

**1H13 Pennsylvania Marcellus Data Analysis**

- **Investment summary.** Friday morning, the Commonwealth of Pennsylvania released its semi-annual natural gas production for 1H13. At the company level, the release showed further confirmation for our top gas pick, COG (\$37.13). COG had 18 of the top 25 industry producing wells in 1H13 and is set for very strong production growth in 2H13 after a slower growth in 1H13. With production growth about to accelerate and 2014 being set up for stronger than consensus expectations (rig additions), this should allow the stock to move up with or without a move in gas in 2H13 in our view. At the industry level, key industry points include: (1) 23% production growth in 1H13/2H12 relative to 28% in 2H12/1H12. (2) Northeast counties comprise the bulk of production, but Green and Washington Counties are exhibited strong growth, (3) CHK (\$25.00) remains the largest producer and further widened the gap in 1H13, and (4) COG continues to dominate the list of top producing wells.
- **Total Production averaged nearly 7.8 bcf/d, up 23% or 1.47 bcf/d from the 2H12 as absolute production growth re-accelerated.** Marcellus production in the Pennsylvania increased to nearly 7.8 bcf/d, a 1.47 bcf/d increase from the 2H12 average of 6.3 bcf/d. This 1.47 bcf/d increase shows a reacceleration of absolute production growth that slowed in 2H12 adding 1.39 bcf/d of production compared to nearly 1.49 bcf/d added in 1H12 (**Exhibit 1**). According to EIA estimates, the broader Marcellus, including West Virginia, is currently producing at approximately 9.3 bcf/d as of June compared to 8.4 bcf/d in December. Production in 1H13 per EIA estimates averaged 8.8 bcf/d over the first half of the year, implying that Pennsylvania accounts for nearly 89% of Marcellus production.
- **NEPA leads the top producing counties list, but Green and Washington show strong gains.** Counties in northeast Pennsylvania (NEPA) continue to be the largest contributors to production growth with Bradford, Susquehanna, and Lycoming topping the list. Greene and Washington Counties are the leading producing counties in southwest Pennsylvania (SWPA) and recently overtook Tioga County despite significant liquids volumes that are excluded from the dataset. Bradford remains the largest producing county, but Susquehanna continues to narrow the gap. Of the five largest producing counties, the highest growth rates are coming from Green (+46%) and Lycoming (+37%) with Tioga experiencing the only decline (-2%), see **Exhibit 2**.
- **Production by operator – CHK remains the largest producer and increased the gap in 1H13.** Operated gross production by CHK averaged 1.68 bcf/d, an increase of nearly 0.3 bcf/d from 2H12. In addition, the gap between CHK and COG, the second largest producer of dry gas, increased by nearly 40 mmcf/d. Aside from CHK and COG, the next largest producers include RRC (\$77.66), EQT (\$83.63), APC (\$91.52), TLM (\$10.94), and SWN (\$36.95), see **Exhibit 3**. SWM posted the strongest 1H13/2H12 growth rate, exceeding 100% followed by privately held Chief, CVX (\$119.88), XCO (\$7.54), and EQT all posting significant gains. Largest producers that experienced declines include privately-held Citrus, TLM, and CNX (\$30.75) see **Exhibit 4**. On an absolute basis, CHK, COG, SWN, and EQT added the largest gas volumes, adding over 175 mmcf/d of production each.
- **The list of top producing wells continues to be dominated by COG.** The list of the top 25 largest producing wells in 1H13 continues to be dominated by COG, accounting for 18 of the top 25 wells. The remaining wells were from EQT (three wells) and Chief (four wells). The well from SWN appears to be an input error.

\* Prices are market close as of 8/16/13

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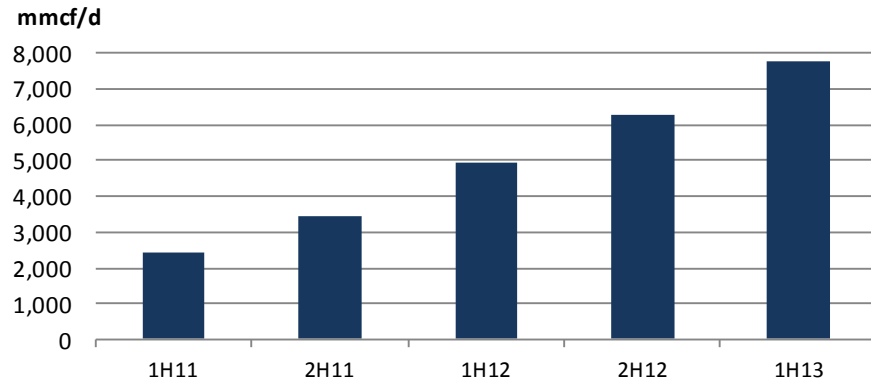


