

The Long View: Sifting Through the Uncertainties

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The Long-term Risks and Uncertainties in the Natural Gas Market are Many

Resource Base is vast, but production levels and cost remain uncertain

› Ultimate shale/unconventional production performance

- By 2013-2014, we will know much more about how shale wells perform longer term, and will have a much better idea of ultimate recoveries and production potential for a given well

› Environmental resistance – hydraulic fracturing regulations, for example.

- Environmental resistance, and political attention, is building
- Regulatory costs and permitting delays could slow development considerably

› Competition with oil for upstream dollars and services

- As companies move toward oil, gas shale plays must compete for horizontal rigs and crews
- A booming opportunity in oil could raise target IRRs on gas plays as producers seek the best margins

Demand opportunities require major capital commitment or policy help

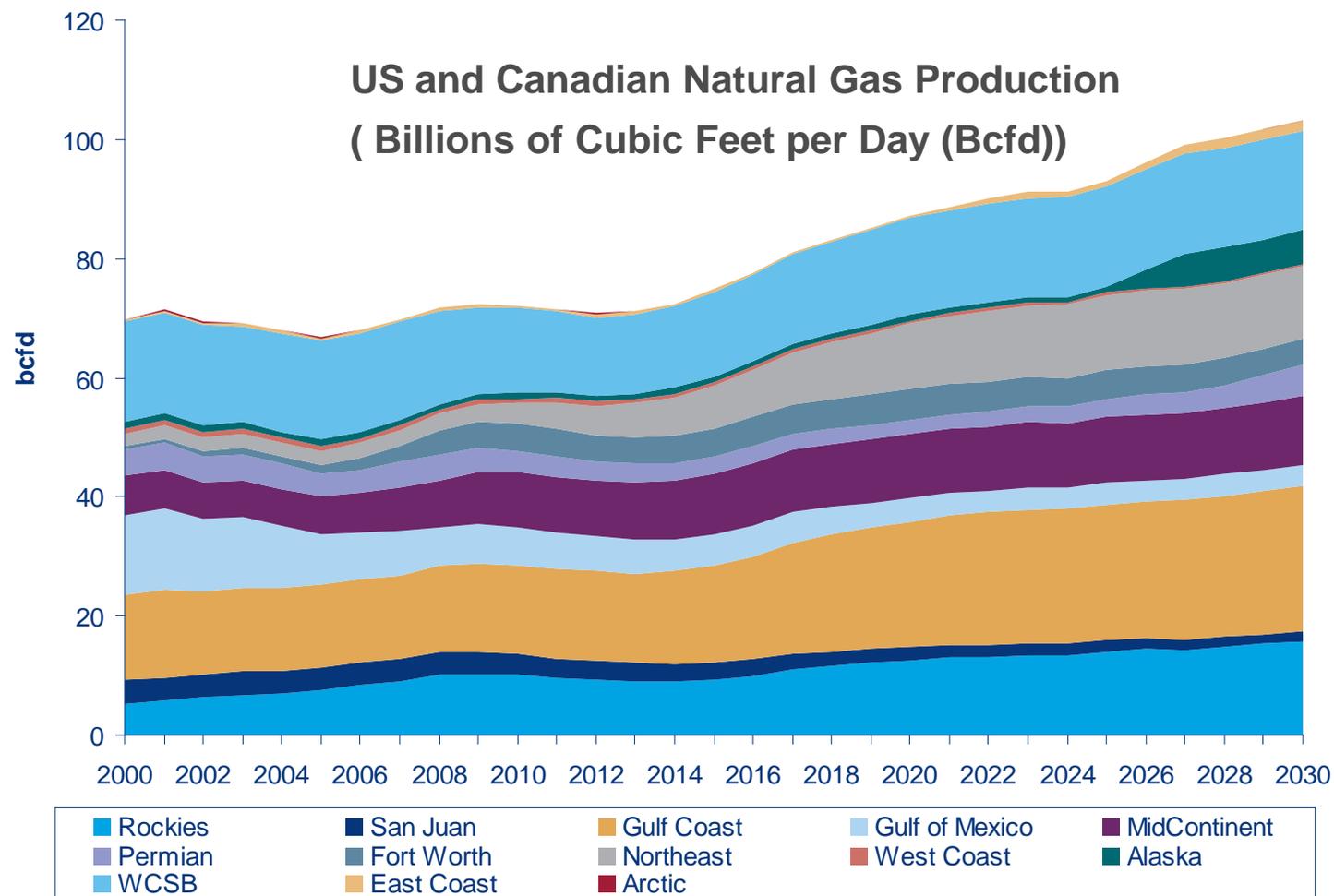
› Carbon and environmental policy

- Wide range of possibilities w. carbon depending on the targets, timing, price and investment focus
- EPA regulation and pressure on older coal units—how many retire?

