Natural Gas Production Report

Q1

January to March 2020

This report uses data reported to the Pennsylvania Department of Environmental Protection (DEP) from natural gas operators to develop statewide tabulations of production volume and well counts. These data are presented on a quarterly basis to show recent trends in natural gas activity in the Commonwealth. Production and well count data pertain only to gas produced from unconventional sources (e.g., shale). The production and well count data throughout this report focus on horizontal wells, which account for over 99 percent of unconventional production in Pennsylvania. The report also provides (1) state production comparisons from the U.S. Energy Information Administration (EIA) and (2) recent regional price trends from Bentek Energy.

Production Volume and New Wells Spud

Recent data from DEP show that natural gas production volume from horizontal wells was 1,766 billion cubic feet (bcf) in the first quarter of 2020 (see **Table 1**). This output represents an increase of 6.8 percent from the first quarter of the prior year, the lowest such growth rate in over two years. Year-over-year growth in production has decelerated over the last three quarters after recording very strong gains from the first quarter of 2018 to the second quarter of 2019. Furthermore, first quarter production represents a slight decline from the fourth quarter of 2019. This is the first quarter-to-quarter decline in over three years. The slowdown in production likely resulted from the combination of (1) a persistently low-price environment for natural gas and (2) early impacts of the COVID-19 pandemic.

There were 153 new horizontal wells spud in the first quarter of 2020. This figure represents a decrease of 45 wells (-22.7 percent) from the same period in the prior year. Despite being an increase from the fourth quarter of 2019, it was the fourth consecutive quarter in which there was a year-over-year decline in new wells spud. Over the last six quarters, cumulative growth in new wells spud is -28.2 percent (-4.6 percent per quarter on average).

Table 1: Production Volume and New Wells Spud

	2018	2019				2020
	Q4	Q1	Q2	Q3	Q4	Q1
Production	1,649	1,654	1,670	1,717	1,775	1,766
Growth Rate	17.8%	14.7%	14.7%	9.5%	7.6%	6.8%
New Wells Spud	199	198	163	135	117	153
Growth Rate	-5.7%	2.6%	-23.1%	-21.1%	-41.2%	-22.7%

Note: Growth rates are year-over-year. Production in billion cubic feet. All data exclude vertical wells, which account for less than one percent of production.

Figure 1 displays the year-over-year growth rates of horizontal well production over the last 16 quarters. After reaching the lowest quarterly growth rate on record in the first quarter of 2017 (2.3 percent), production growth accelerated in six consecutive quarters, reaching the strongest recorded year-over-year growth rate of 18.6 percent in the third quarter of 2018. Since reaching this peak, quarterly production growth has decelerated in five of the last six quarters.