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**Exhibit 1. Total Marcellus Production in Pennsylvania**

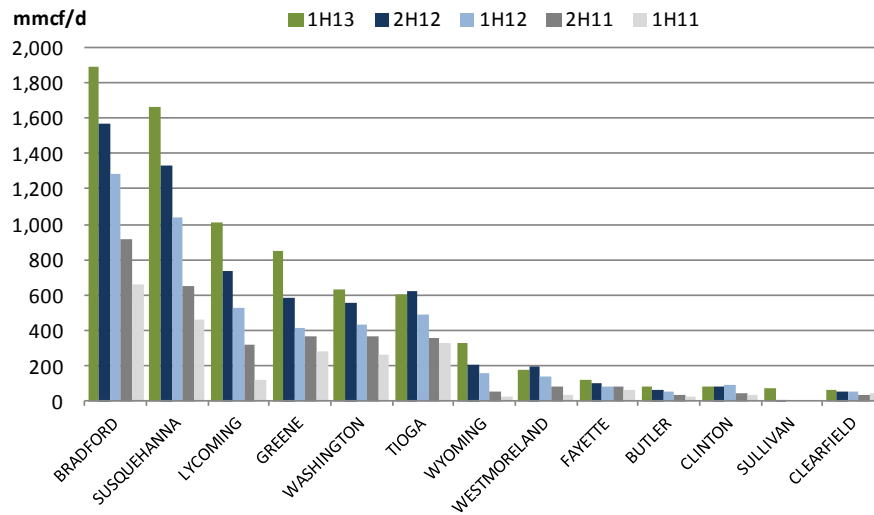
*Production growth reaccelerated and averaged 7.8 bcf/d in 1H13, an increase of 1.47 bcf/d from 2H12 and up from the 1.39 bcf/d increase in 2H12 over 1H12.*



Source: Pennsylvania Department of Environmental Protection

**Exhibit 2. Largest Producing Counties in the Pennsylvania Marcellus**

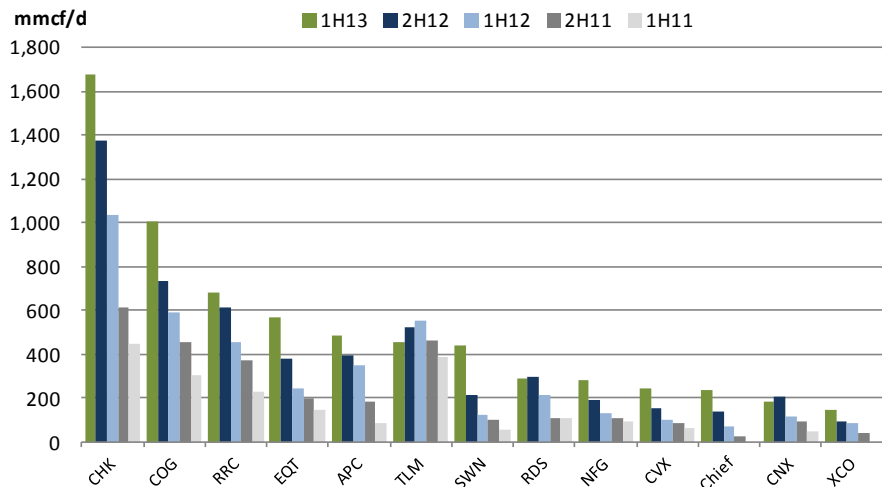
*Production continues to be dominated by NEPA, but Greene and Washington counties recently overtook Tioga in terms of average production.*



Source: Pennsylvania Department of Environmental Protection

**Exhibit 3. Largest Operators in the Pennsylvania Marcellus**

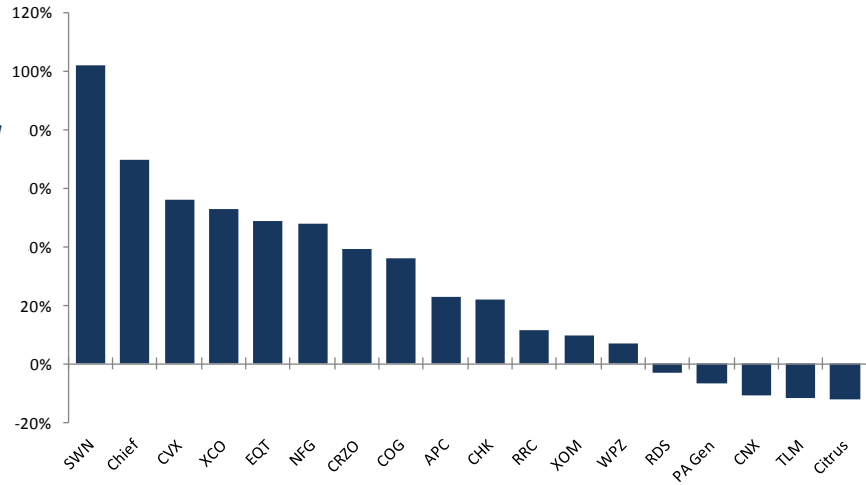
*CHK remains the largest producer of dry gas in Pennsylvania and continues to expand the gap.*