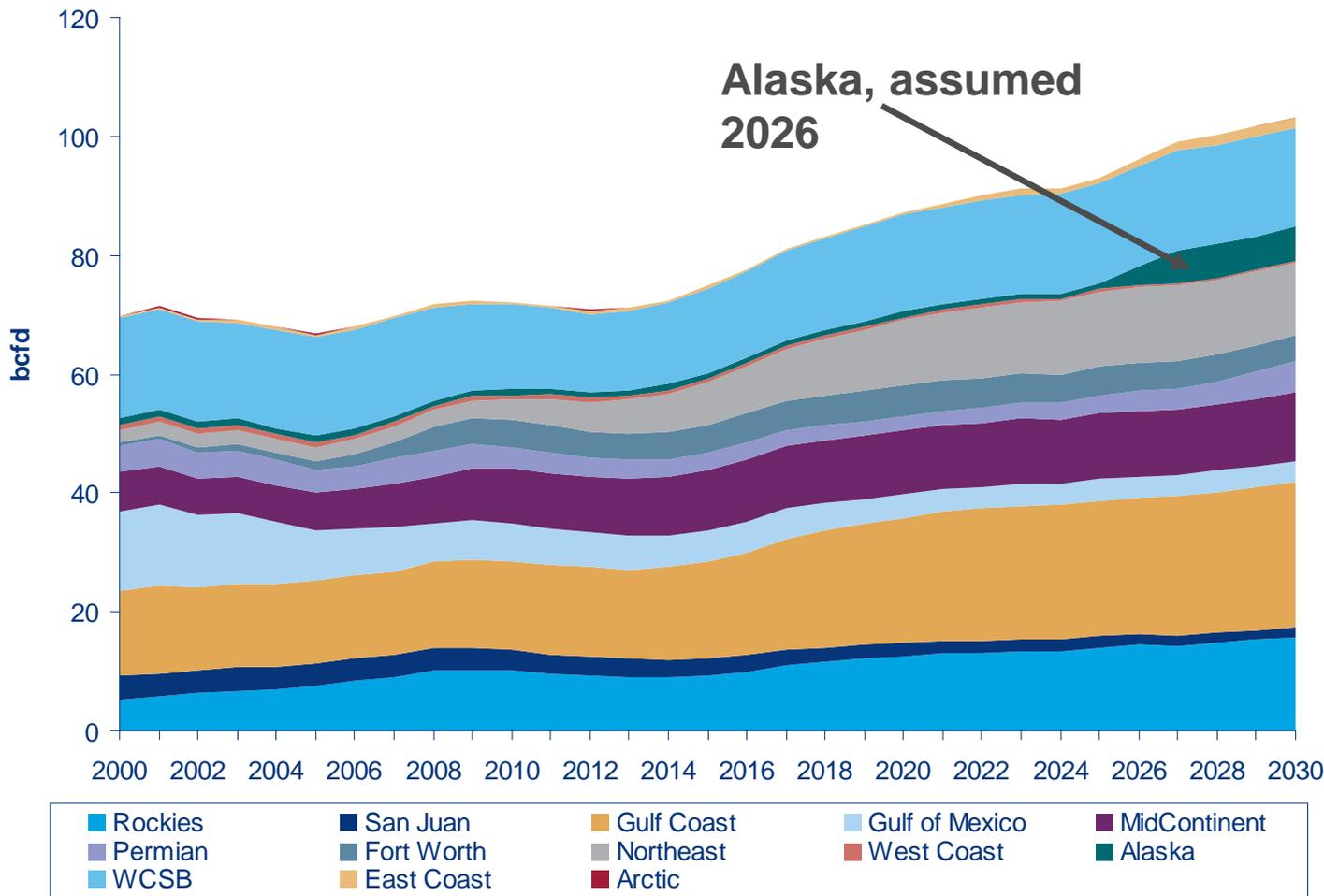
› New (or renewed) markets for gas

- Gas-intensive industries represent an opportunity, but depend on liquids and global dynamics
- NGVs? Difficult competition from plug-in hybrids for passenger cars and energy density issues for long haul heavy duty vehicles

The Known: the N. Am. Natural Gas Resource Base is Indeed Vast, and Can Support Demand Growth at “Reasonable” Prices

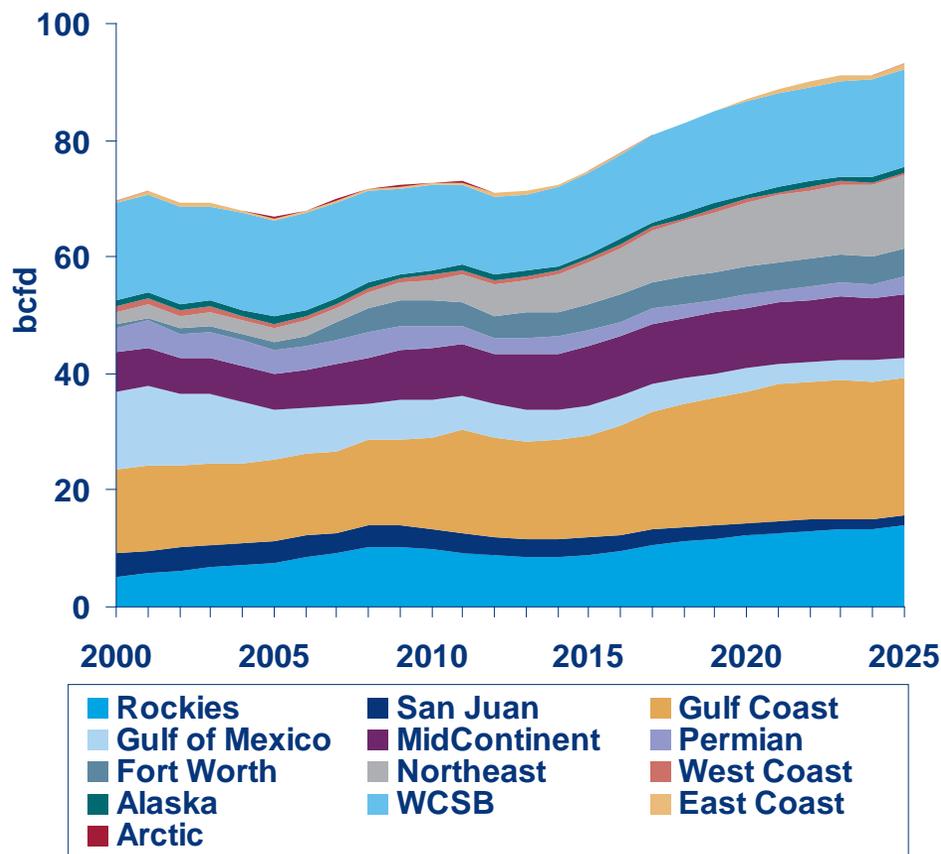


But, Alaskan Supplies Are Not Necessarily Shut Out of the Supply Mix

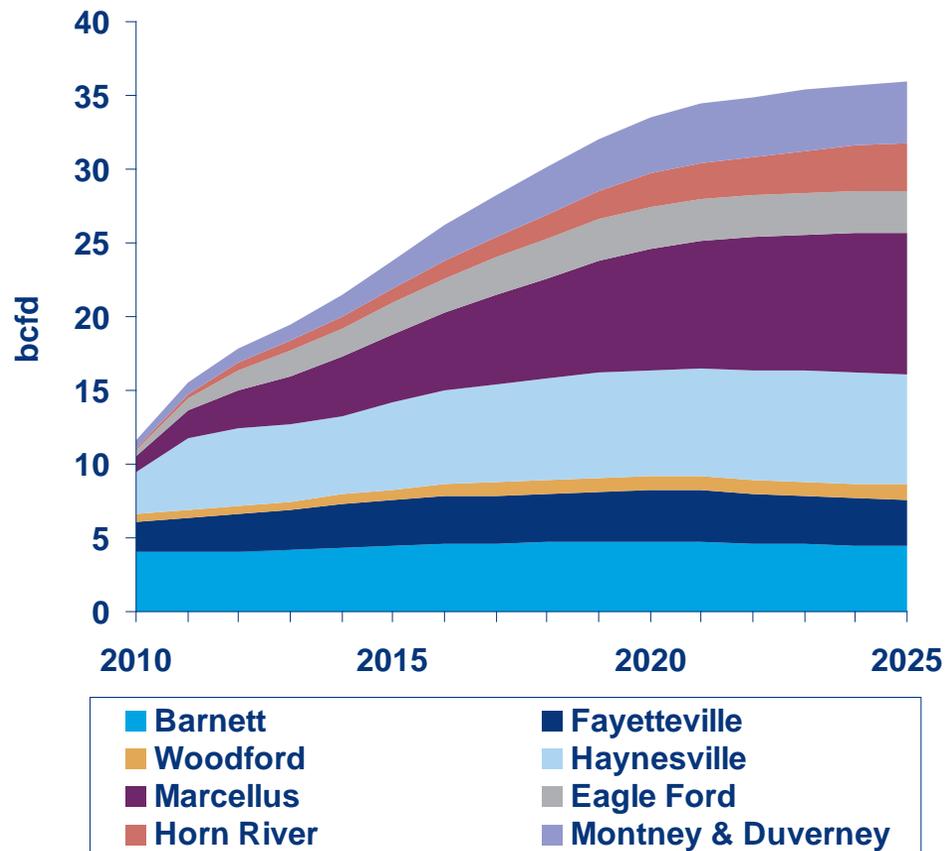


Just the *Known* Shales Could Reach 35-40% of Overall US/Canadian Production

US and Canadian production



Major shales



But There are Many Uncertainties, Especially:

