Natural Gas Production Report

October to December 2021

Q4

This report uses data reported to the Pennsylvania Department of Environmental Protection (DEP) by 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 comprise over 99% of total 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 1,949 billion cubic feet (bcf) in the fourth quarter of 2021 (see **Table 1**). This output represents an increase of 6.7% from the fourth quarter of 2020. Full-year production increased by 6.8% from the prior year, a notable uptick from the weaker-than-usual production growth for 2020 (4.0%). Despite the increase from prior year growth, the rate of 6.8% still represents a deceleration from pre-pandemic rates. From 2016 to 2019, horizontal production volume increased at an average rate of 10.2% per annum.

There were 154 new horizontal wells spud in the fourth quarter of 2021. This figure represents a 55.6% increase from the same period in the prior year, and the highest number of wells spud in a quarter since the first quarter of 2020. There were 518 new wells spud in 2021, an increase of 42 wells (8.8%) from the prior year. This was the first year-over-year annual increase in new wells spud since 2017.

Table 1: Production Volume and New Wells Spud

	2020		2021			
	Q3	Q4	Q1	Q2	Q3	Q4
Production	1,765	1,827	1,863	1,852	1,892	1,949
Growth Rate	2.9%	3.0%	5.4%	7.8%	7.2%	6.7%
New Wells Spud	111	99	133	120	111	154
Growth Rate	-17.8%	-15.4%	-13.1%	6.2%	0.0%	55.6%

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. Annual growth in quarterly production fell to the lowest rate on record in the second quarter of 2020 and stagnated through the remainder of the year. Production growth in 2021 resembled rates from just prior to the pandemic.

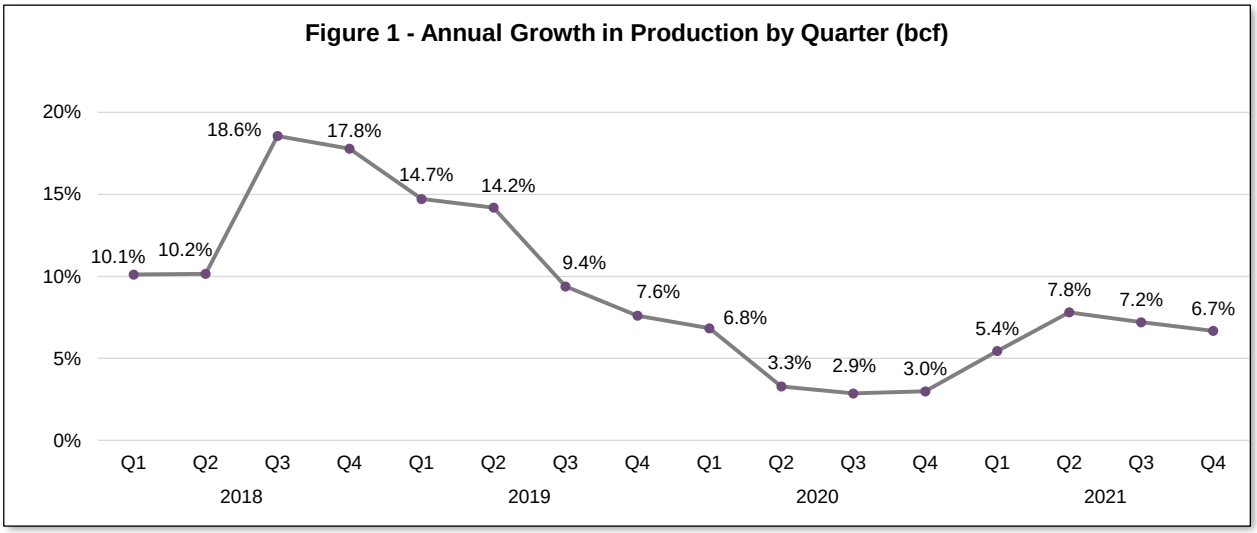
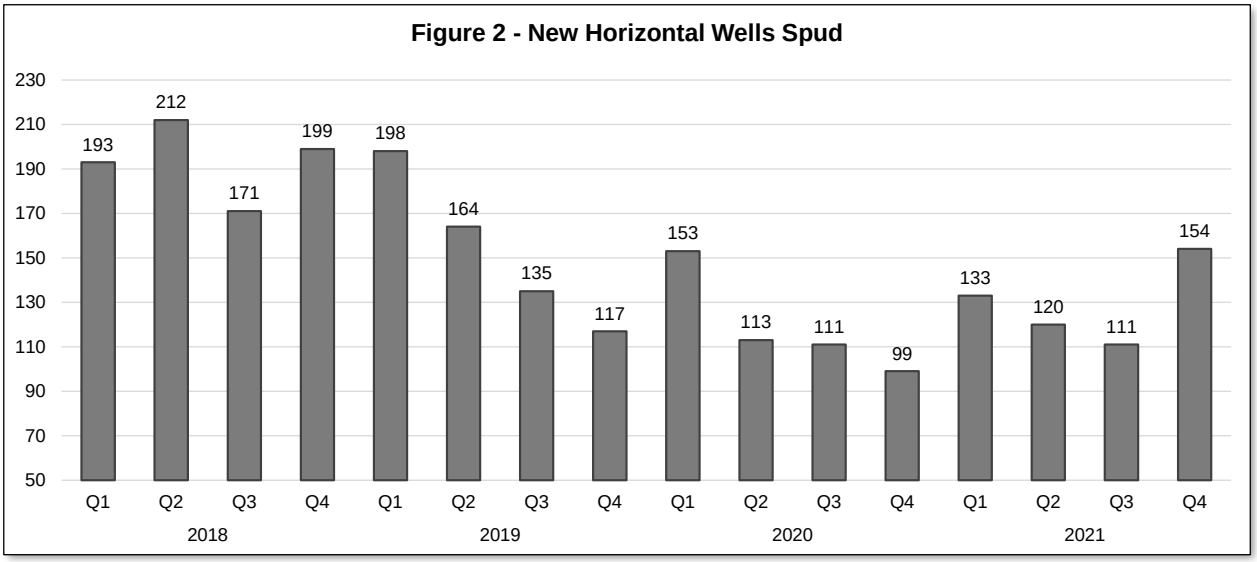