Source: Pennsylvania Department of Environmental Protection

**Exhibit 4. Production Growth Rate [1H13/2H12] by Operator**

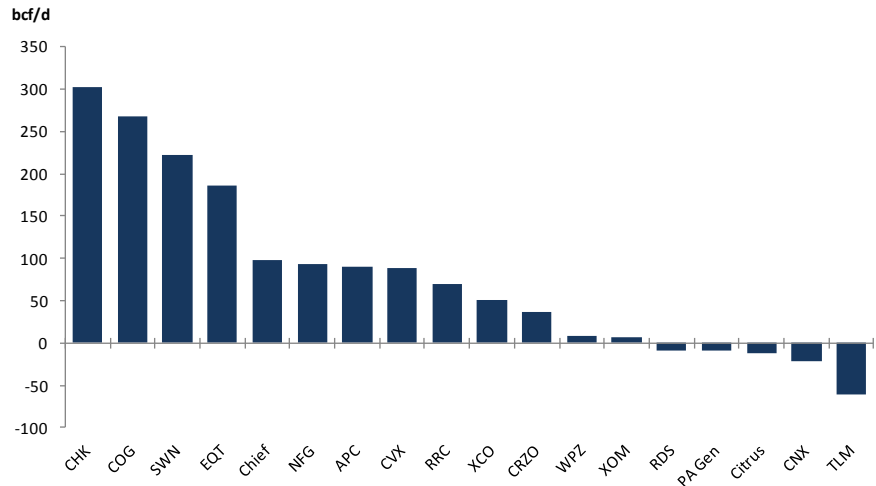
*SWN, Chief, and CVX are posting the strong growth rates with declines coming from Citrus, TLM, and CNX.*



Source: Pennsylvania Department of Environmental Protection

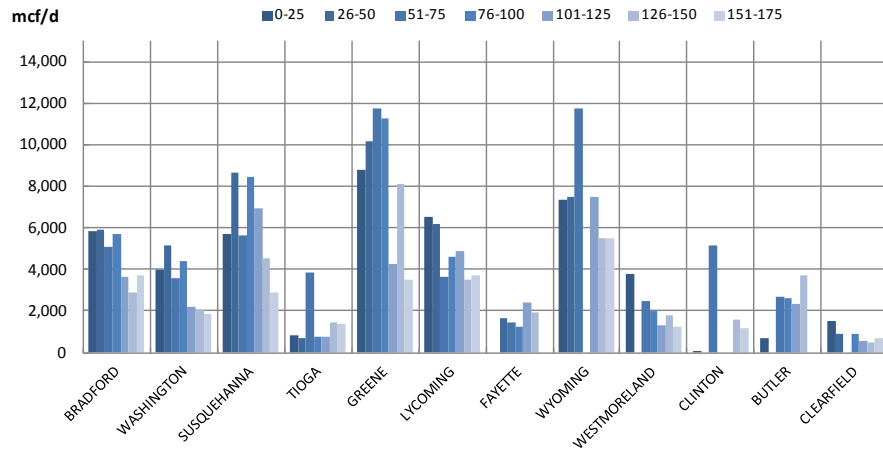
**Exhibit 5. Absolute Production Growth [1H13/2H12] by Operator**

*CHK, COG, SWN, and EQT added over 175 mmcf/d of production in 1H13. The largest decreases came from TLM and CNX.*