1) the Cost of *Future* Shale and Other Unconventional Supply Developments, and



2) the Size of the Market



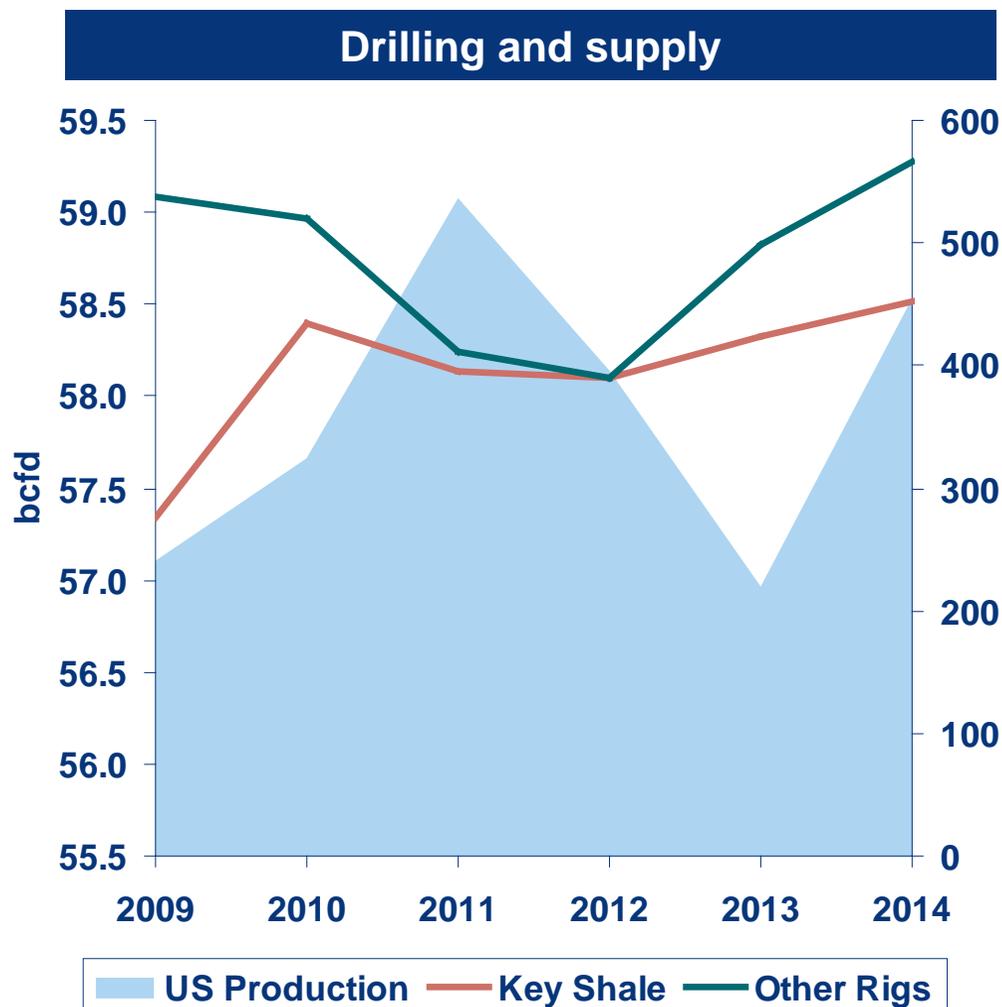
Current Drilling Levels are Misleading, and Not Supported by Price

› Temporary Factors Supporting Drilling:

- Hold-by-production clauses in leases
- Hedging at higher prices from last year
- Foreign capital

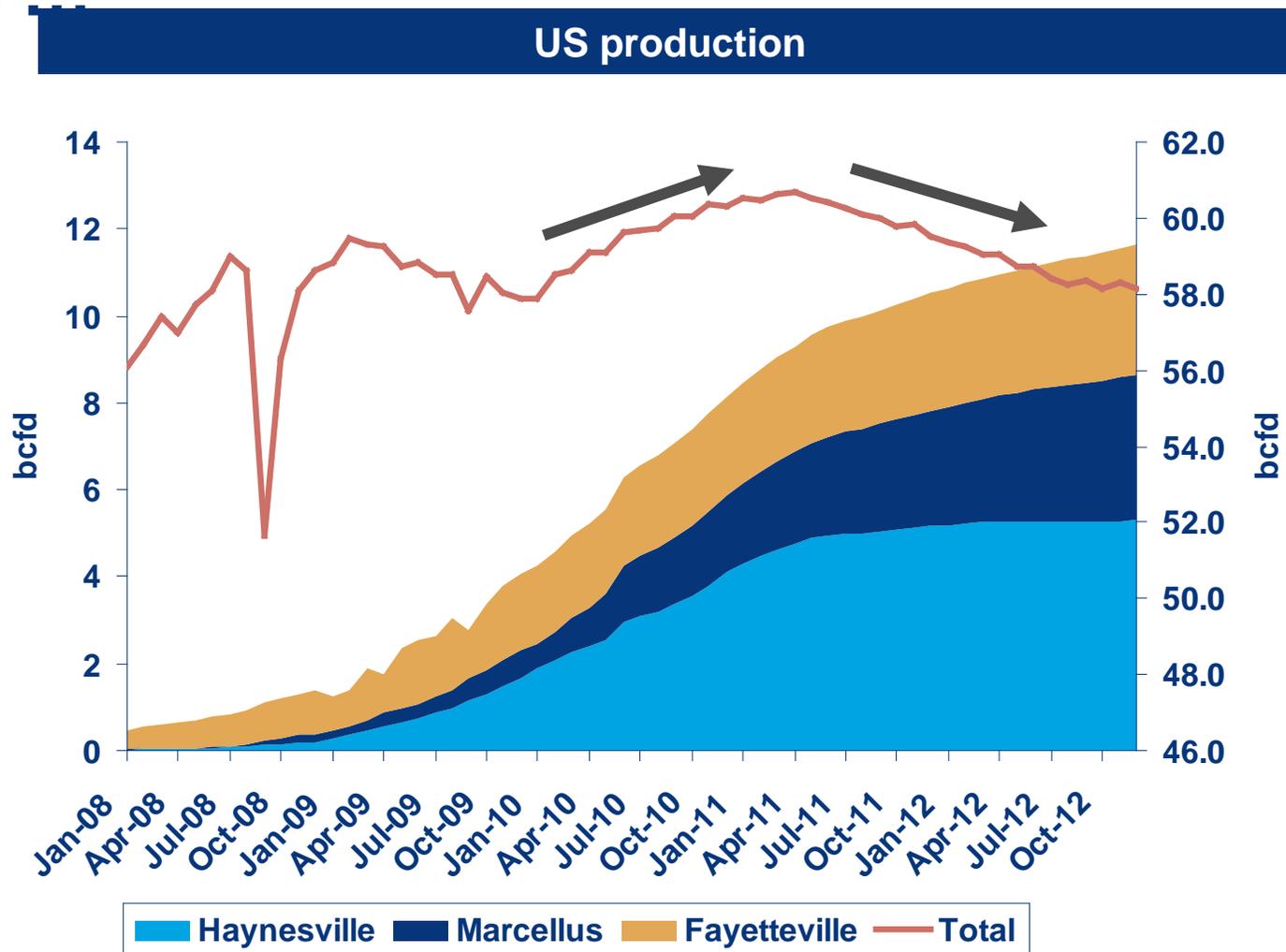
› But – the first 3 factors roll off in late 2011 and 2012

