U.S. Natural Gas Outlook

The 3rd London Gas & LNG Forum
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The Rag Army & Navy Club
London

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About EPRINC

• Founded 1944
• Not-for-profit organization
• Studies intersection of petroleum economics and public policy
• Provides independent and technical analyses for distribution to the public
• Funded largely by the private sector, foundations and U.S. government
• Supports USG projects, e.g. Quadrennial Energy Review, DoD strategic outlook
• www.eprinc.org
EPRINC Embassy Series

• Engagement with Washington’s energy policy community

• Collaboration among diplomatic community provides interesting venue and constructive policy discussion

• Series offers opportunity to gain greater understanding of U.S. energy policy in an era of expanding U.S. supplies of oil and gas
Main Themes

• A Quick Comment on the Law of Diminishing Returns

• We Have Lots of Gas and it’s Very Inexpensive

• Implications of New Environmental Regulations on Exploration & Development, i.e. what are the regulatory threats to supply

• Most important: What things cost is critical!! (actually a repeat of point one)
First, a few words about …

THE LAW OF DIMINISHING RETURNS

emitte lucem et veritatem
A Comment on Environmental Regulation
How Much Should We Pay for the Last 10 Yards?

This is not a Defense of VW’s Clean Diesel violation, but…

- Fuel economy is better than advertised for 2.0-liter diesel, averaging 45 miles per gallon on highway and 30 in city

- Output of GHG emissions, averaged at 50 percent or more below federal standards, but VW Violated the NOx standard, at a level of at least 15 times the standard

- But the average gasoline-powered pickup truck puts more NOx pollution than the typical Volkswagen diesel—and there are more than 10 million such trucks on the road

- Security delays on vehicles waiting to enter San Diego from Mexico produce 157 tons of extra NOx pollution—VW’s entire violation (for California) is approximately 90 tons of Nox

- Next year, the average new car will have cut pollution by 99.4 percent compared to 1963 models
The Resilience of the U.S. Natural Gas Resource
Understanding American Political Comments vs. Reality

“So by the time we get through all of my conditions, I do not think there will be many places in America where fracking will continue to take place.”
— Hillary Clinton, March 6, 2016

“The Marcellus Shale, the nation's largest play, will yield in March 2016 nearly 2 bcf/d more than EIA forecast just 30 days ago. New production from Pennsylvania caused the change from improvements in productivity and pipeline capacity.”
—Josef Lieskovsky (EIA), March 9, 2016
WESTERN INTERIOR SEAWAY

Shale Gas Play Map

Source: EIA
Changes in Proved Reserves of the United States, 2004-2014
(trillions of cubic feet of natural gas)

Source: EIA Data
U.S. Natural Gas and Shale Gas Production with Henry Hub Prices

Source: EIA Data, EPRINC/PetroNerds Calculations
Gas Production by Major Shale Play

Source: EIA data, PetroNerds calculations
U.S. Gas Rig Count by Basin

Source: EPRINC Report Shale Gas; The Road Ahead (August 2016)
Marcellus Gas Type Curves 2010-2015

Source: EPRINC REPORT, Shale Gas: The Road Ahead (August 2016)
Base Case Shale Gas Forecast by Play

Source: EPRINC Report Shale Gas: The Road Ahead (August 2016)
Shale Gas Production Under Two Scenarios

Source: EPRINC REPORT, Shale Gas: The Road Ahead (August 2016)
CAN US LNG EXPORTS REMAIN COMPETITIVE IN LOW PRICE ENVIRONMENT?

- Substantial number of facilities with relatively low development costs still exist (i.e., capital investments were made at sites for LNG import terminals).
- Most projects in planning are large train (5 million metric tons/yr), but have capability for cost-effective downsizing.
- In general, US has low inflation and low currency volatility risks.
- Pending methane regulations could reduce supply and leave it in the ground movement also poses risks (Keystone Pipeline & Dakota Access Pipeline Syndromes).