Figure 2 shows the quarterly number of new horizontal wells spud over the last 16 quarters. After quarter-to-quarter declines in the prior two quarters, new wells spud in the fourth quarter reverted to a pre-pandemic level. The uptick in drilling in the fourth quarter was likely due in part to abnormally high national and regional natural gas prices in the second half of the year.



Well Count Trends

Table 2 displays the number of producing wells over the last six quarters. There were 10,762 total producing wells in the fourth quarter of 2021, an increase of 4.2% from the prior year. Horizontal producing wells, which account for over 99% of production, recorded an annual increase of 4.6%. Decelerating growth in producing wells is due to less drilling activity and older wells being shut in or plugged.

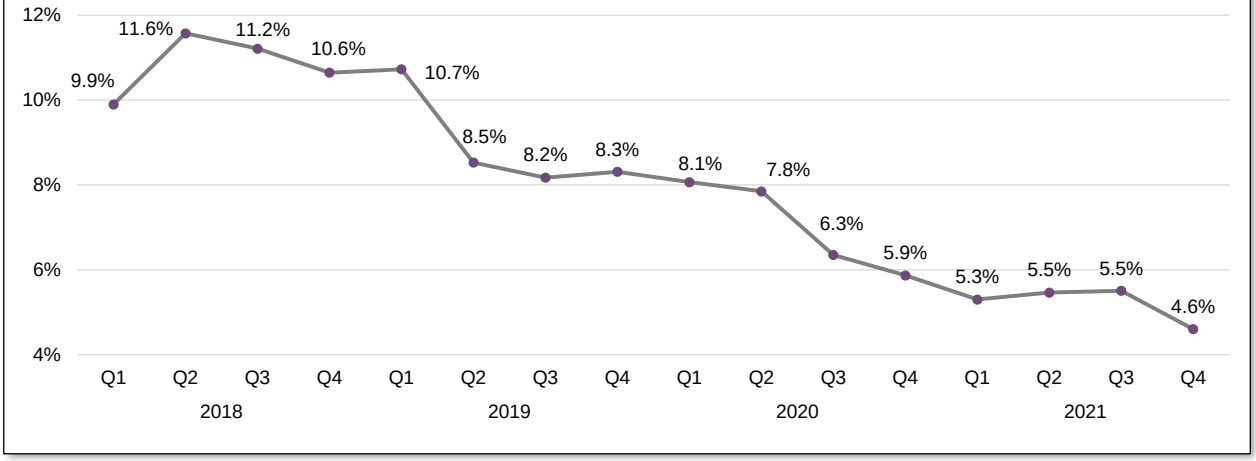
Table 2: Quarterly Producing Well Count

	2020		2021			
	Q3	Q4	Q1	Q2	Q3	Q4
Horizontal	9,700	9,868	9,975	10,118	10,234	10,322
Growth Rate	6.3%	5.9%	5.3%	5.5%	5.5%	4.6%
Total	10,168	10,333	10,441	10,573	10,676	10,762
Growth Rate	5.9%	5.6%	4.9%	5.0%	5.0%	4.2%

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 the number of horizontal producing wells over the last 16 quarters. Growth in producing wells has consistently declined over the last four years and has dropped to its lowest rate on record. Without a significant uptick in new wells spud, producing well growth will likely continue to decelerate or stagnate.

Figure 3 - Annual Growth in Producing Well Counts by Quarter



County and State Comparison

Table 3 shows county-level production volume and producing wells in 2020 and 2021. 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 76.0% of production and 67.4% of producing wells statewide. The top producing county, Susquehanna, recorded a year-over-year decline in production volume. The combined growth in Washington, Bradford, Lycoming and Wyoming counties represented over 100% of the statewide increase, as most other counties recorded only a modest increase or a decline in quarterly production volume.

Table 3: County Production Comparison

		Production Volume				Producing Wells			
		Calendar Year		2021 Metrics		Calendar Year		2021 Metrics	
Rank	County	2020	2021	Share	Growth	2020	2021	Share	Growth
1	Susquehanna	1,635	1,619	21.4%	-1.0%	1,598	1,708	16.2%	6.9%
2	Washington	1,198	1,394	18.4%	16.3%	1,713	1,821	17.3%	6.3%
3	Bradford	947	1,154	15.3%	21.8%	1,337	1,412	11.7%	5.6%
4	Greene	1,050	1,087	14.4%	3.5%	1,191	1,230	13.4%	3.3%
5	Lycoming	448	488	6.5%	9.0%	890	925	8.8%	3.9%
6-10	Next 5 Counties	1,260	1,237	16.4%	-1.8%	1,815	1,887	17.9%	4.0%
	All Other	538	578	7.6%	7.3%	1,460	1,542	14.7%	5.6%

Note: Horizontal wells only. Production in billion cubic feet. Next 5 Counties includes Wyoming, Tioga, 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. Through November 2021, Pennsylvania production recorded the strongest year-over-year growth of any top-five state. West Virginia entered the top five for the first time in 2021 after recording consecutive years of significant production growth.

Table 4: State Production Comparison

		Production Volume			Annual Growth Rate		
Rank	State	CY 2019	CY 2020	CY 2021	CY 2019	CY 2020	CY 2021
1	Texas	10,433	10,410	9,557	14.5%	-0.2%	0.1%
2	Pennsylvania	6,897	7,148	7,013	10.1%	3.6%	7.9%
3	Alaska	3,250	3,429	3,160	-0.1%	5.5%	1.8%
4	Louisiana	3,219	3,212	3,074	13.3%	-0.2%	4.7%
5	West Virginia	2,155	2,592	2,519	21.6%	20.3%	6.7%
6-10	Next 5 States	11,045	10,522	9,502	6.3%	-4.7%	-1.6%
	All Other	3,782	3,300	2,976	2.5%	-12.7%	-1.5%

Source: U.S. Energy Information Administration. Production does not directly correspond to DEP data. Includes all production sources and well types. Production and growth rates for CY 2021 are through November. Production in billion cubic feet. Next 5 States includes Oklahoma, New Mexico, Ohio, Colorado, and Wyoming.

