

Business as Unusual Unconventional Oil & Natural Gas Revolution in North America

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Acknowledgements

- RBN Energy
- Energy Information Administration
- Federal Energy Regulatory Commission
- Bloomberg
- Pipeline & Hazardous Materials Safety Administration

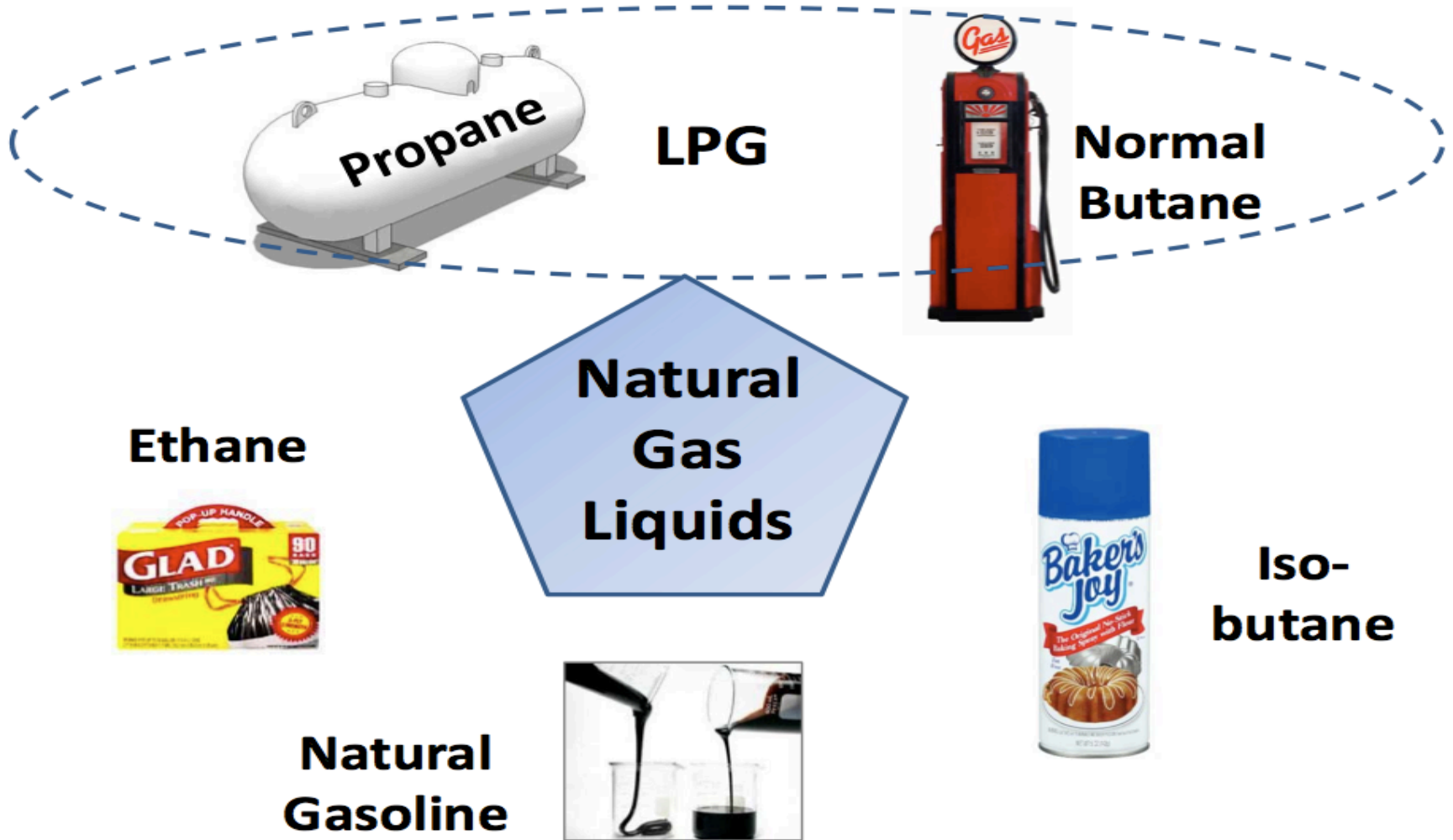
Why Business as Unusual?

- Three major energy commodities interlinked (oil, natural gas and NGLs)
- Producers have significantly reduced expenses
- Infrastructure to get molecules to market
- Physical gas can be traded at almost 200 sites
- Increasing level of exports and prices
- Very liquid futures markets to hedge risk
- Power Sector is getting more “gassy”