› And, drillers are moving away from gas, to oil.



As a Result, US Supply Growth Continues This Year, Then Reverses

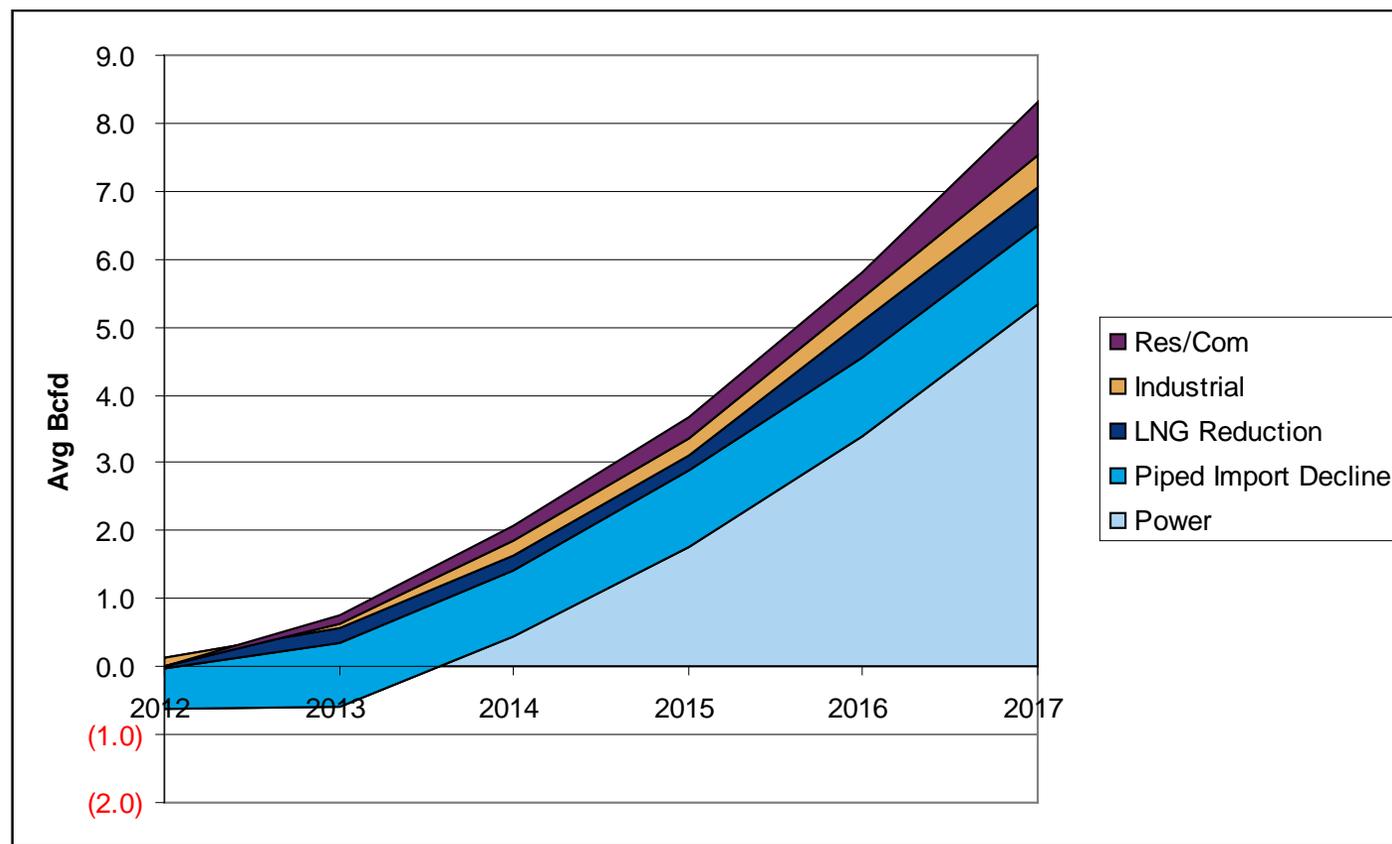
- › Over the last six months, Haynesville, Fayetteville, and Marcellus production climbed by 1.5 bcf/d
- › But even there, the pace of growth slows in 2011



...Just as Demand Begins to Grow: Power Demand Drives an Increase in the Call on US Domestic Supply

- › Power demand uplift is 2/3 of overall growth from 2012-2017.
- › Pipes imports decline, including an increase in exports to Mexico.
- › Canadian exports to the US continue to decline.

