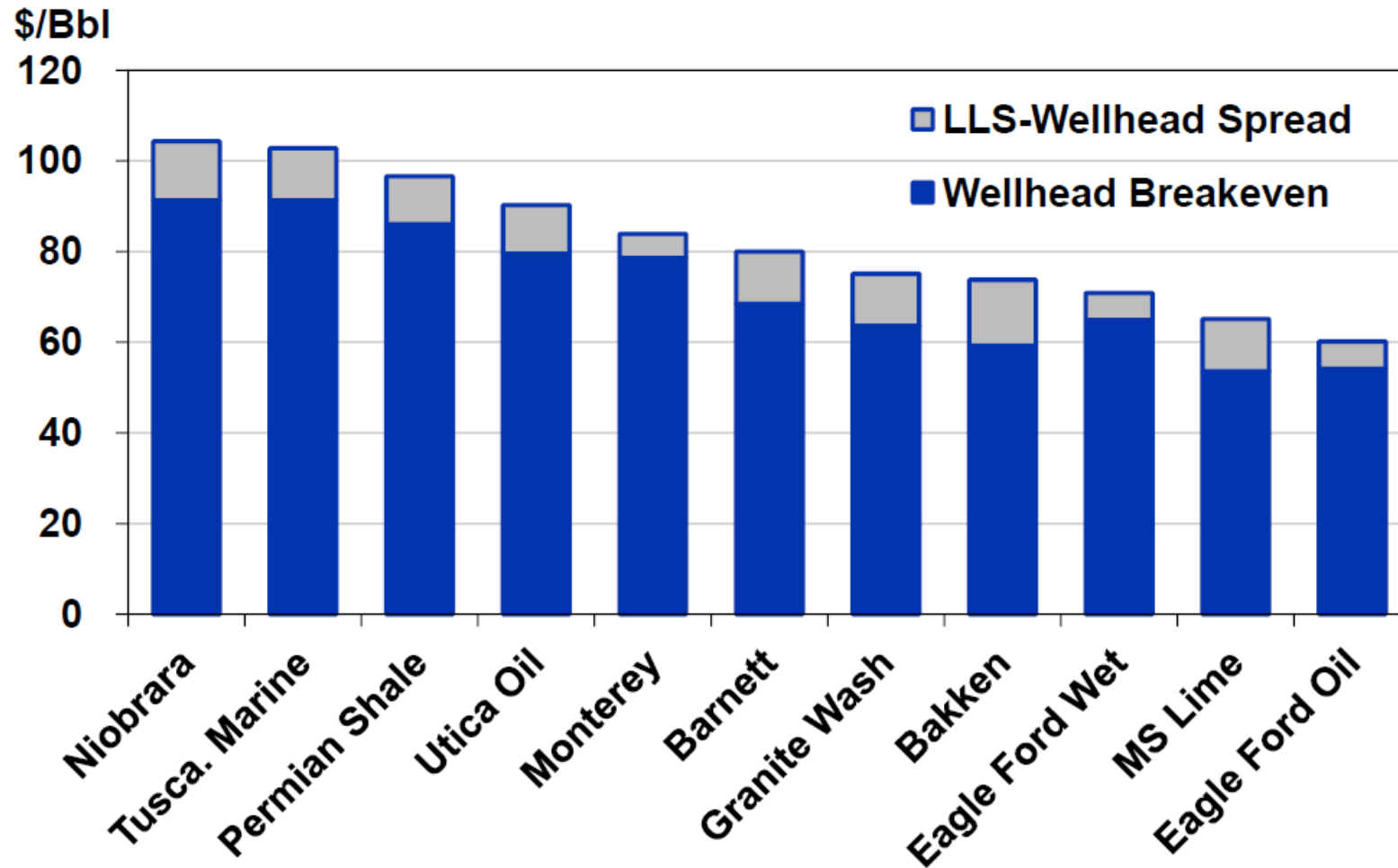
-If Brent price above LLS more West African barrels should head towards Europe instead of towards the US



Cheaper oil but not cheap oil

The New Shale Resources Are Not Particularly Cheap

- Oil prices needs to stay in the 75-90 \$/b range or higher to make the broad shale industry economical