Natural Gas Industry is not an Island

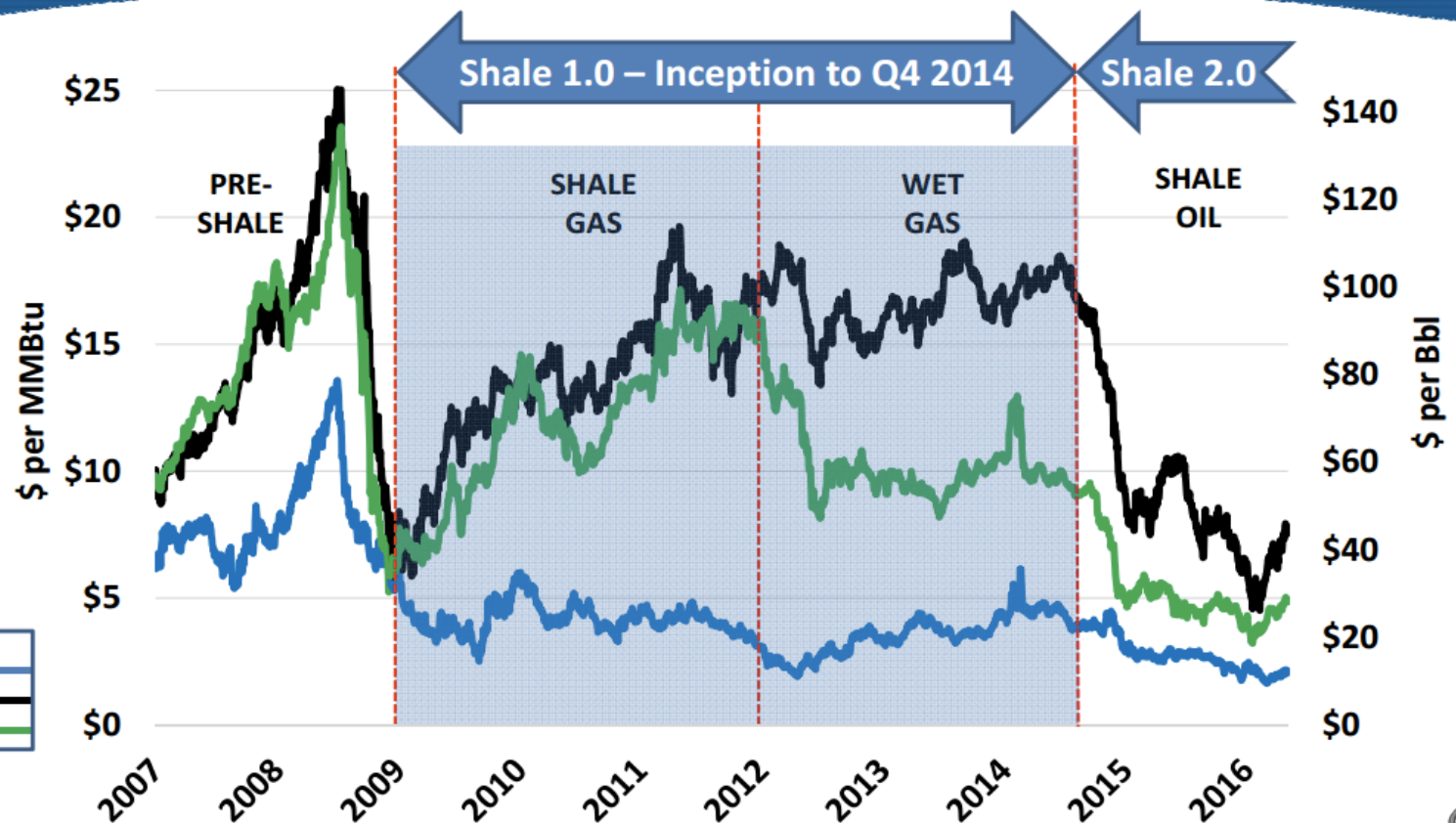


Examples of Natural Gas Liquids



Shale 2.0

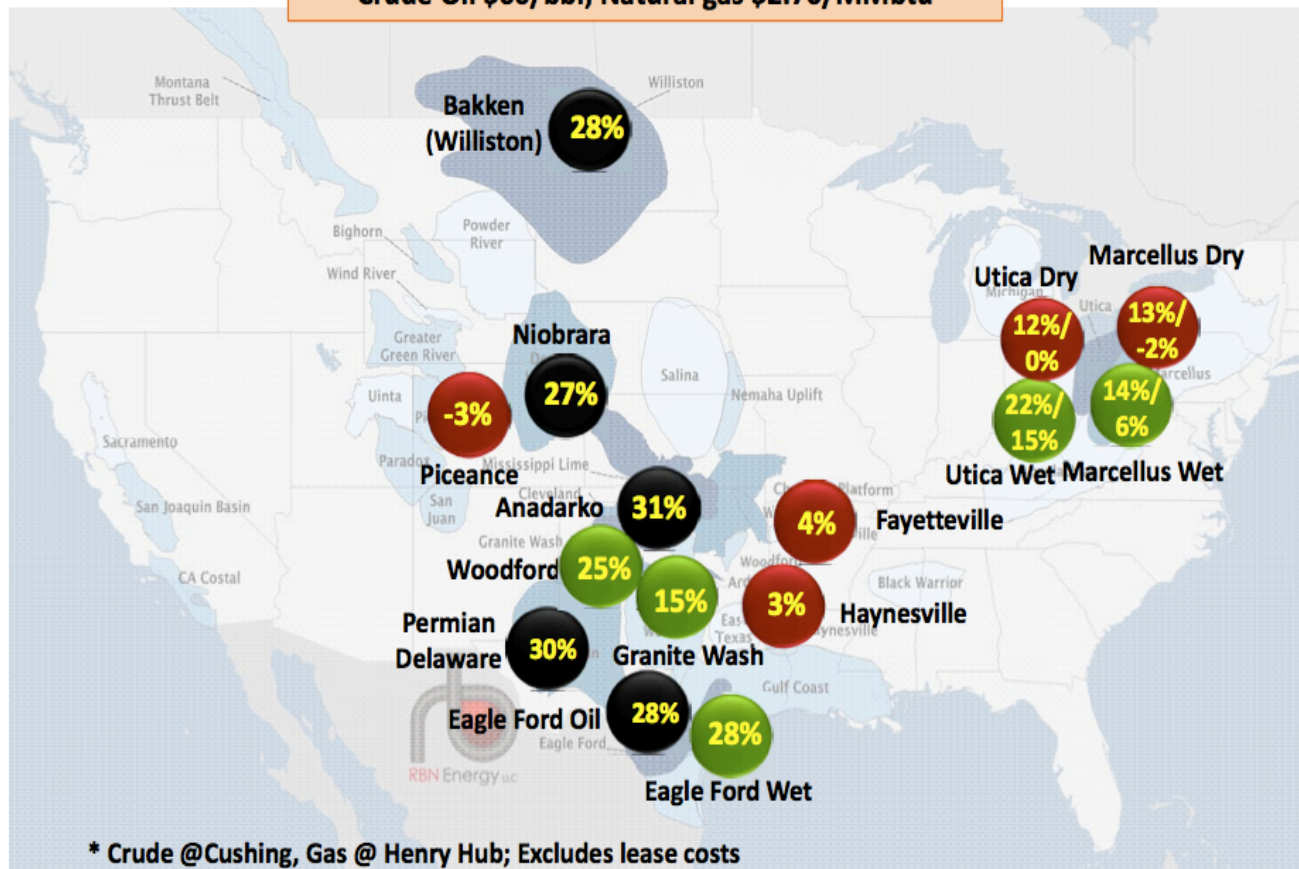
Gas, NGL and Crude Prices



\$60/bbl oil and \$2.70/MMBtu gas squeeze margins

Producer Rates of Return – May 2015 – 25% Cost Reduction