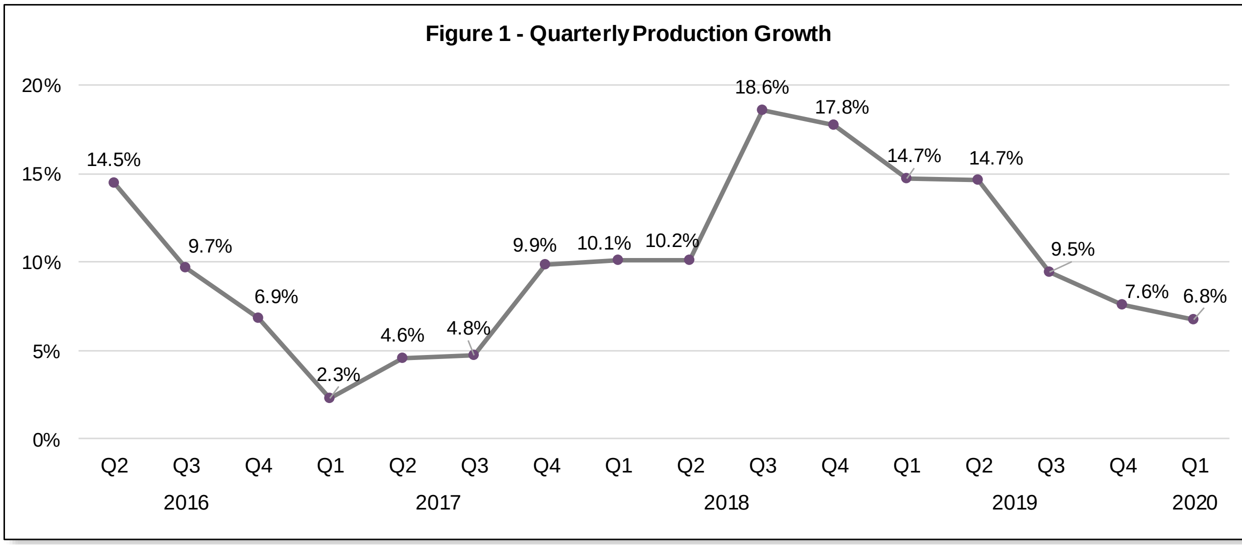
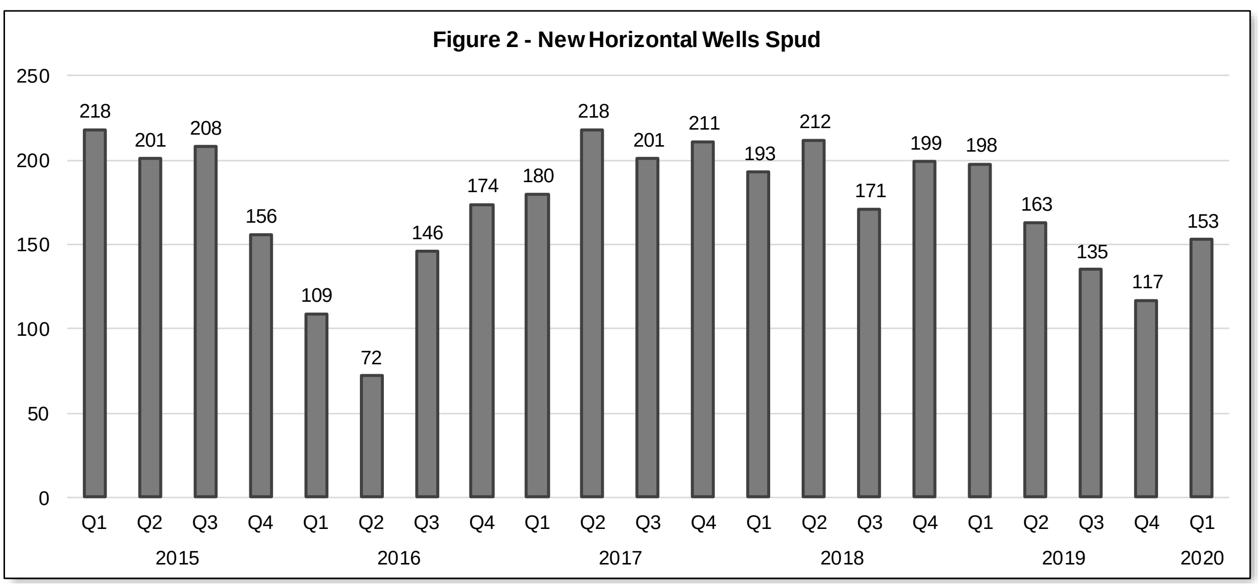


Figure 2 shows the quarterly number of new horizontal wells spud since the first quarter of 2015. The number of wells spud in the first quarter of 2020 was the lowest first quarter spud count since 2016. In 2019, there were 613 new horizontal wells spud, a decline of 162 wells (-20.9 percent) from the prior year. The spud count for the first quarter of 2020 suggests the potential for another annual decline. Preliminary data for the second quarter show that the number of wells spud in April and May declined by roughly one-third from the prior year.



Well Count Trends

Table 2 displays the number of producing wells over the last six quarters. There were 9,941 total producing wells in the first quarter of 2020, which represents an annual increase of 7.5 percent. Horizontal producing wells, which account for over 99 percent of production, recorded an annual increase of 8.0 percent. This is the smallest year-over-year increase in quarterly horizontal producing wells on record. Decelerating growth in producing wells is the result of less drilling activity and older wells being shut in or plugged.