Price Trends

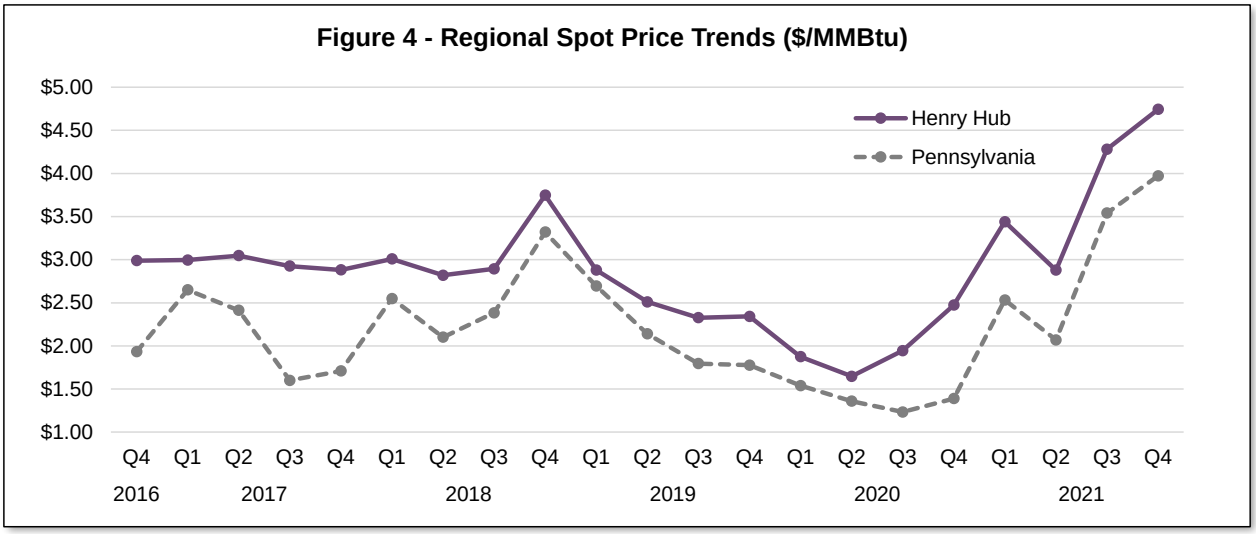
Table 5 displays recent trends in natural gas spot prices at the Henry Hub and an average price for two major Pennsylvania hubs. These data show that the Henry Hub price increased by 91.7% from the same period in 2020 and the average Pennsylvania hub price increased by 186.0%. These prices recorded significant gains due to the combination of weaker-than-usual production growth and demand rebounding from closures and mitigation efforts related to the COVID-19 pandemic in 2020. Current forecasts project that prices will remain elevated in the near-term due to global supply and demand pressures.

Table 5: Regional Spot Price Trends

	2020		2021			
	Q3	Q4	Q1	Q2	Q3	Q4
Henry Hub	$1.95	$2.47	$3.44	$2.88	$4.28	$4.74
Growth Rate	-16.4%	5.6%	83.4%	74.7%	120.1%	91.7%
PA Average	$1.23	$1.39	$2.53	$2.07	$3.54	$3.97
Growth Rate	-31.3%	-21.8%	64.4%	52.2%	187.1%	186.0%

Source: Bentek Energy. Prices in $/MMBtu. 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 displays trends in the same prices over the last 21 quarters. The figure shows that both national and regional prices, after falling steeply throughout 2020, have increased to their highest levels since the 4th quarter of 2018 due to strong demand and limited production.



Staff Acknowledgements

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