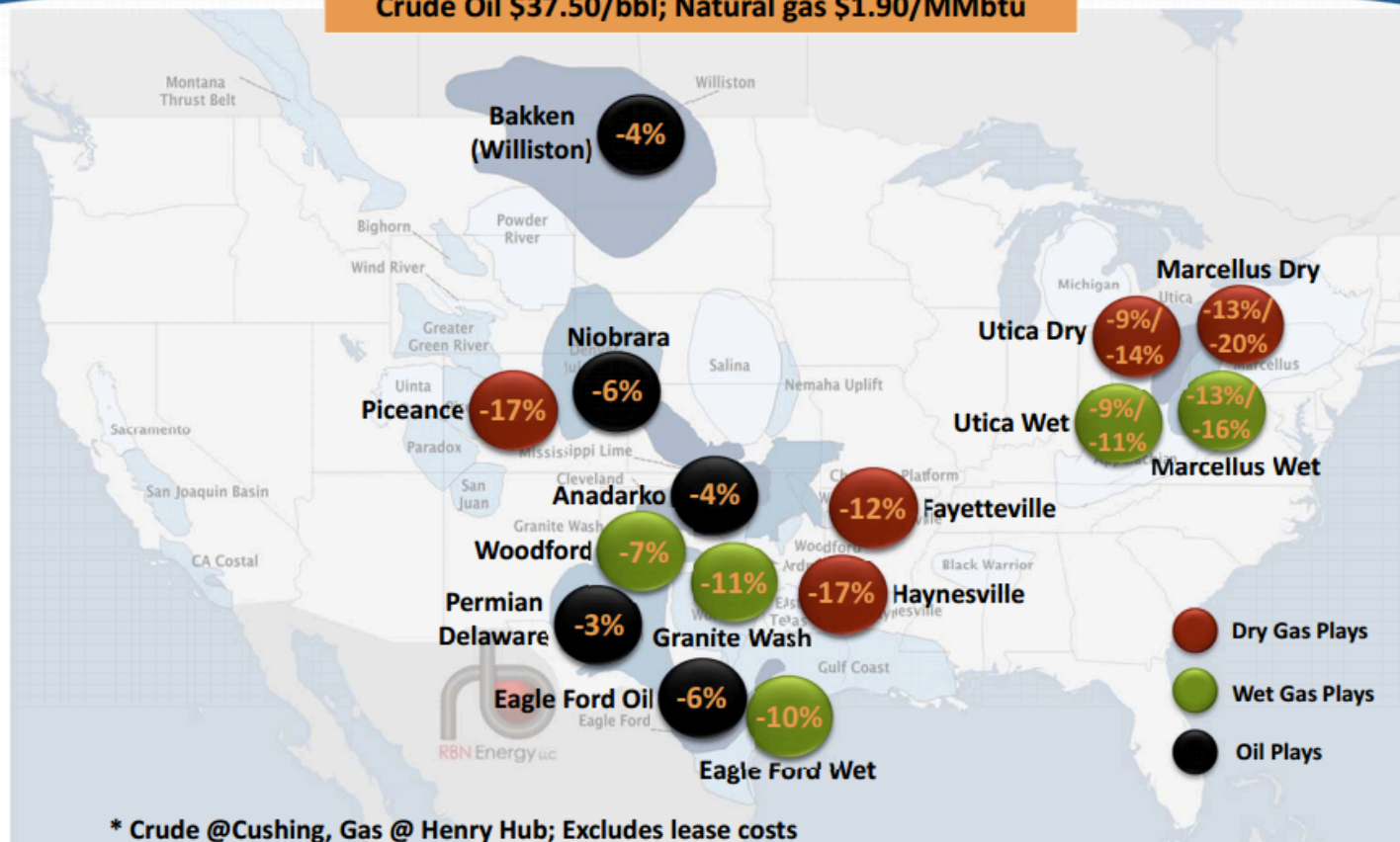
Crude Oil \$60/bbl; Natural gas \$2.70/MMBtu



Ouch! Oil falls to <\$37.50/bbl & gas <\$2/MMBtu

Producer Rates of Return – December 2015

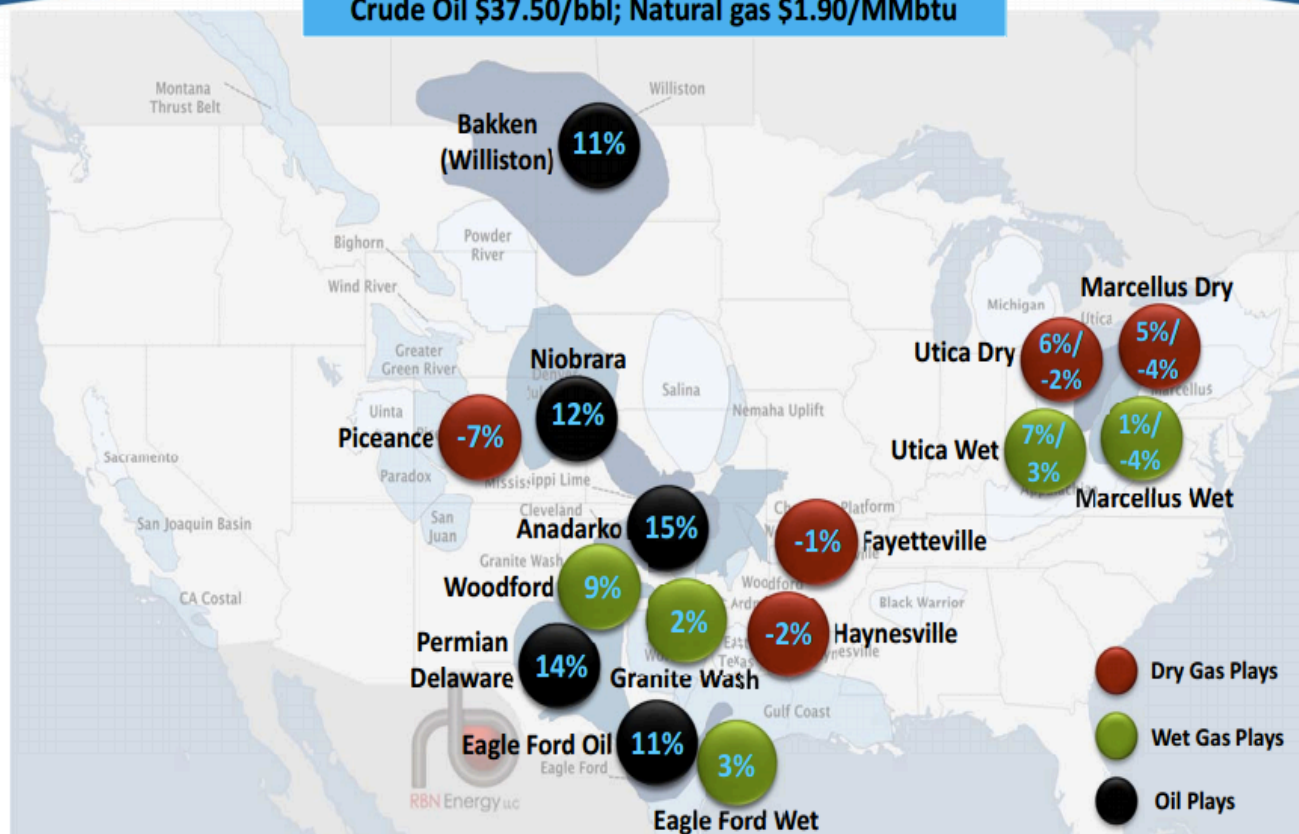
Crude Oil \$37.50/bbl; Natural gas \$1.90/MMBtu



