US Will Require to Drill 189,000 Shale Gas wells to Achieve the Target Gas Forecast

M. A. Mian, December 18, 2015

U.S. shale gas production was 5% of total U.S. dry gas production in 2004, 10% in 2007, and is now 52% in 2015. Shale resources remain the dominant source of U.S. natural gas production growth. The total gas production is expected to increase from the current 26.43 TSCF/year in 2015 to 35.45 TSCF/year in 2040.

Current production from the Shale gas is 13.62 TSCF/year in 2015 and it is expected to increase to 19.58 TSCF/year in 2040. The following table shows the US Gas forecast by EIA. The supply from shale gas is expected to contribute around 55% of the total US gas requirement.

Source	2015	2020	2025	2030	2035	2040
Shale Gas & Tight Oil Plays	13.62	15.44	17.03	17.85	18.85	19.58
Tight gas	4.70	5.21	5.55	5.99	6.40	6.97
Coalbed Methane	1.38	1.45	1.32	1.24	1.24	1.25
Other	4.81	4.42	4.19	3.97	3.77	3.69
Lower 48 Offshore	1.61	2.03	2.16	2.79	2.73	2.81
Alaska	0.30	0.27	0.25	1.18	1.16	1.15
Total US Gas Forecast	**26.42**	**28.82**	**30.50**	**33.02**	**34.15**	**35.45**
http://www.eia.gov/analysis/projection-data.cfm#annualproj						

The above data is graphically shown in **Fig. 1**. The blue line assumes that drilling of shale gas wells stops at end of 2015. Now the challenge is to fill the delta between the BLUE line and the EIA's forecast of 35.5 TSCF/year.

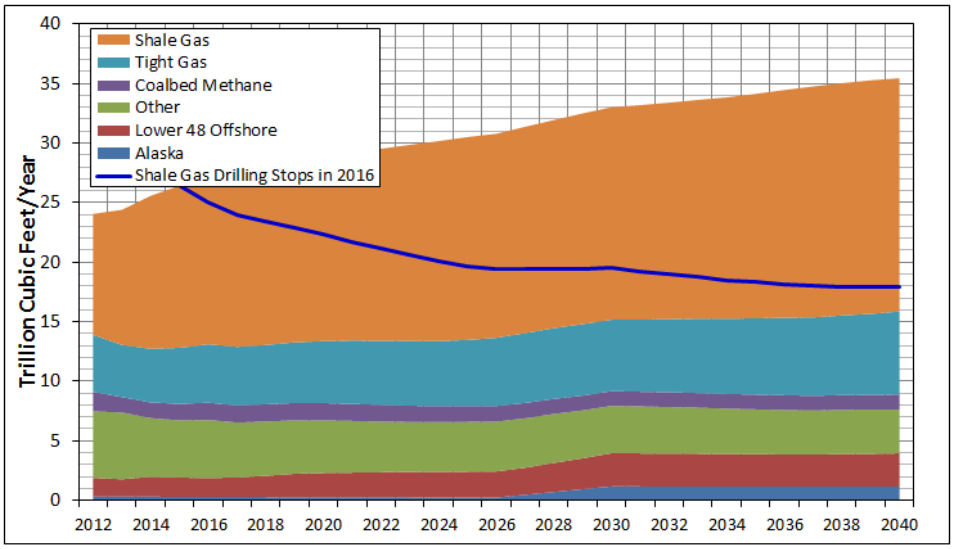

Figure 1. US Dry Gas Forecast by EIA

A typical shale gas forecast is being developed using actual average production of 100 shale gas wells as shown in **Fig. 2**. A 7% per year exponential decline is assumed when the hyperbolic decline forecast drops below 7%.