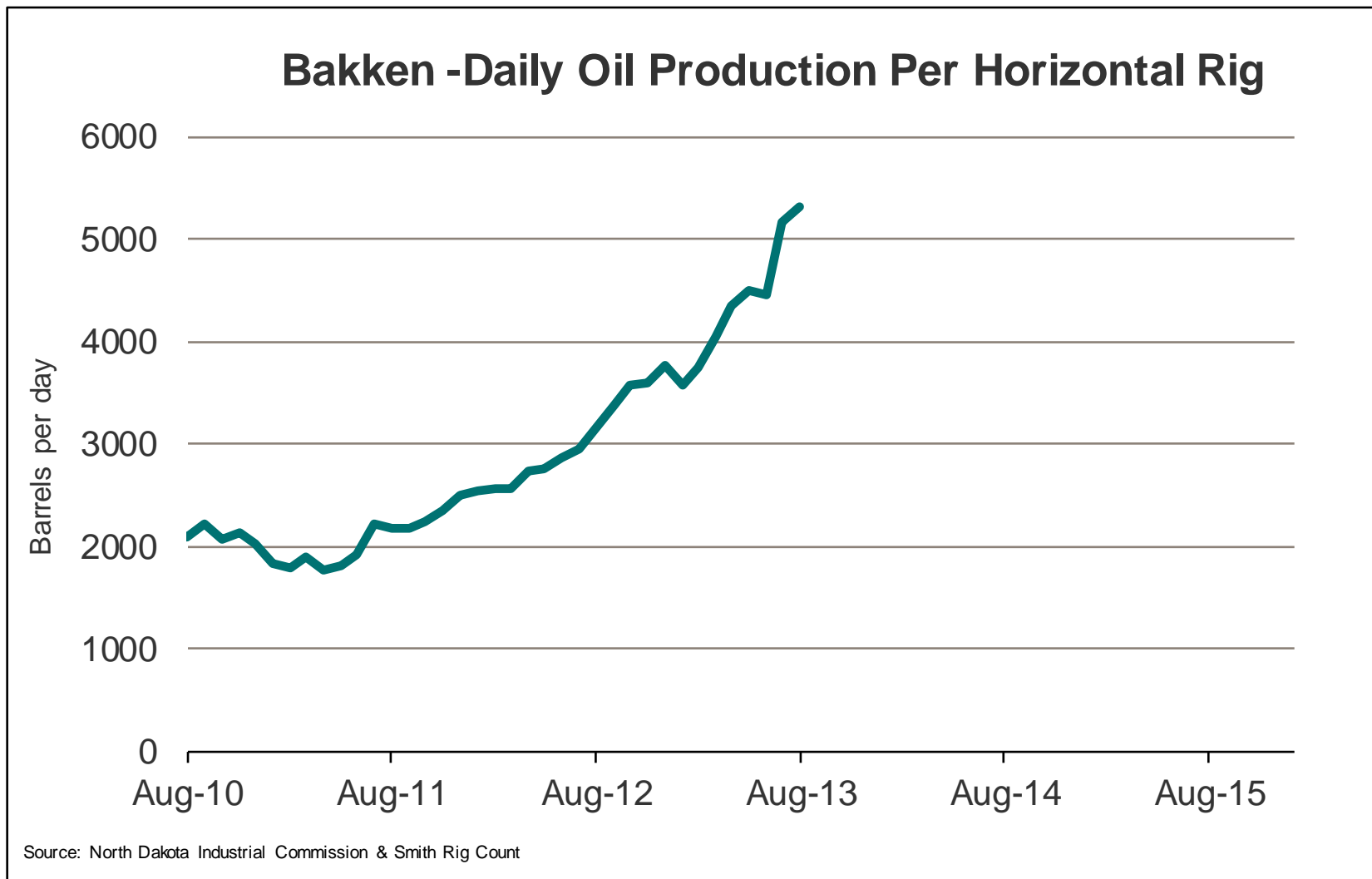


Source: PIRA Energy, October 2013

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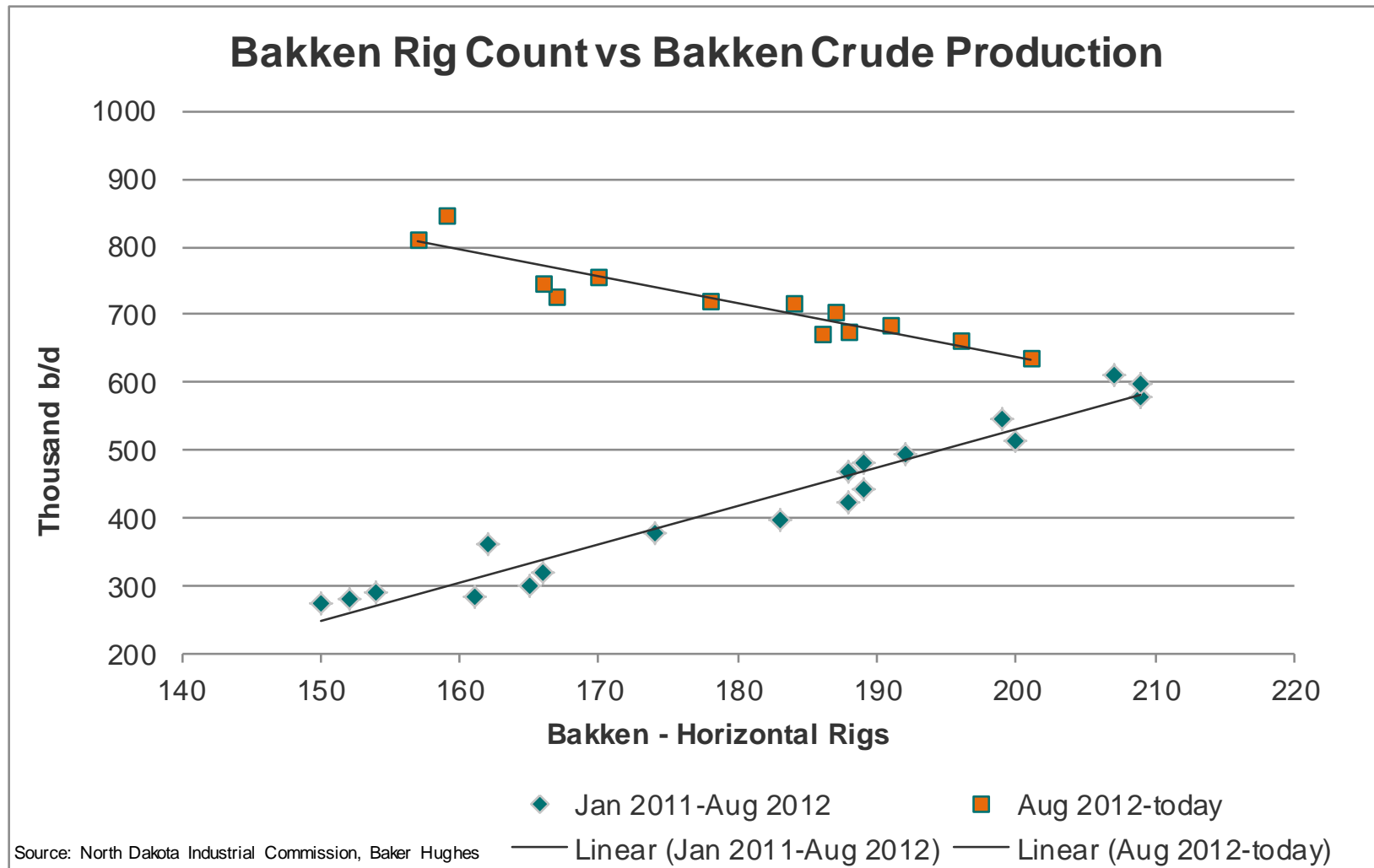
Learning Curve Still Ongoing In The Shale Plays

- Production **per rig** is exploding to the upside



No Predictability For Oil Production In Counting Rigs Anymore

- The lower the rig count; the higher production is what we are currently seeing...