40% reduction in expenses maintains profitability

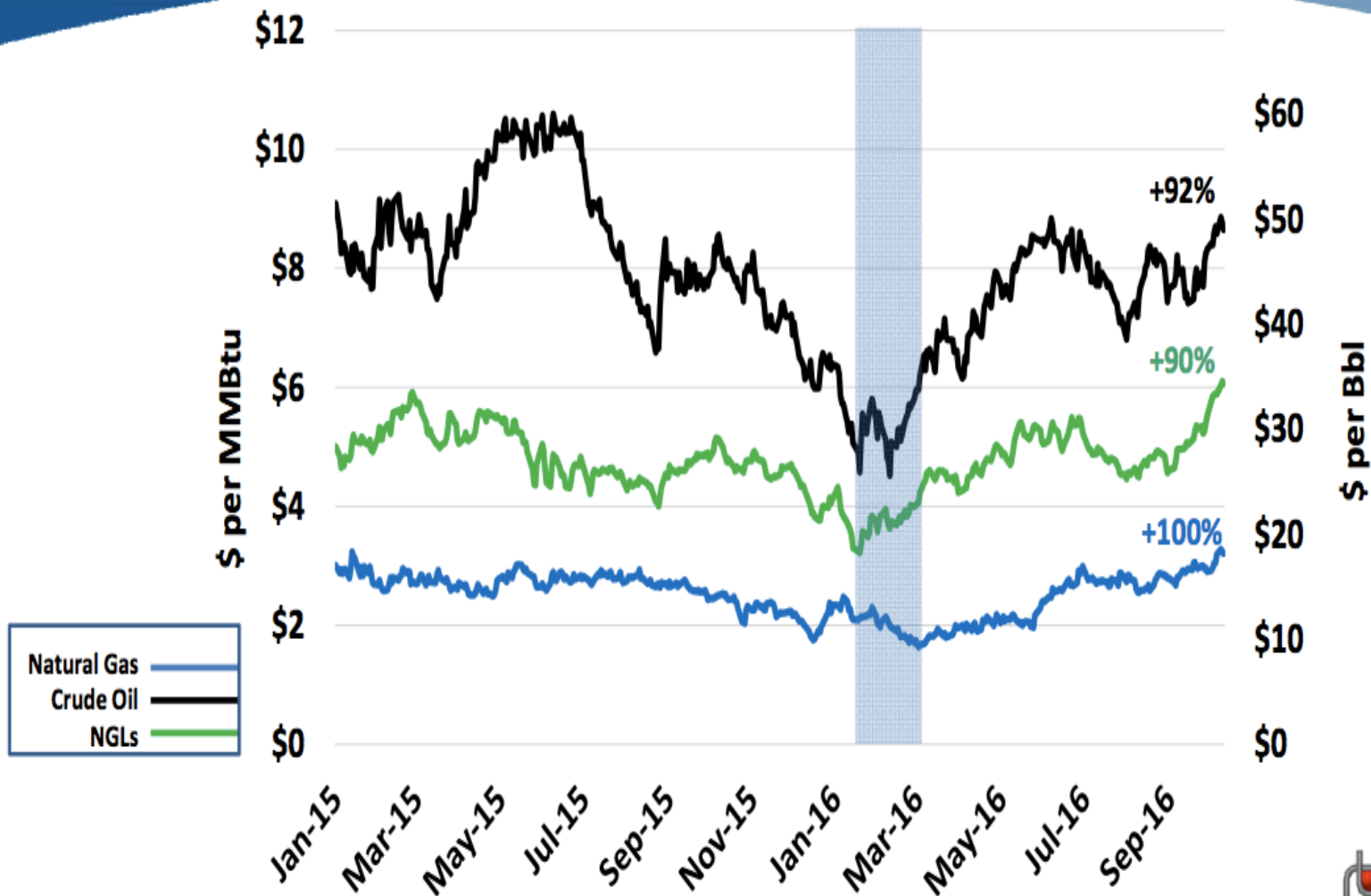
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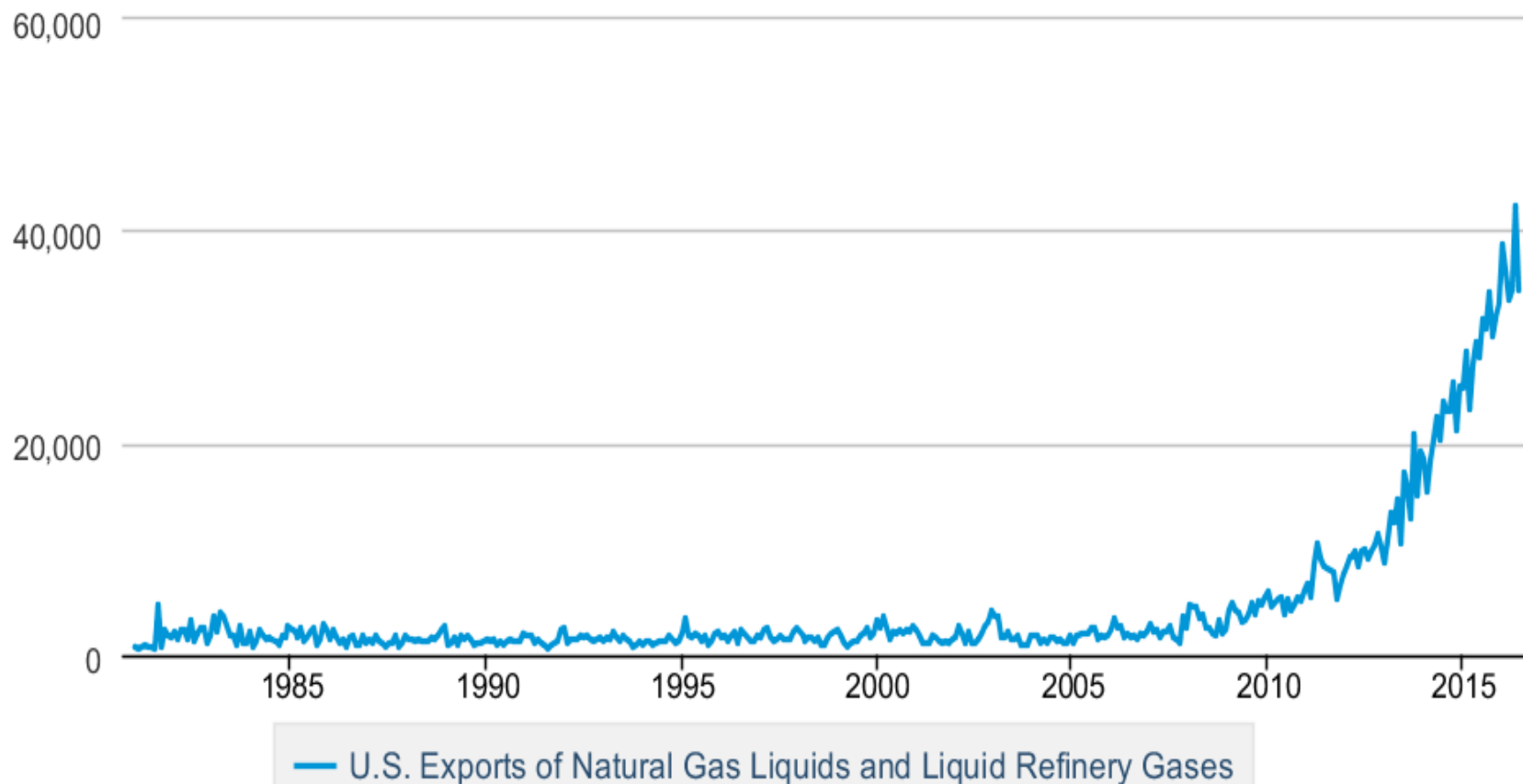
* Crude @Cushing, Gas @ Henry Hub; Excludes lease costs