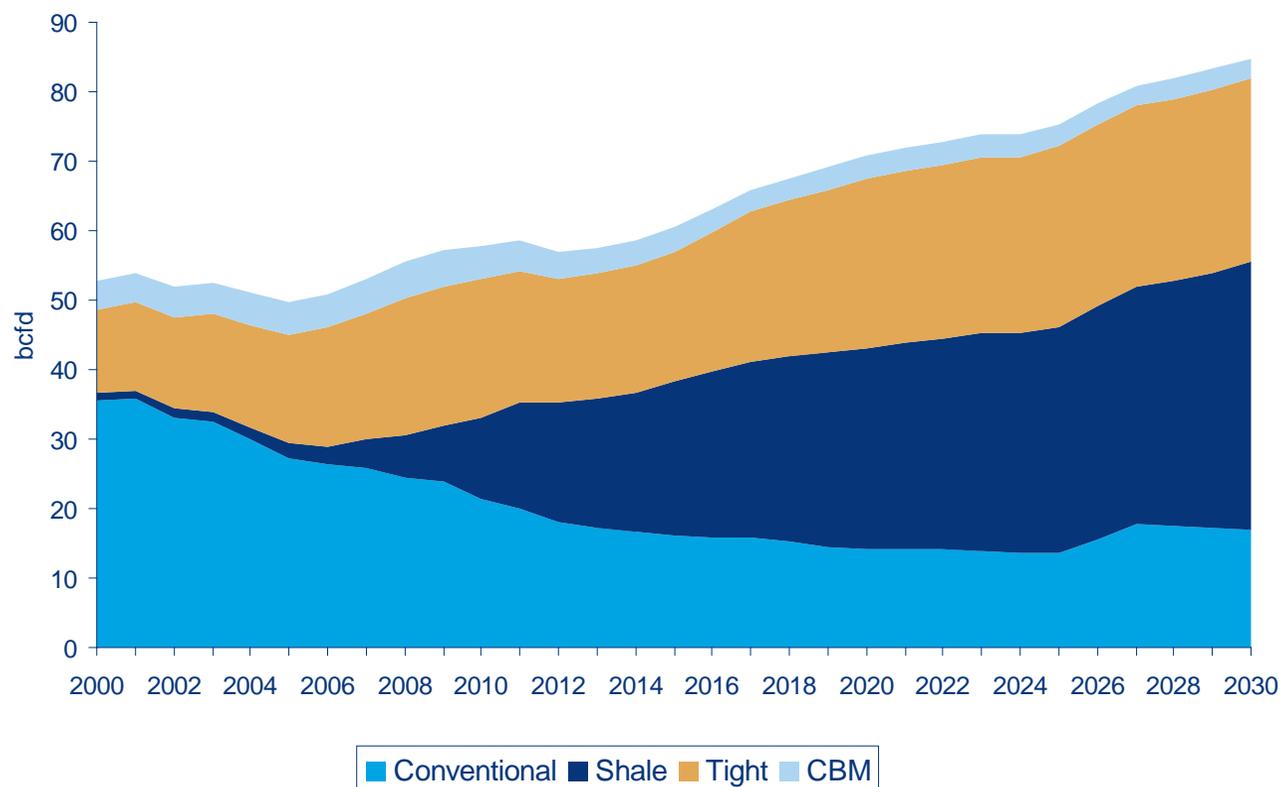
Increasing Call on US Production



Can Supply Follow This Growth? Yes – but it's All from Unconventional Sources

US Supply by Source

› Most growth is from shales, while some is from “tight” gas, and none from coalbed methane (CBM).



So, Prices Must Rise to Induce Drilling, but Gas is Still Less than Half the Cost of Oil per MMBtu