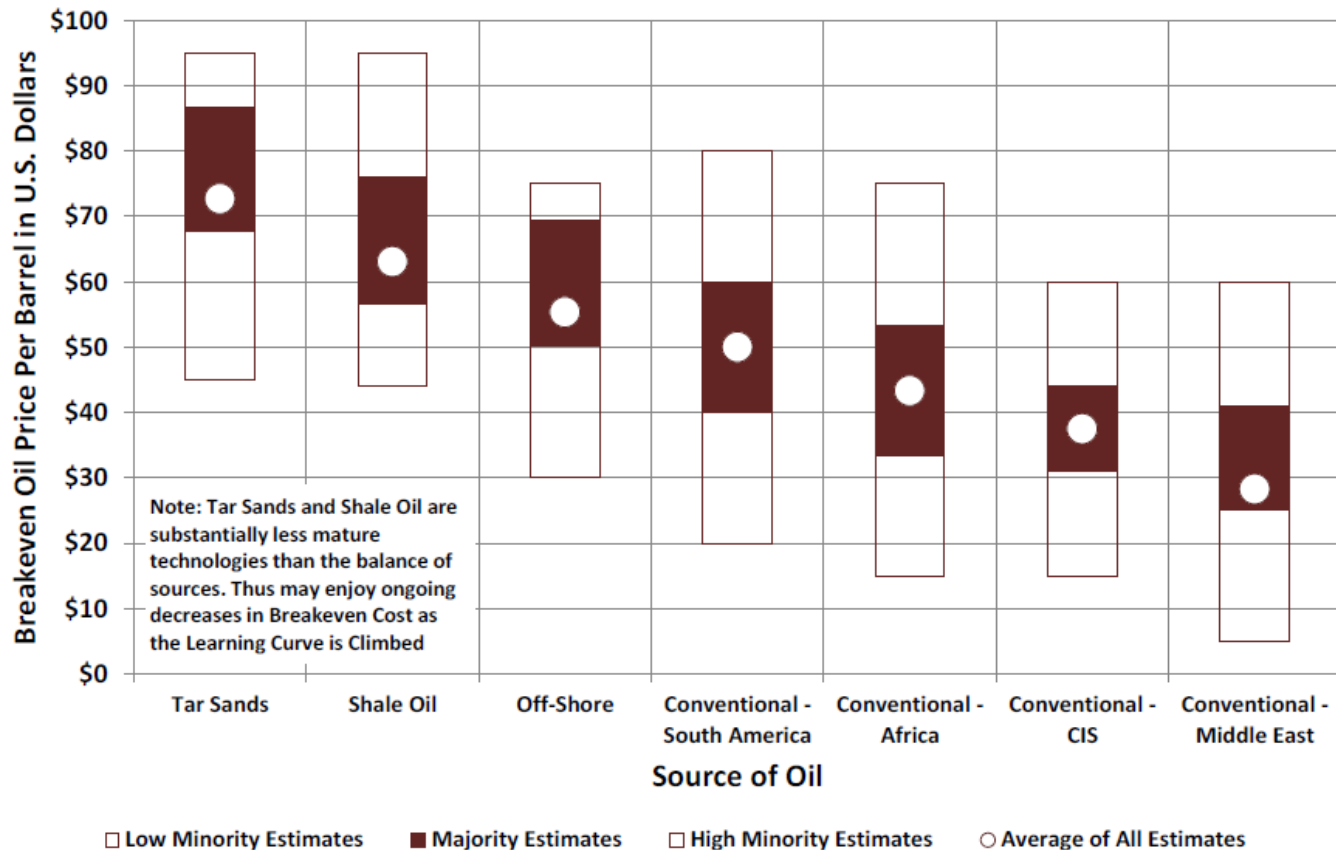


General World Break Even Prices By Source (Source: J.T. Gabrielsen Consulting)

- Same spread in shale oil as oil sand, but average and majority of estimates are significantly lower
- Both in *Off-shore* and *Conventional South-America* some projects will require higher oil prices than the cheapest *Shale oil*

General Ranges of Breakeven Oil Prices per Barrel

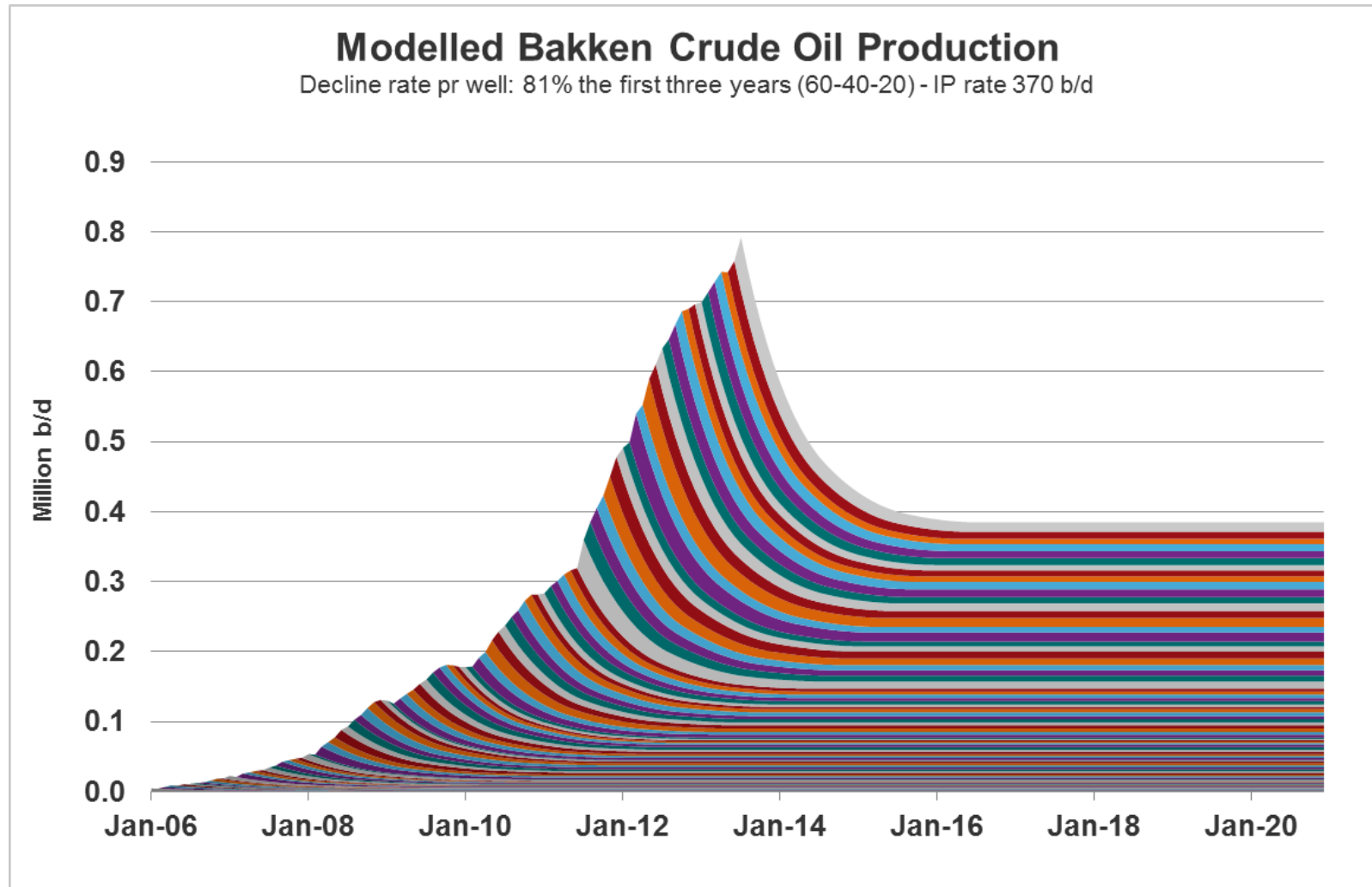
Ranges Encompass those Cited by the Majority of Analysts