Gas, NGL and Crude Prices



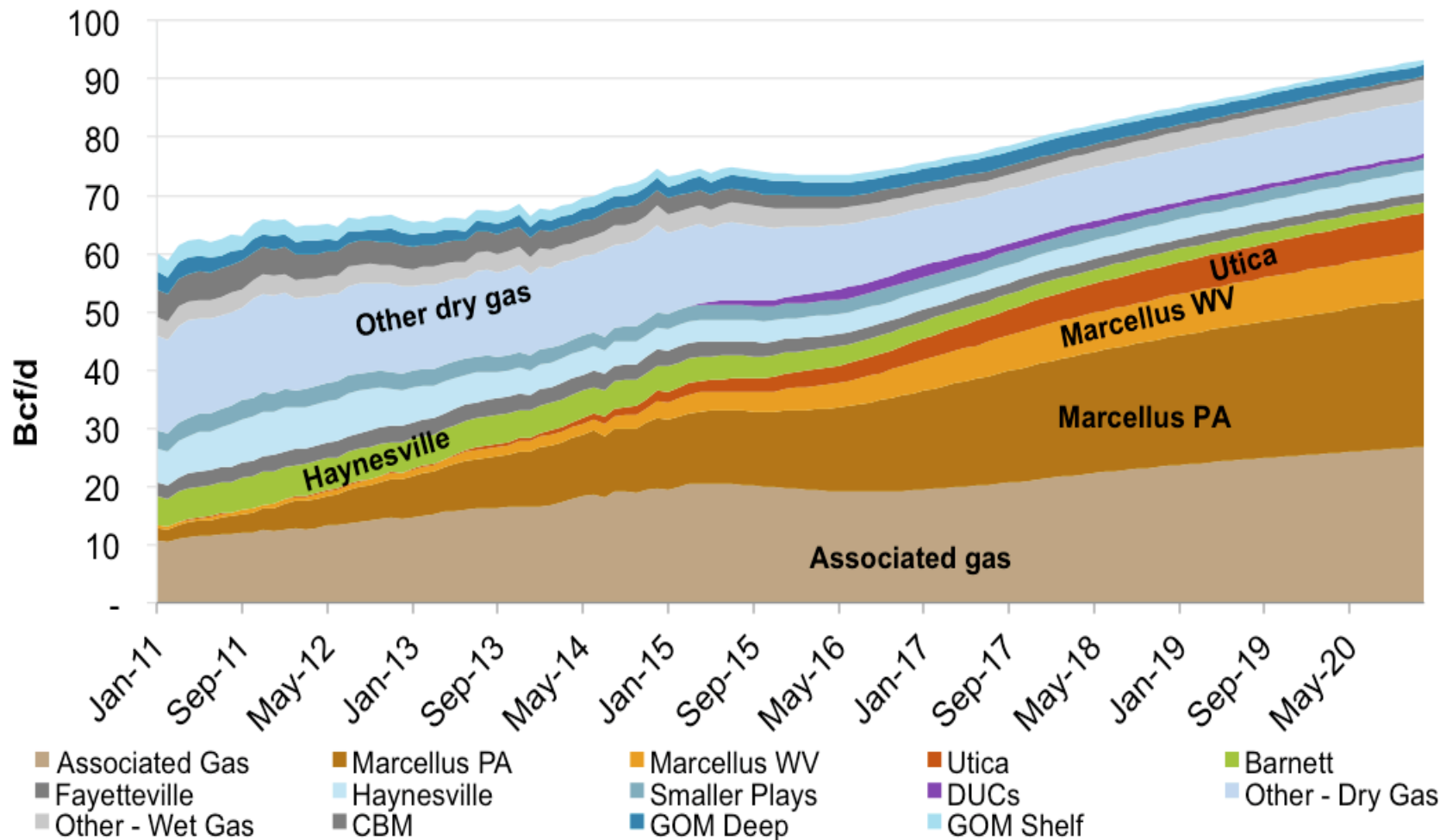
Historical Exports of NGLs & Refinery Gases