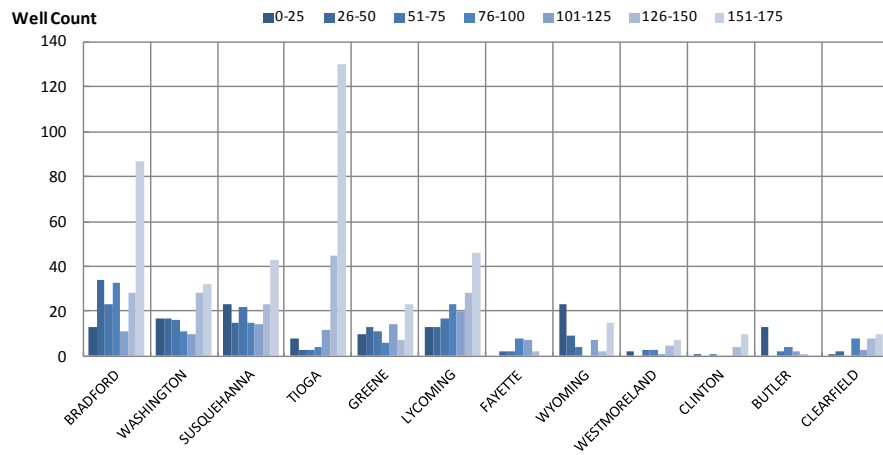
Source: Pennsylvania Department of Environmental Protection

**Exhibit 6. Well Performance Segmented by County and Days on Production**



Source: Pennsylvania Department of Environmental Protection

**Exhibit 7. Well Permits Segmented by County and Days on Production**



Source: Pennsylvania Department of Environmental Protection

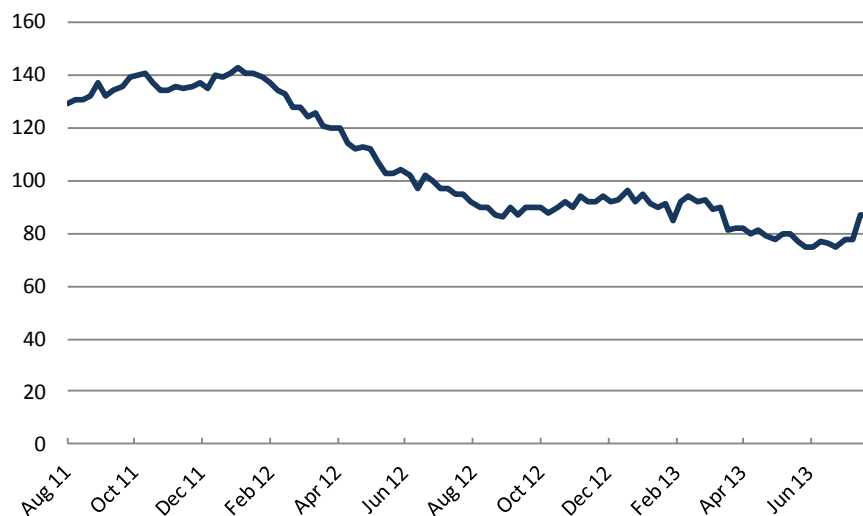
**Exhibit 8. Top 25 Biggest Producing Wells**

*COG accounts for 18 of the top 25 largest wells (excluding the SWN well, which might be a data error).*

Well Permit #	Gas Quantity mcf	Days on Production	Operator Name	Well County
015-21961	14,114,690	165	SOUTHWESTERN ENERGY PROD CO	BRADFORD
115-20861	5,489,841	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20860	4,127,220	181	CABOT OIL & GAS CORP	SUSQUEHANNA
059-25961	3,661,033	181	EQT PRODUCTION CO	GREENE
059-25960	2,794,754	181	EQT PRODUCTION CO	GREENE
015-21369	2,749,964	174	CHIEF OIL & GAS LLC	BRADFORD
115-20682	2,620,917	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20949	2,572,242	118	CABOT OIL & GAS CORP	SUSQUEHANNA
115-21004	2,534,322	132	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20683	2,467,794	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20196	2,454,785	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20482	2,421,120	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20595	2,415,521	181	CHIEF OIL & GAS LLC	SUSQUEHANNA
115-20951	2,390,893	118	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20937	2,380,296	181	CABOT OIL & GAS CORP	SUSQUEHANNA
131-20147	2,343,327	181	CHIEF OIL & GAS LLC	WYOMING
115-20856	2,343,118	154	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20639	2,324,456	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20762	2,289,123	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-21005	2,272,250	132	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20681	2,264,065	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20226	2,244,183	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20183	2,210,430	181	CABOT OIL & GAS CORP	SUSQUEHANNA
059-25959	2,196,064	181	EQT PRODUCTION CO	GREENE
115-20896	2,162,150	181	CABOT OIL & GAS CORP	SUSQUEHANNA
115-20613	2,143,131	180	CHIEF OIL & GAS LLC	SUSQUEHANNA

Source: Pennsylvania Department of Environmental Protection

**Exhibit 9. Marcellus Rig Count**



Source: Baker Hughes

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