Sources: Jon T. Gabrielsen Consulting analysis of data from: "Facboi-Oil production cost estimates by country" July 26, 2009 referencing IEA, Kazakh-British Chamber of Commerce, Reuters, and the Industry Body Oil & Gas UK, 20th World Petroleum Congress "Brazil's deepwater: A financial as well as technical challenge" citing Petrobras CEO Jose Sergio Gabrieli, Article "The Cost of New Oil Supply" citing Chris Skrebowski April 18 2012 <http://petroleum-guide-to-energy.blogspot.com/2012/04/production-costs-of-unconventional-oil.html>, bakkendatch.com "More on Occidental Petroleum and Rising Production Costs" June 13, 2012, Business Insider: "Analyst Makes Bombshell Prediction of \$50 Oil, And More Production Than We Could Possibly Know What to Do With" December 1, 2012, Daily Finance: "3 Risks for Canadian Oil Investors" October 29, 2012, Den Norske Bank - Torbjørn Kjus "Oil Market Outlook" 22 August 2012 citing PIRA, EagleFordShale.com May 5, 2013 "What is the Breakeven Oil Price in the Eagle Ford?" citing Baker Hughes, Energy Maritime Associates "Oil Price Unevenly Affects Floating Production Projects" February 2009 Oil and Gas Journal, Forbes January 8, 2013, "What Would Happen To The Current Fracking Activity And Subsequent Booms Generated If Oil Prices Were to Drop?", Forbes January 8, 2013, "What Would Happen To The Current Fracking Activity And Subsequent Booms Generated If Oil Prices Were to Drop?", Forbes, "Oil Price Differentials: Caught Between the Sands and the Pipelines" June 21, 2012, IEA Oil Market Report citing Rystad Energy, Oil and Gas Investor "Oil-Sands Lessons" April 2010, price.com article citing Wood Mackenzie reports, "Have Canadian Tar Sands had their Day?", dutchchange.com "We Need to Learn quickly" May 19, 2012, petroleumnewsbakken.com quoting Kay Gashman of Statoil at June 20, 2012 Investor Conference, Reuters "Insight: Peak, Pause, or Plummet? Shale Oil Costs at Crossroads" May 17, 2012, The Oil Depletion Analysis Center: Newsletter September 16, 2011 citing Chris Skrebowski and a table from Merrill Lynch/Bank of America, The Oil Drum "Is Shale Production from Bakken Headed for a Run with 'The Red Queen'", thedrill.com "Oil Giants Pour Billions into Bakken Shales", and Thompson Reuters: "Repsol-led group makes big oil find off Brazil" May 24, 2012.