Thousand Barrels



Oil Plays produce associated gas

Lower 48 total total gas production

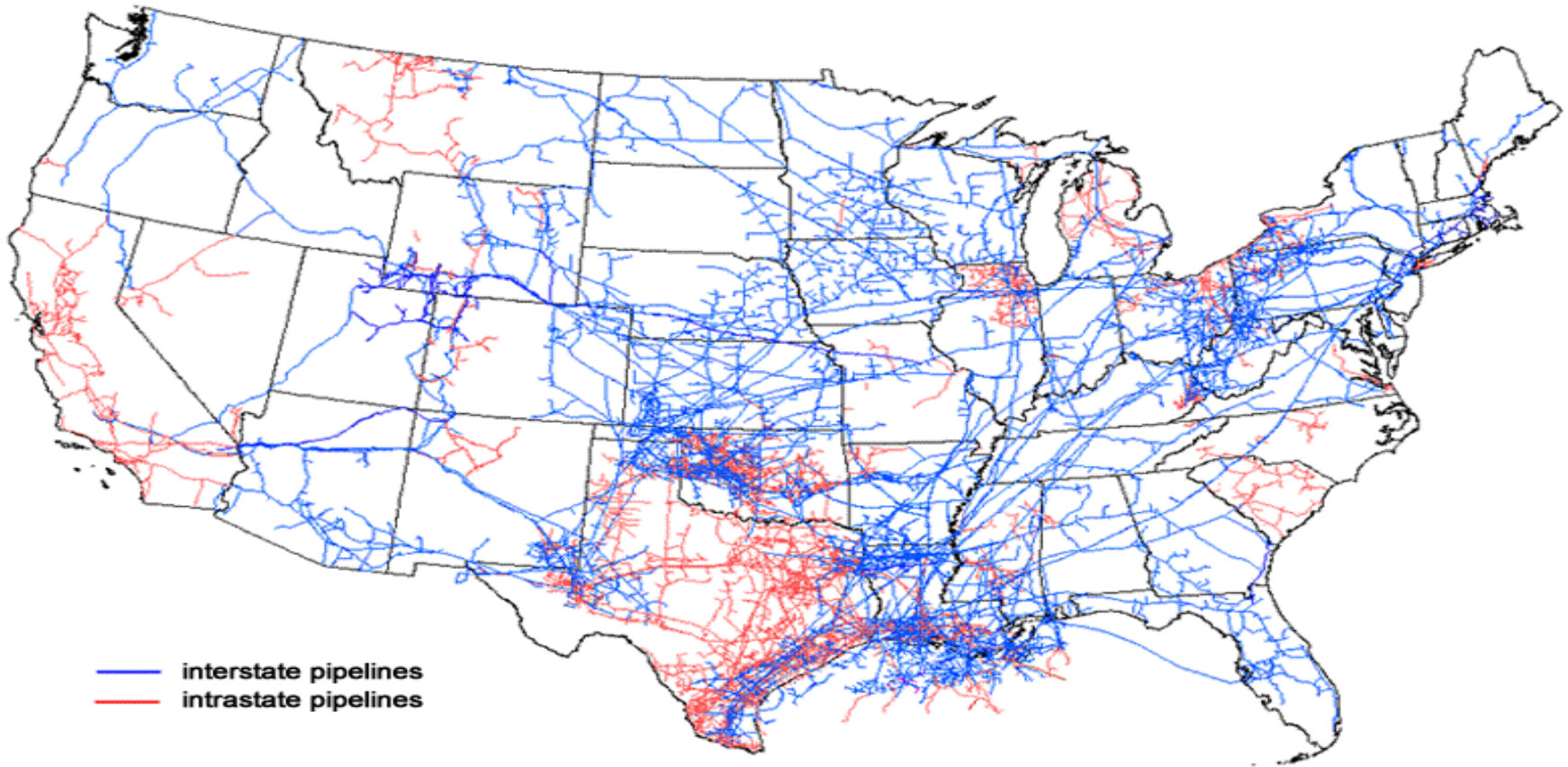


Source: IHS

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The Grid No One Talks about

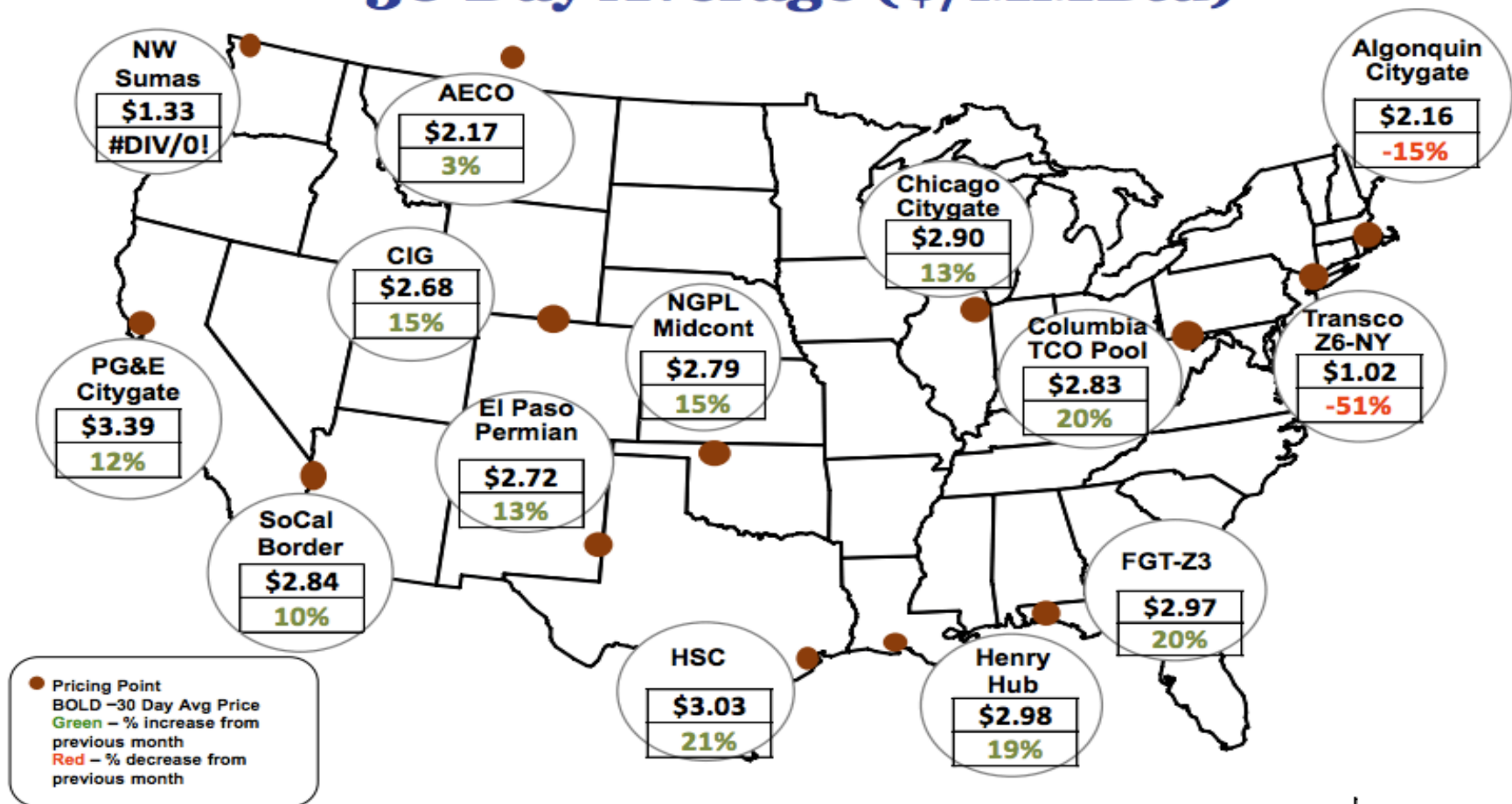
Map of U.S. interstate and intrastate natural gas pipelines