› *Oil supplies are Far from Established – Unlike US/Canadian Gas.*

› *Avg Oil Price - \$98/Bbl*

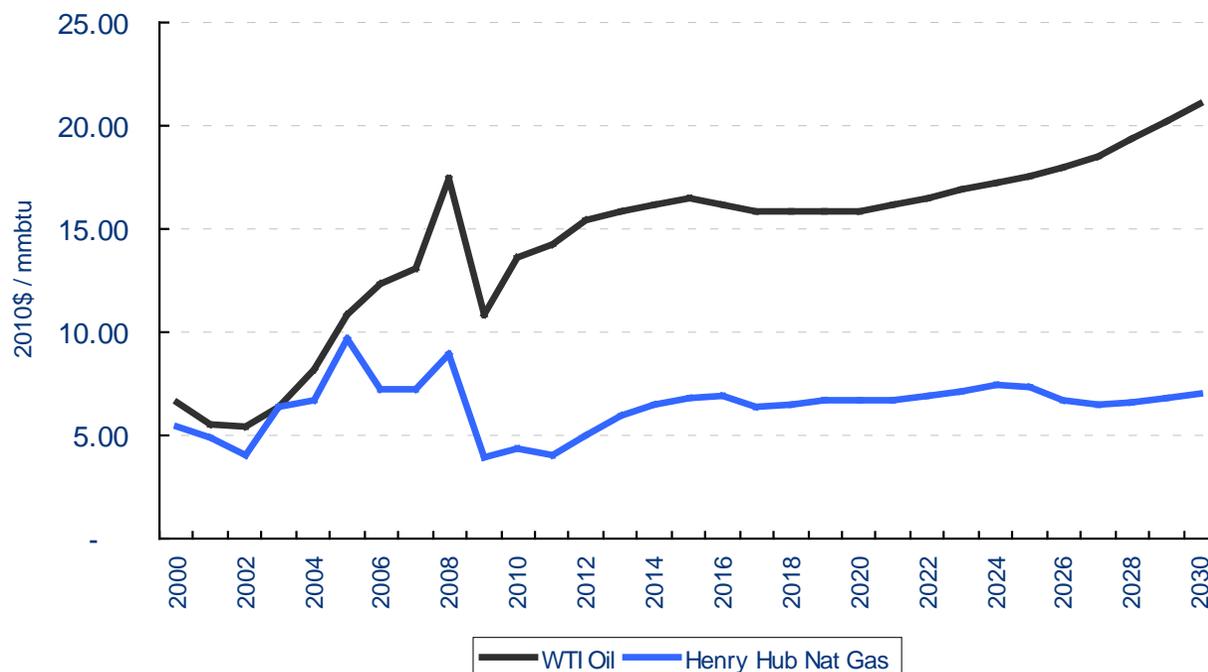
› *Average price Henry Hub*

- 2010: \$4.27/ MMBtu
- 2011-30: \$6.53 / MMBtu

Average Oil to Gas Differential

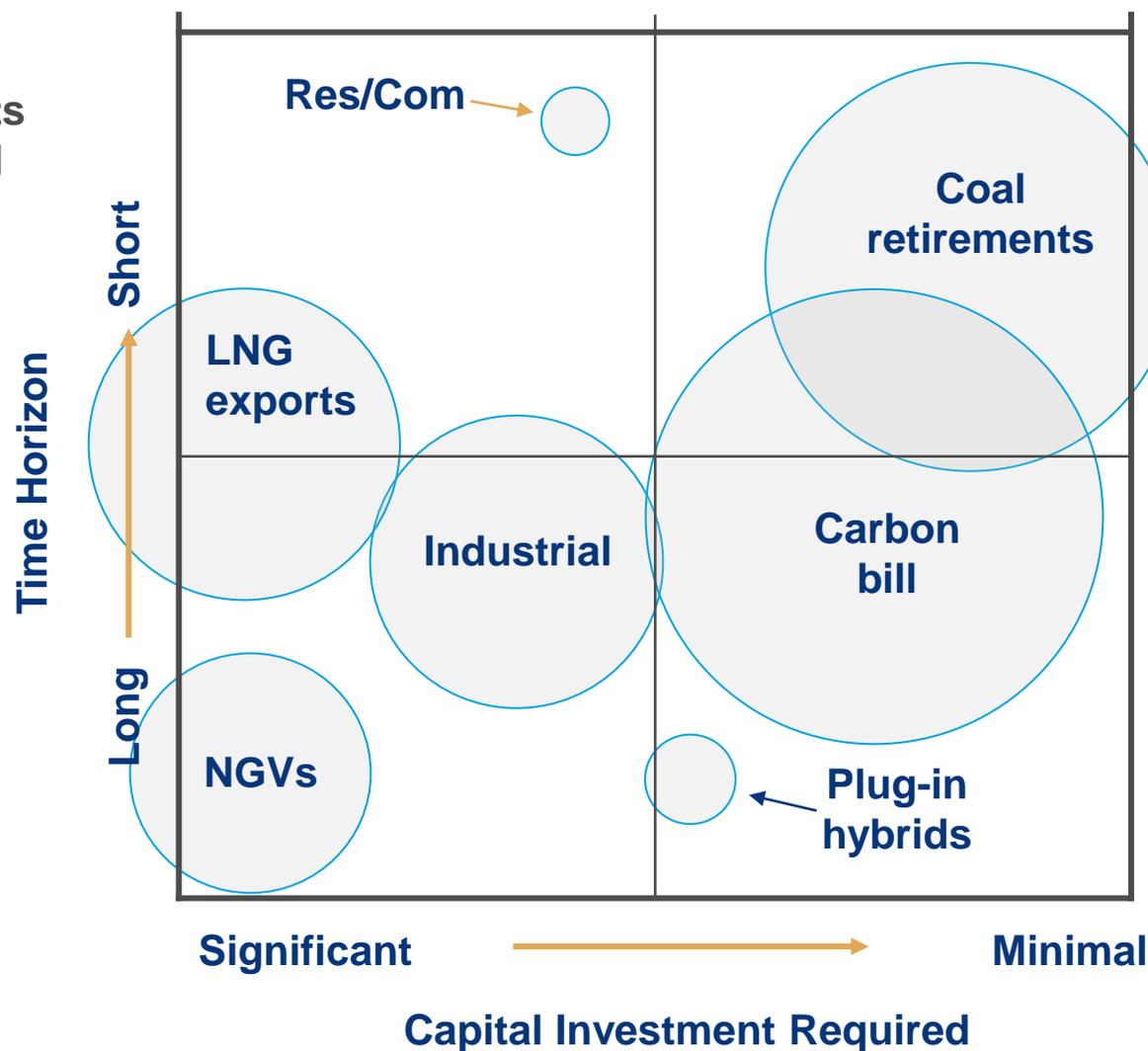
	\$2010/mmbtu
2010-2030	10.37

Oil and Gas Commodity Price Forecasts – 2010\$



Will Gas Find Other Markets? *Maybe*