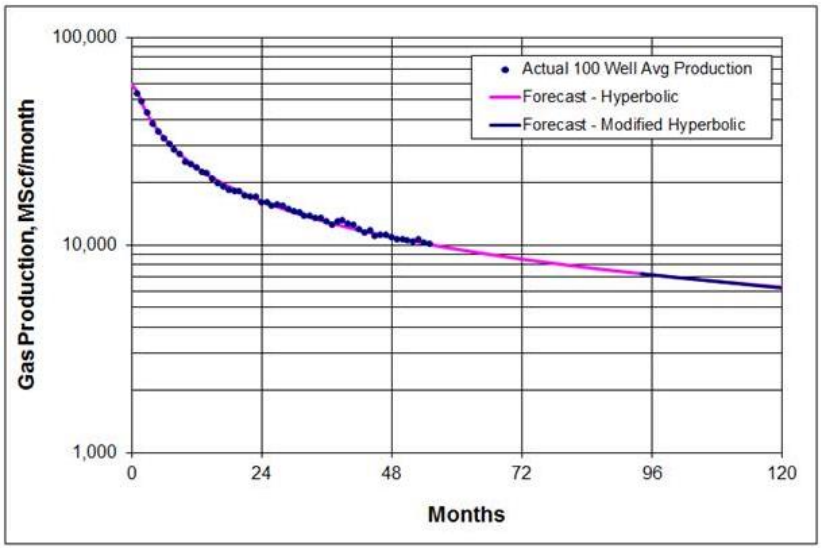

Figure 2. A Typical Average Shale Gas Forecast

Based on the forecast in **Fig. 2** and the Delta to be filled in the EAI's forecast, a significant number of wells have to be drilled as shown in **Fig. 3**. Between 2016 and 2040, approximately 189,000 wells need to be drilled to achieve EIA's forecast. This is an average of 7,560 wells per year and approximately $45 billion to $60 billion per year for drilling (depending on well cost of 6 to 8 million per well). This amounts to a total of $1,125 to $1,500 billion during 2016-2040. In addition to this there will be cost of flow lines and other facilities. These numbers raise the following questions.

1. Is it logistically possible to drill 7,560 wells a year? Some 600 rig years will be required.
2. Would there be enough funds available (magnitude of $45 to $60 billion per year) noting that most of the players in the shale gas plays are smaller independents not the majors like ExxonMobil, Chevron, ConocoPhillips and so on.

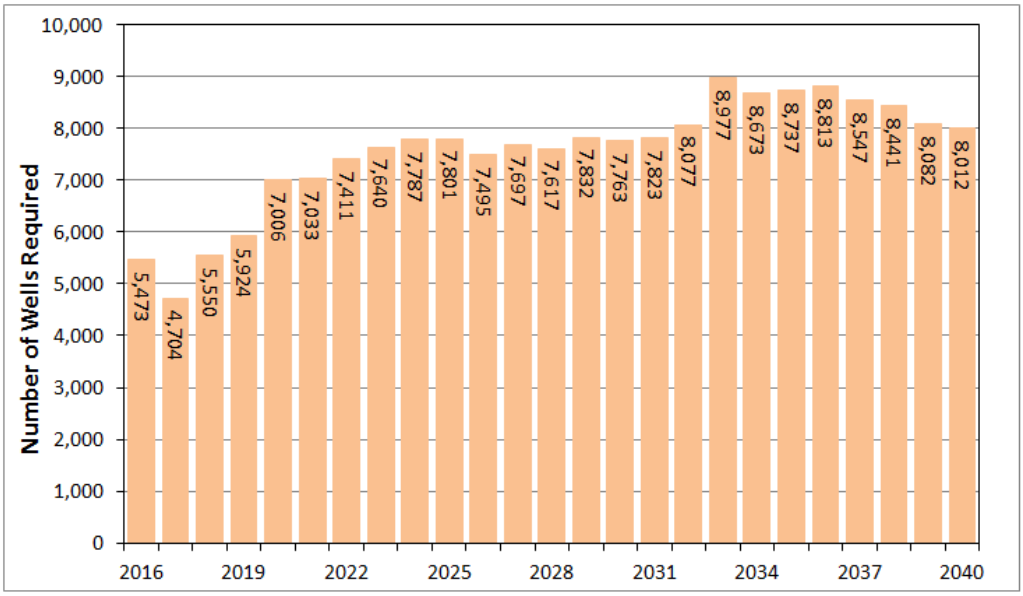

Figure 3. Wells Required to Achieve EIA's Gas Forecast