Drilling Must However Continue To See Further Growth

- If drilling stops the decline rates will take hold; Bakken production would be cut in half within two years

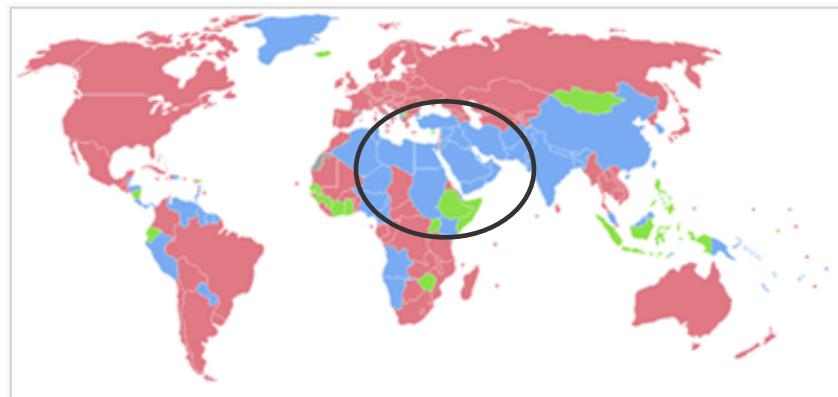
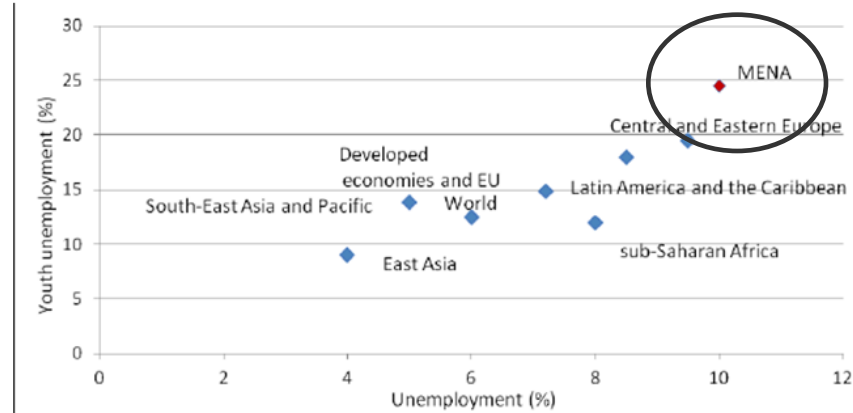


MENA Demographics: Young - Unemployed - Males

- A recipe for social unrest

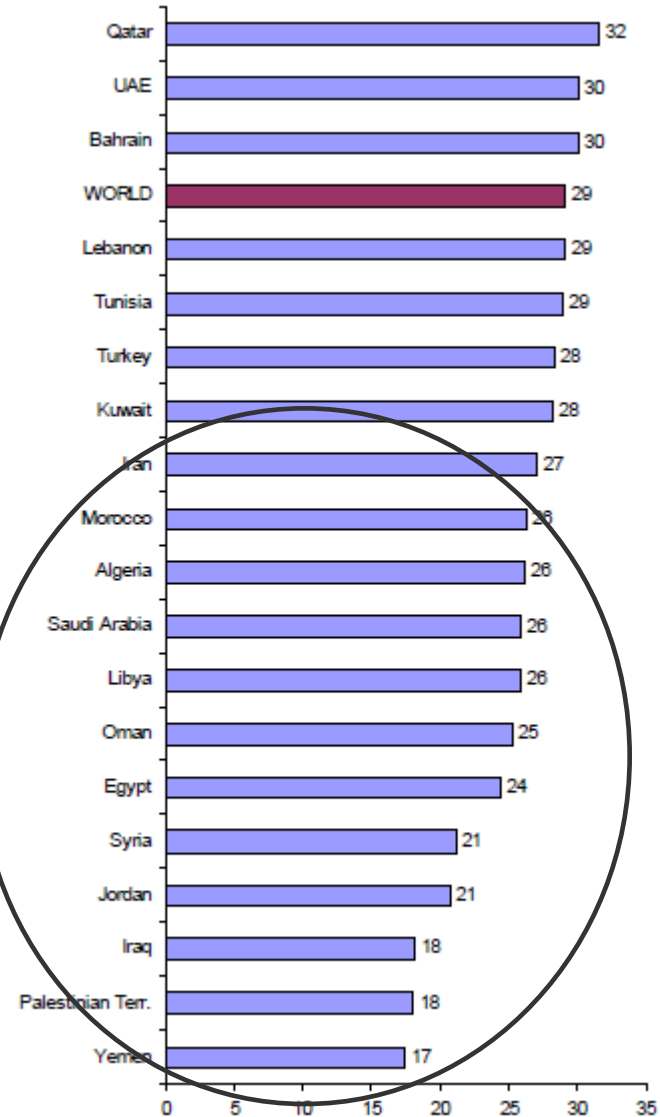
Figure 1: Total and Youth Unemployment by Regions (2010)

Source: ILO and IMF data.