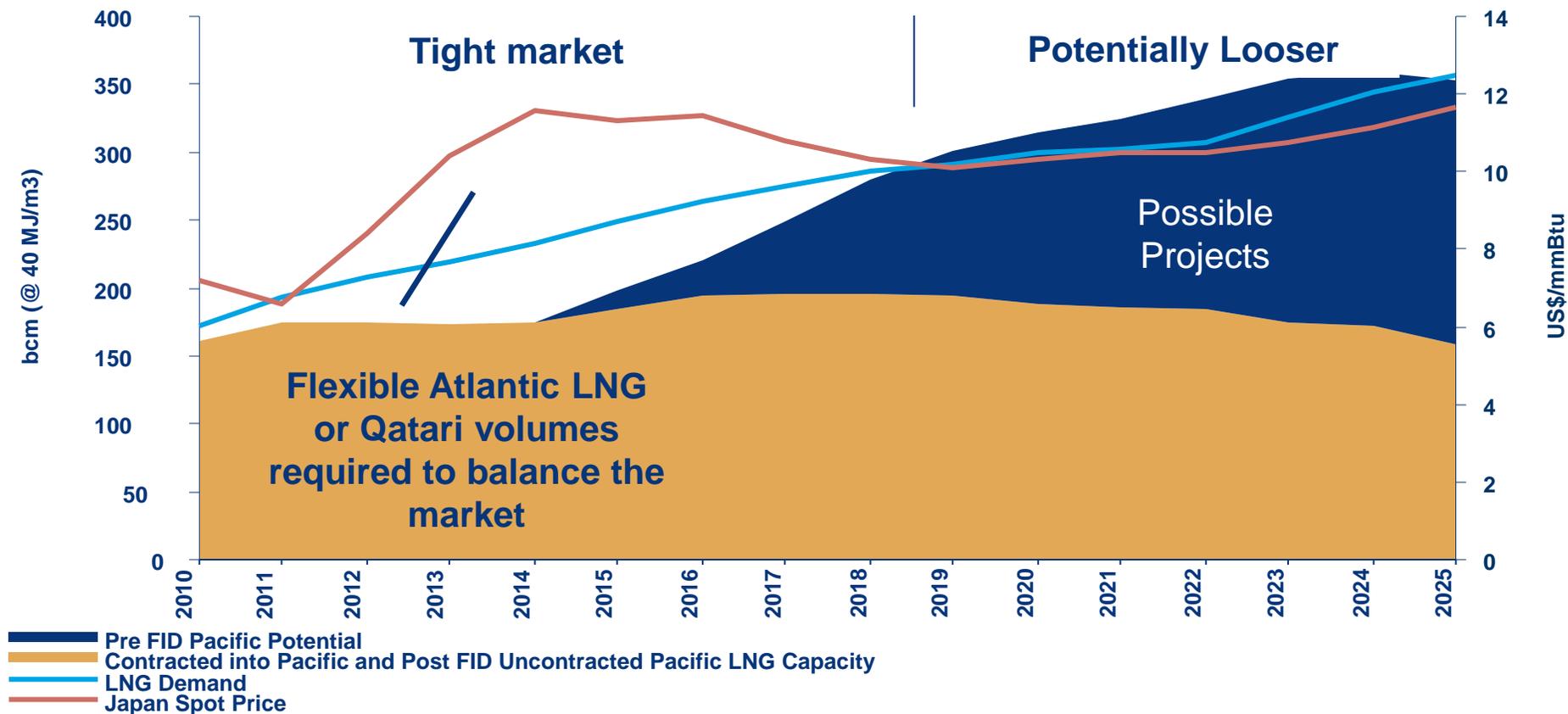
Circle size reflects demand potential



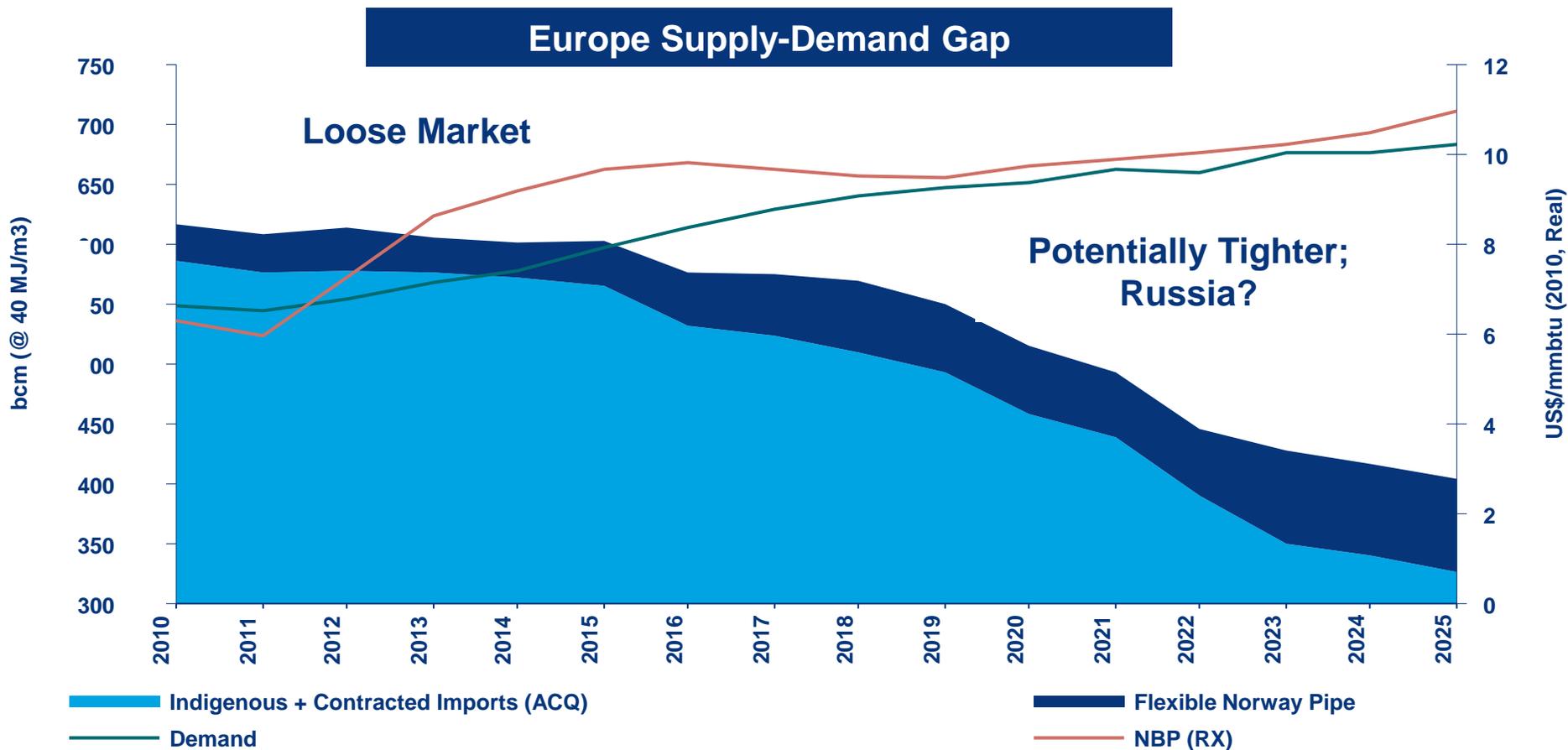
Source: Wood Mackenzie

What About Exports? Asia Pacific Natural Gas Markets: Short, Then Long

Pacific LNG Demand & Supply (Contracted & Pacific)



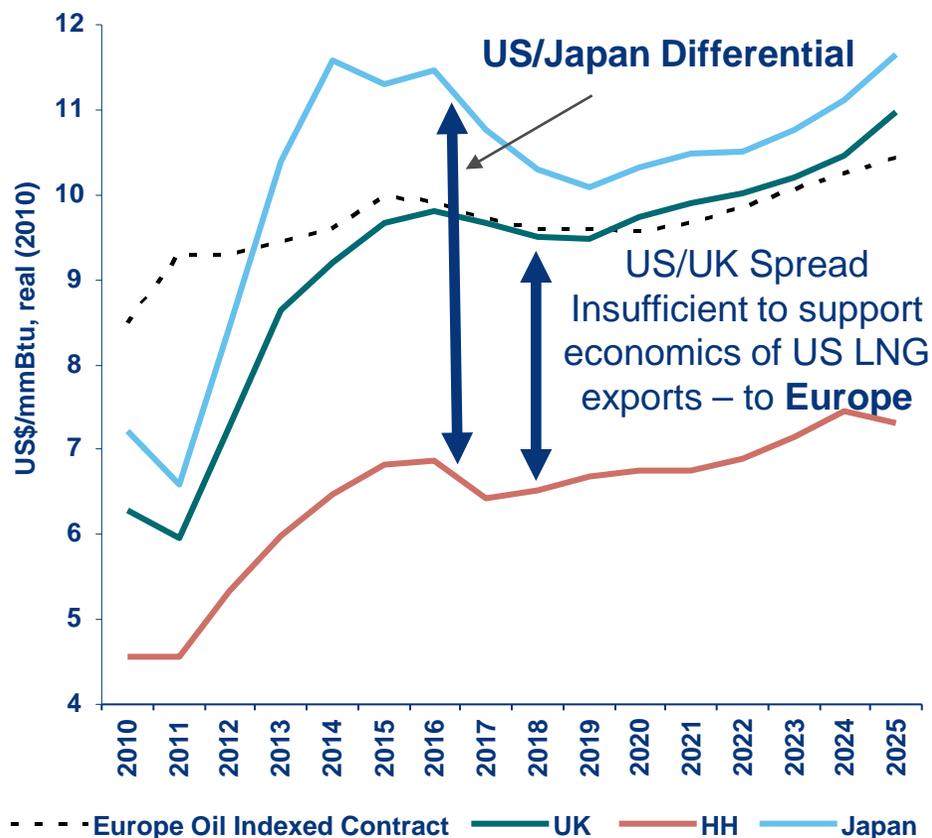
Europe Natural Gas - Long, then Short; new Supply Needed from Russia, 2015 and Forward