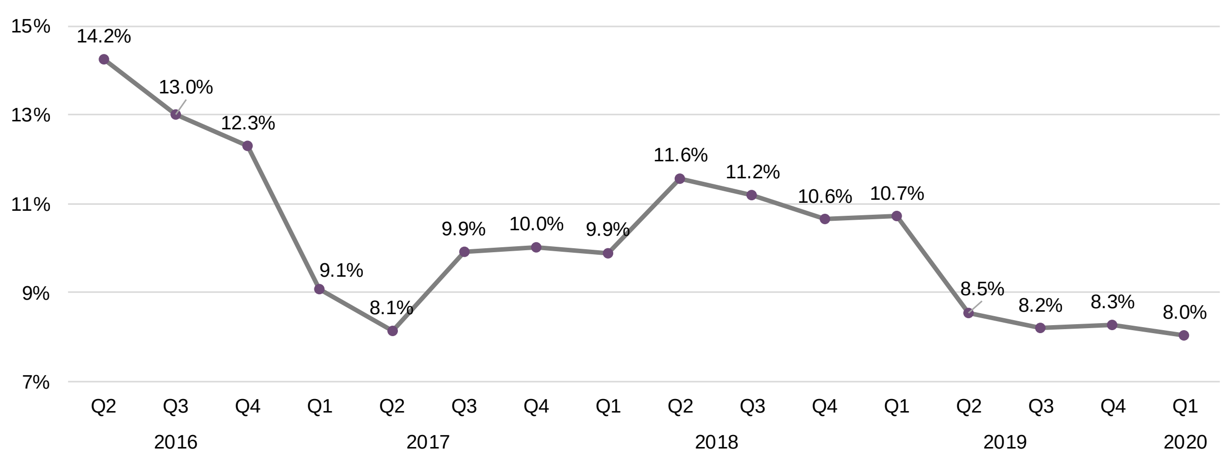
Table 2: Quarterly Producing Well Count

	2018	2019				2020
	Q4	Q1	Q2	Q3	Q4	Q1
Horizontal	8,606	8,766	8,897	9,121	9,321	9,470
Growth Rate	10.6%	10.7%	8.5%	8.2%	8.3%	8.0%
Total	9,092	9,245	9,379	9,600	9,789	9,941
Growth Rate	9.9%	9.9%	8.1%	7.6%	7.7%	7.5%

Note: Growth rates are year-over-year. Vertical wells are not shown separately, as they account for less than one percent of production.

Figure 3 shows the year-over-year growth in horizontal producing wells over the last 16 quarters. Growth in producing wells over the last four quarters has remained near levels similar to early 2017, when quarterly production growth was at its lowest level on record. Without a significant uptick in new wells spud, producing well growth will likely continue to decelerate.

Figure 3 - Producing Well Growth



County and State Comparison

Table 3 shows county-level production volume and producing well counts for the first quarter of 2020 and 2019. Ranked in order of production, the table shows (1) the top five counties, (2) the next five counties combined into one group and (3) the remaining counties as another group. The top five counties accounted for 74.1 percent of production and 67.1 percent of producing wells statewide. The top two producing counties, Susquehanna and Washington, both recorded year-over-year declines in production in the first quarter. This is the first year-over-year decline in quarterly production for Susquehanna County on record. Greene County accounted for over one-third of the statewide production increase for the quarter.

Table 3: County Production Comparison

		Production Volume				Producing Wells			
		First Quarter		2020 Metrics		First Quarter		2020 Metrics	
Rank	County	2019	2020	Share	Growth	2019	2020	Share	Growth
1	Susquehanna	409	404	23.0%	-1.1%	1,364	1,500	15.8%	10.0%
2	Washington	293	289	16.4%	-1.5%	1,509	1,598	16.9%	5.9%
3	Greene	243	284	16.1%	16.6%	1,022	1,129	11.9%	10.5%
4	Bradford	215	222	12.6%	3.4%	1,213	1,276	13.5%	5.2%
5	Lycoming	91	105	6.0%	14.9%	805	853	9.0%	6.0%
6-10	Next 5 Counties	282	317	18.0%	12.6%	1,578	1,730	18.3%	9.6%
	All Other	120	144	8.2%	20.3%	1,274	1,384	14.6%	8.6%

Note: Horizontal wells only. Production in billion cubic feet. Next 5 Counties includes Tioga, Wyoming, Butler, Allegheny and Sullivan Counties.

Table 4 provides a state comparison of gross natural gas production from all well types. Ranked in order of production, the table shows (1) the top five states, (2) the next five states combined into one group and (3) the remaining states combined into one group. Among the top five producing states, Texas recorded the strongest gains in 2019 (15.9 percent).

