



Debunking the 100-year Natural Gas Supply Myth

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Bill Powers



The Myth?

The 100-Year Supply Myth:

- Due to the commercialization and promotion of several shale plays in recent years, the importance of shale gas has become grossly overstated.
- Shale gas now accounts for approximately 35 percent of total U.S. production.
- Similar to offshore production, CBM, and tight gas, early results have inflated expectations.



Who's Responsible?

1) The Shale Showmen:

“I say you’ re going to **recover 4,000 trillion.**”

- T. Boone Pickens, CNBC April 28, 2011

“In the last few years we have discovered the equivalent of **two Saudi Arabias of oil in the form of natural gas** in the United States. Not one, but two.”

- Aubrey McClendon, 60 Minutes Nov. 14, 2010



Who's Responsible?

The Shale Showman (cont.):

“Estimates of the entire natural gas resource base, taking shale gas into account, are **now as high as 2,500 trillion cubic feet, with a further 500 trillion cubic feet in Canada.**

That amounts to **more than a 100-year supply of natural gas...**”

- *Dan Yergin, WSJ*
April 2, 2011

“This calculation yields **a 50 percent probability the Marcellus will ultimately yield 489 tcf.**”

- *Dr. Terry Engelder (PSU),*
Ft. Worth Basin Oil and Gas Journal August 2009



Who's Responsible?

2) Industry Sponsored Shale Gas Studies

- MIT, Penn State, Navigant Consulting and the Potential Gas Committee have published unrealistic (and widely cited) estimates of shale gas potential.

3) Government:

- Despite recent reductions in shale resource estimates, the EIA still vastly overstates future recoveries from shale plays.
- “We have a **supply of natural gas that can last America nearly 100 years.**”

*- President Barack Obama,
State of the Union Address. January 24, 2012*



The Truth about EIA Estimates



July 2011

EIA estimated U.S. unproved technically recoverable (TTR) shale resources of **862 tcf**, including 410 tcf from the Marcellus.

January 2012

EIA reduced estimate of TTR for U.S. unproved shale resources to **482 tcf**, 141 tcf from the Marcellus.

EIA estimate: A whopping **42% reduction** in 6 months due to 66% decline in Marcellus



New EIA Estimates Realistic?

- **No Way!**
- Consider the following:
 - EIA New Estimate for the Marcellus: 141 tcf
 - Marcellus has produced only slightly more than ~3 tcf to date from two emerging core areas.
 - Vast majority of Marcellus acreage remains unproven.
 - **The biggest field in North America -- the Hugoton Field:**
 - **Produced 35 tcf over 70 years.**



Reality vs. EIA: Play by Play

- **Barnett Shale:**

- Produced ~11 tcf of gas from nearly 17,000 wells since 2001.
- Prospective area shrunk down to four core counties: Denton, Johnson, Tarrant & Wise.
- Optimistic estimate of future recovery: 25 tcf.
- **EIA:** Barnett will recover another 43 tcf. (7/2011)



Reality vs. EIA: Play by Play

- **Fayetteville Shale:**
 - Produced ~3 tcf of gas from ~4,000 wells between 2005 and mid-2012.
 - Prospective area only 750,000 acres.
 - Optimistic estimate of future recovery: 7 tcf.
 - **EIA:** Fayetteville will recover another 32 tcf. (7/2011)



Reality vs. EIA: Play by Play

- **Haynesville Shale:**
 - Produced ~5 tcf of gas from ~ 2,000 wells between 2008 and mid-2012.
 - Small core area of only 110,000 acres, mostly in DeSoto Parish.
 - Optimistic estimate of future recovery: 12 tcf.
 - **EIA:** Haynesville will recover another 75 tcf. (7/2011)



Reality vs. EIA: Play by Play

- **Antrim Shale:**

- Produced 3 tcf of gas from 10,000 wells between 1989 and 2010.
- Production has fallen every year since 1998.
- Optimistic estimate of future recovery: 2 tcf.
- **EIA:** Antrim will recover another 20 tcf. (7/2011)



Adding It All Up

Shale Play	EIA Estimate	Reality
Antrim	20 tcf	2 tcf
Barnett	43 tcf	25 tcf
Eagle Ford	21 tcf	10 tcf
Fayetteville	32 tcf	7 tcf
Haynesville	75 tcf	12 tcf
Marcellus	141 tcf	50 tcf
Other	150 tcf	21 tcf
Total	482 tcf	127 tcf



Why Are Prices So Low?

- **Hedges:** Many companies put in profitable hedges in 2008 and 2009.
- **Hold by Production Drilling (HBP):** Thousands of uneconomic wells drilled last three years to hold acreage.
- **Technology:** Longer laterals and more fracture stimulations per well.
- **Drilling for Liquids Rich Gas:** Many wells drilled in Barnett, Eagle Ford and Marcellus for liquids recovery.



Why Are Prices So Low? (continued)

- **JVs with Foreign Companies:** Tens of billions of dollars in drilling carries spent in last five years from joint-ventures with foreign firms overpaying to learn shale business.
- **Lack of Perceived Scarcity** (i.e. 100 Year Supply Myth): Current market view is that gas will remain abundant and cheap for decades to come.



Where Do We Go From Here?

- **Dropping NG Rig Count:** Rigs will continue to fall due to rising service costs and lack of hedges.
- **NG will return to Historical 10:1 ratio with Oil:** Gas is more than one standard deviation below 20-year norm.
- **LNG exports/imports a Joke:** Significant LNG imports will not materialize no matter how high gas prices rise.
- **Declining Imports from Canada:** Rising demand from oil sands and declining production will likely eliminate exports by 2020.



Where Do We Go From Here? (continued)

- **Prices Rise, Drilling Picks up but Production Drops:**

Year	Average Gas Price per MCF	Baker Hughes Average Annual Rig Count	Marketed Production TCF
1973	\$.22	1,196*	22.64
1984	\$2.66	2,428*	18.30
2001	\$4.00	939**	20.57
2007	\$6.25	1,436**	20.19

*includes oil rigs, **natural gas rigs only



Where Do We Go From Here? (continued)

- **Natural Gas Deliverability Crisis**
 - **Begins Between 2013 to 2015.**
 - **High prices very damaging to economy due to inelasticity of NG demand curve.**
 - **Wailing and Gnashing of Teeth Begins!**



Questions

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