Map indicating the human sex ratio by country.^[1]

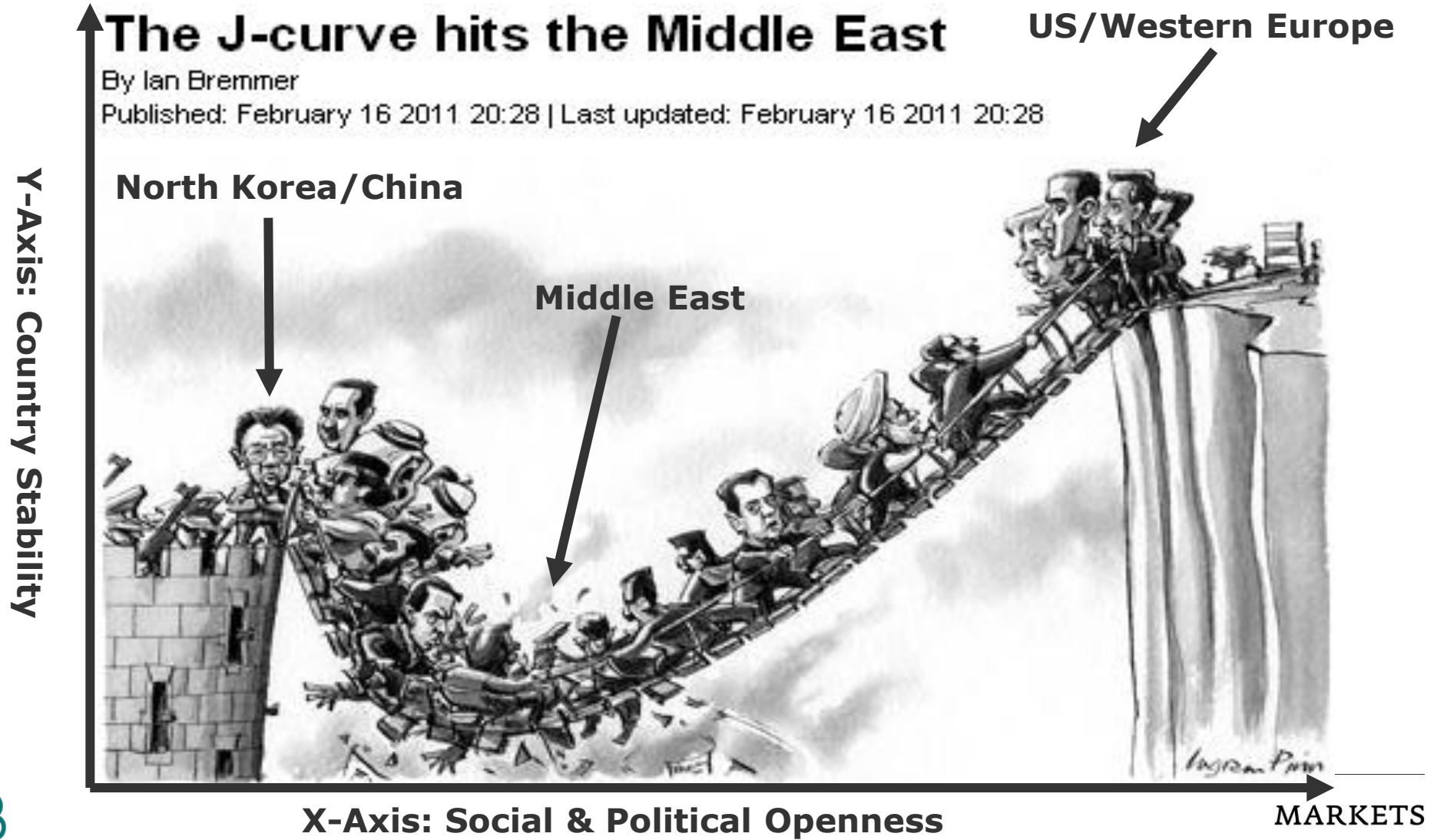
- Countries with more **females** than males.
- Countries with the **same** number of males and females (accounting that the ratio has 3 **significant figures**, i.e., 1.00 males to 1.00 females).
- Countries with more **males** than females.