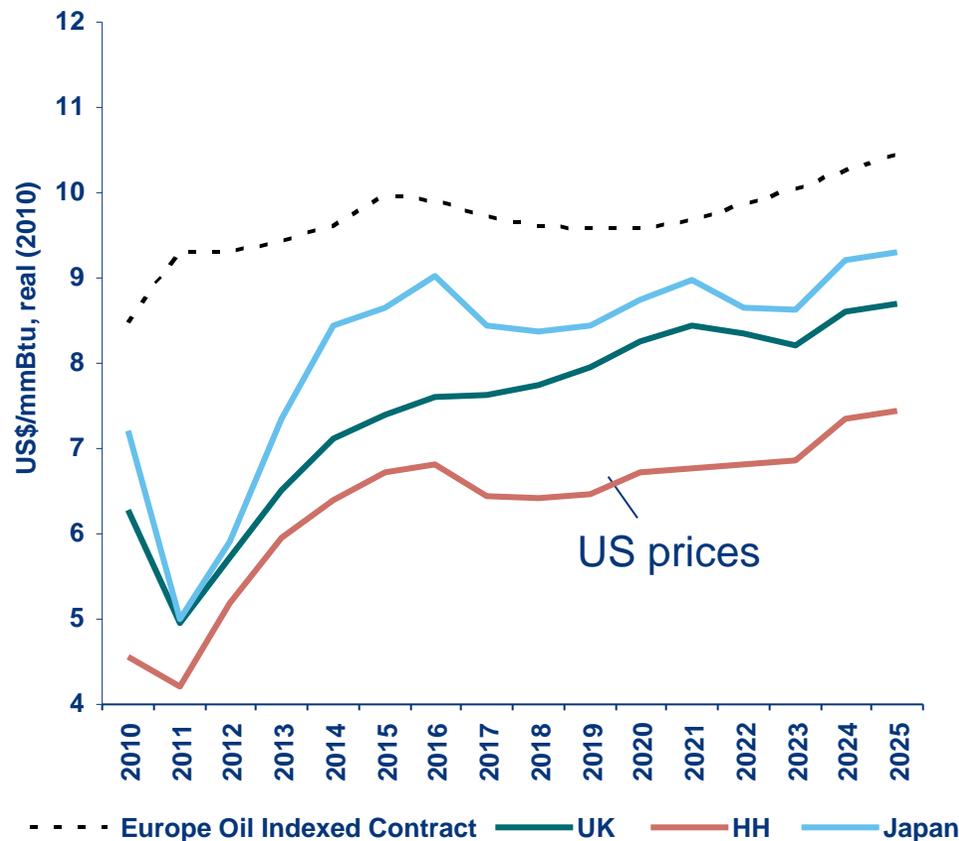
Source: Wood Mackenzie Global Gas Service H2'10

The \$3.00 US/Euro Gas Price Differential is *Not Quite* the Amount Needed to Justify Exports. To Asia?

Global Spot Prices & Europe Contract (Base H2 10)



Global Spot Prices & Europe Contract (Gas Competition)



The Future of the Gas-to-Oil Linkage in Europe Contracts will Determine the Viability of US LNG exports!

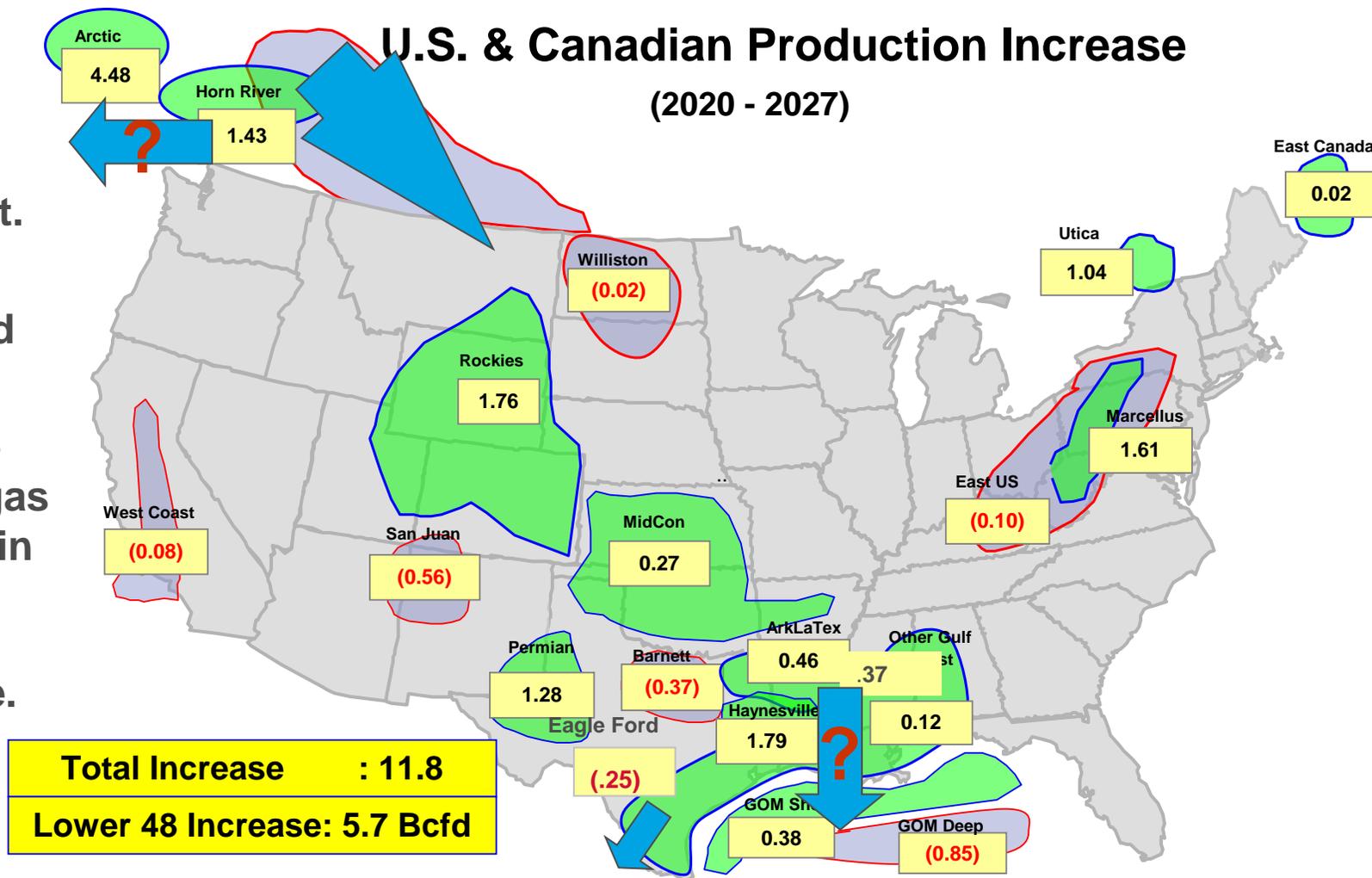
Could a Pipeline from Alaska Co-Exist with Exports from North America?

It Seems Highly Unlikely, but...

Stranger Things Have Happened.

- > AK gas competes in a \$6.00 - \$7.00 /Mmbtu market.
- > Exports to Mexico needed
- > LNG exports depend on the link between gas and oil prices in Asia and Europe; a separate issue.

U.S. & Canadian Production Increase (2020 - 2027)



Source: WoodMac - 20100901 BaseCase

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