Source: U.S. Energy Information Administration, *About U.S. Natural Gas Pipelines*

190+ NG Trading Sites

Spot Natural Gas Prices 30 Day Average (\$/MMBtu)



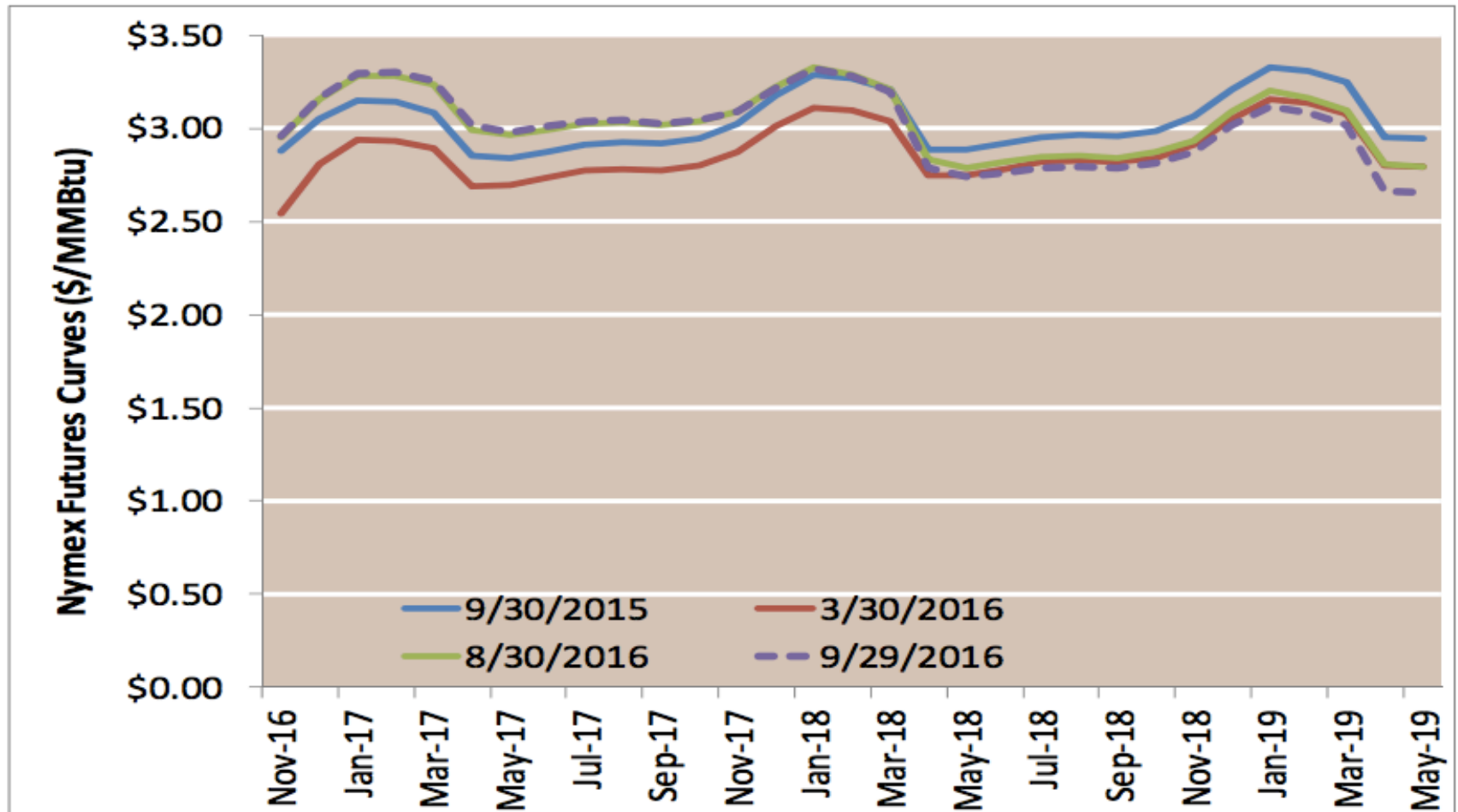
Source: ICE

Updated 10/13/2016

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Hedging with Futures

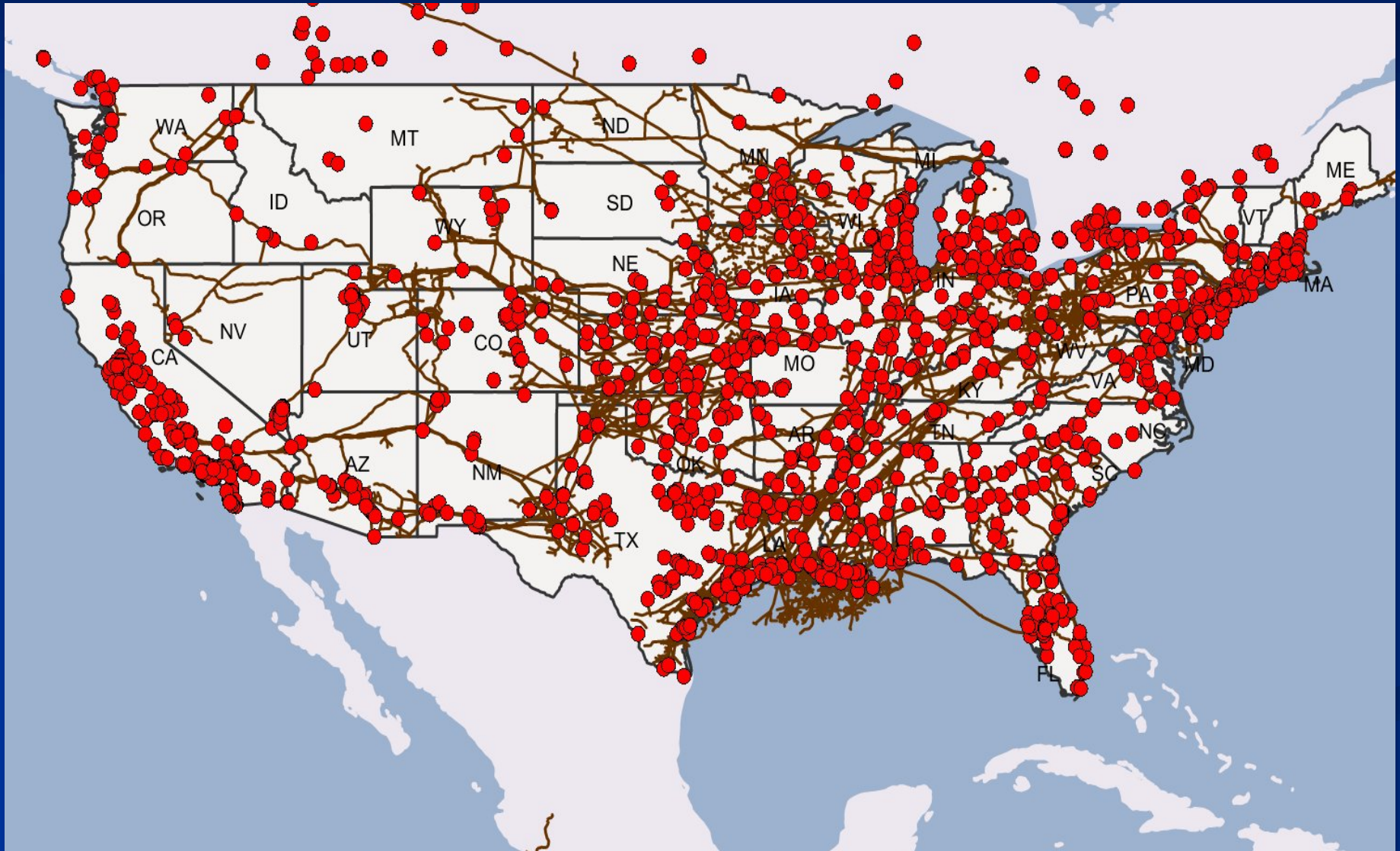
Nymex Futures Curves



Source: Derived from Bloomberg data