Table 4: State Production Comparison

		Production Volume			Annual Growth Rate		
Rank	State	CY 2017	CY 2018	CY 2019	CY 2017	CY 2018	CY 2019
1	Texas	7,996	8,814	10,213	-2.0%	10.2%	15.9%
2	Pennsylvania	5,464	6,207	6,961	4.9%	13.6%	12.2%
3	Alaska	3,251	3,255	3,250	0.6%	0.1%	-0.1%
4	Oklahoma	2,514	2,946	3,175	1.8%	17.2%	7.8%
5	Louisiana	2,148	2,830	3,156	19.8%	31.8%	11.5%
6-10	Next 5 States	8,191	9,260	10,166	7.2%	13.0%	9.8%
	All Other	3,794	3,697	3,773	-7.3%	-2.6%	2.0%

Source: U.S. Energy Information Administration. Production does not directly correspond to DEP data. Includes all production sources and well types. Production in billion cubic feet. Next 5 States includes Ohio, Colorado, West Virginia, Wyoming and New Mexico.

Price Trends

Table 5 displays recent trends in natural gas spot prices at the Henry Hub and two major Pennsylvania hubs. These data show that both prices have been declining dramatically over the last three quarters. From the fourth quarter of 2018 to the first quarter of 2020, the Pennsylvania average price declined by 53.6 percent. This significant decline in prices is the result of sustained production growth (supply), from already record-levels, outstripping demand.

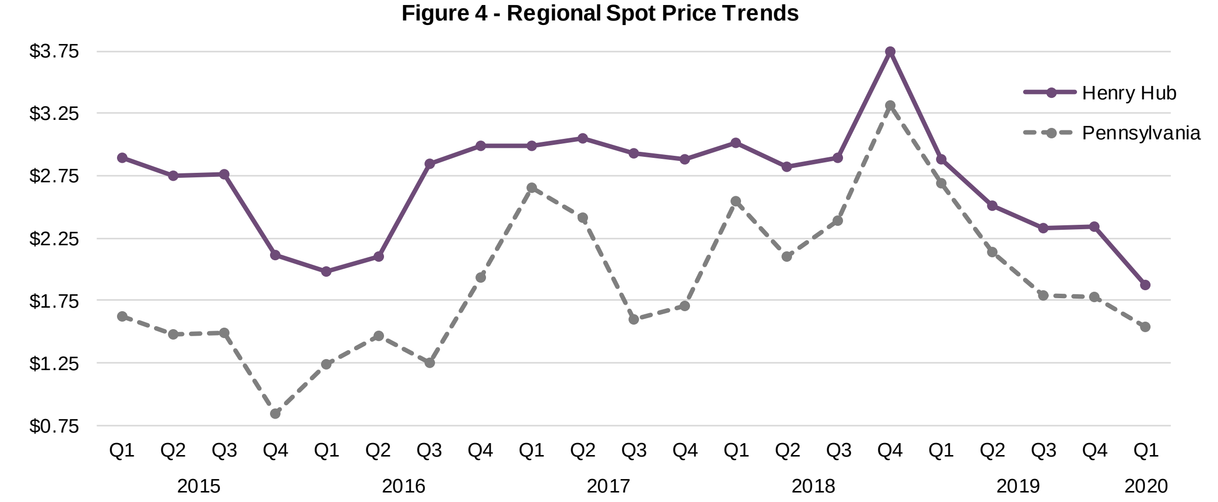
Table 5: Regional Spot Price Trends

	2018	2019				2020
	Q4	Q1	Q2	Q3	Q4	Q1
Henry Hub	$3.75	$2.88	$2.51	$2.33	$2.34	$1.88
Growth Rate	30.1%	-4.3%	-10.9%	-19.6%	-37.5%	-34.9%
PA Average	$3.32	$2.70	$2.14	$1.80	$1.78	$1.54
Growth Rate	94.3%	5.8%	1.9%	-24.7%	-46.5%	-42.9%

Source: Bentek Energy. The PA Average is a weighted average of the Dominion South and Transco Leidy trading hubs. The Henry Hub is located in Louisiana. Growth rates are year-over-year.

Figure 4 shows trends in the same prices over the last 20 quarters. These data show that the typical winter spike in prices did not occur this past winter, likely due to the combination of (1) strong supply growth and (2) weak demand related to mild weather and early impacts of the COVID-19 pandemic.

Figure 4 - Regional Spot Price Trends



Staff Acknowledgements

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