Sources: IMF, UN Population Division, CIA World Factbook

Geopolitical Risk Increase As A Society Opens Up

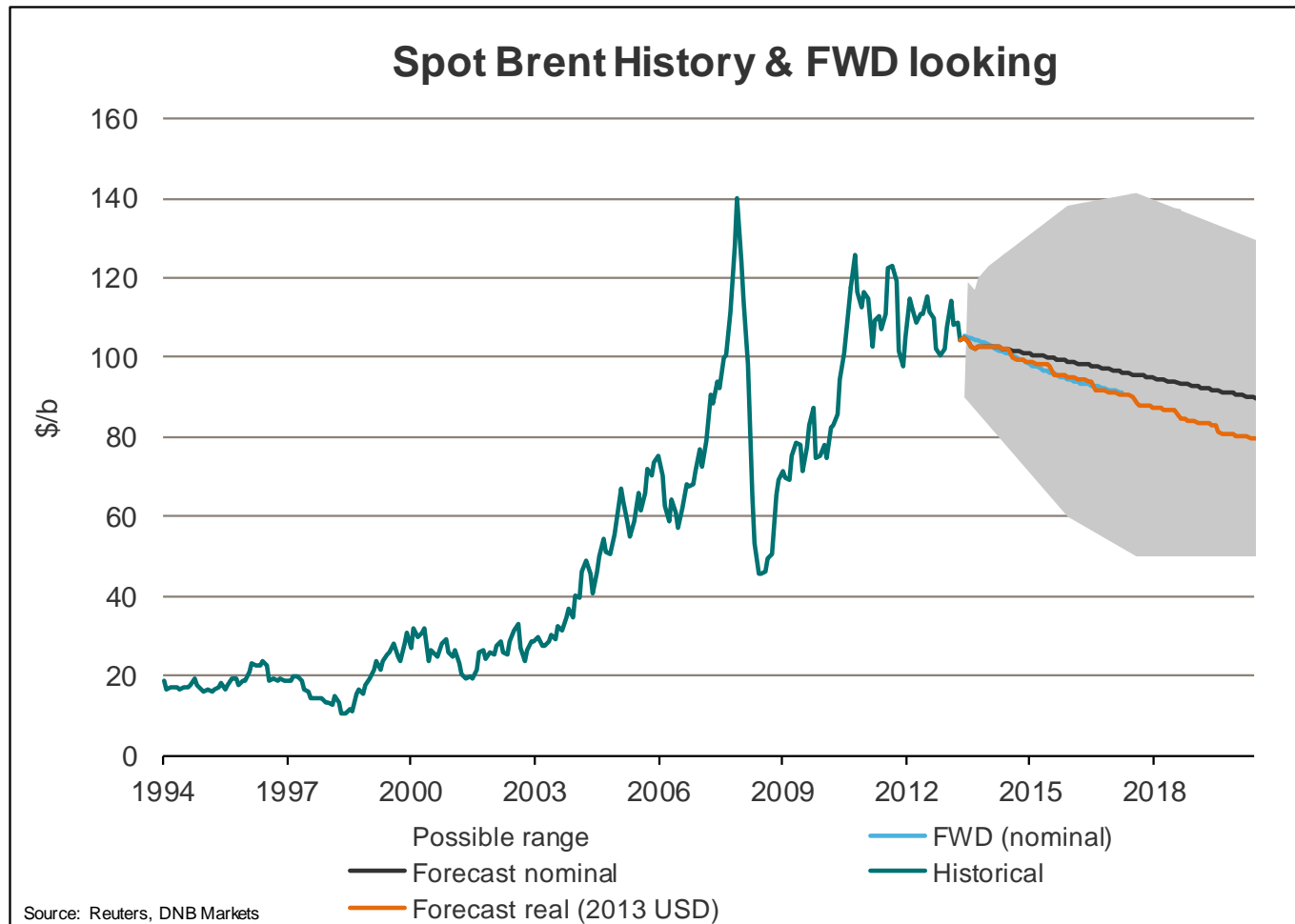
- Internet - Satellite-TV - Cell-phones



Long Term Oil Price Forecast

(The forecast is for the average of the rolling 1st month ICE Brent future contract)

	Historical Nominal \$/b	Historical Real (2011) \$/b
2001	24.9	31.1
2002	25.1	31.3
2003	28.5	35.3
2004	38.1	46.6
2005	55.0	62.8
2006	66.2	72.7
2007	72.7	78.5
2008	98.7	101.6
2009	62.6	64.7
2010	80.4	82.0
2011	110.8	110.8
2012	111.7	111.7
	Forecast Nominal \$/b	Forecast Real (2012) \$/b
Q1-13	112.6	112.6
Q2-13	103.4	103.4
Q3-13	109.7	109.7
Q4-13	103.0	103.0
2013	107	107
2014	102	102
2015	100	98
2016	98	94
2017	96	90
2018	94	87
2019	92	83
2020	90	80



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