Updated 10/13/2016

Gas-fired Power Plants

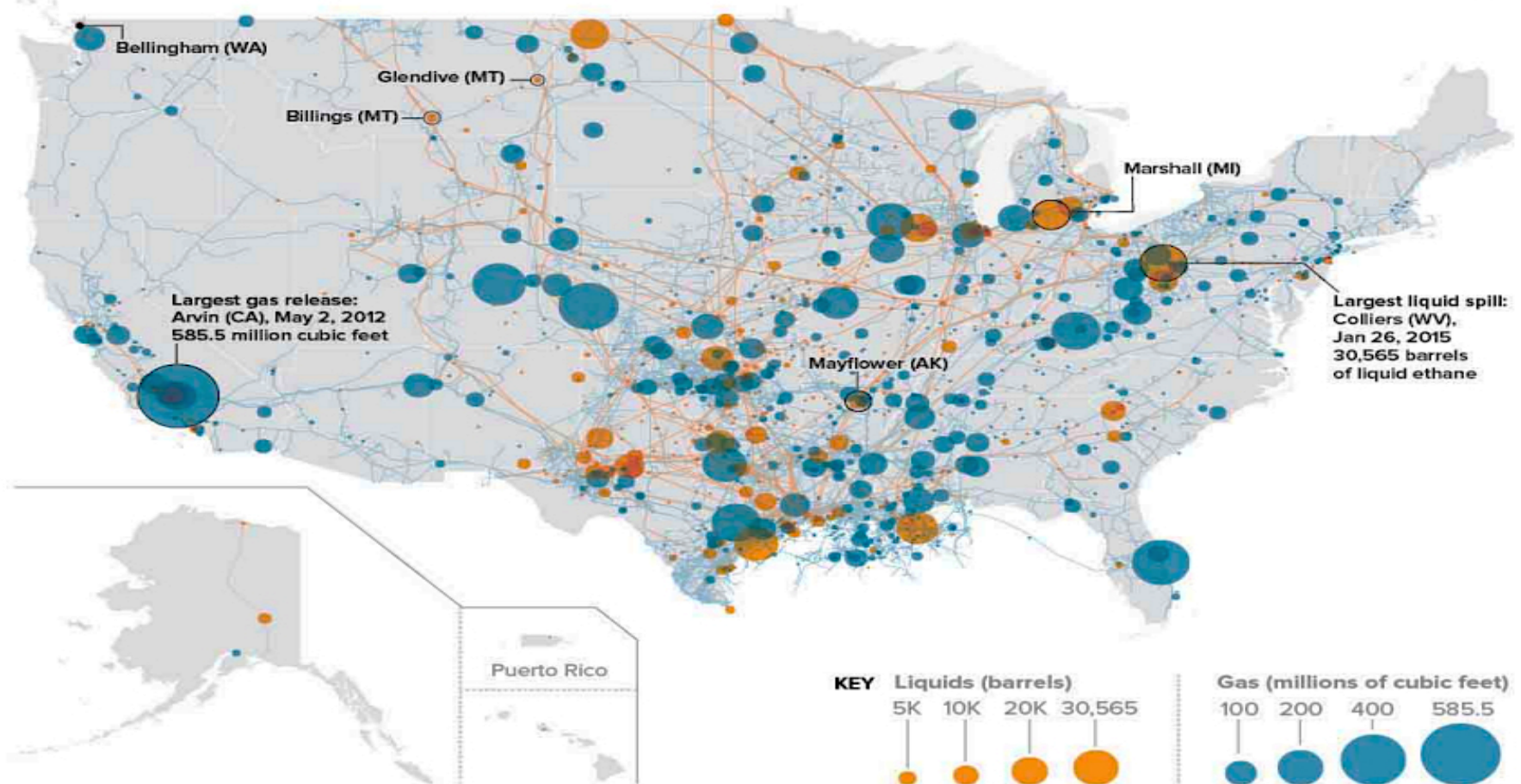


Rising Safety & Health Concerns

ALL INCIDENTS IN THE UNITED STATES, 2010-15

**By amount of liquid or gas accidentally released, through Feb. 24*

TOTAL INCIDENTS 2010-15 **3,141** INJURIES **369** DEATHS **78**



Sources: Pipeline and Hazardous Materials Safety Administration; Energy Information Administration

5W INFOGRAPHICS

Questions?