Natural Gas Production Report

Q4

October to December 2022

This report uses data reported to the Pennsylvania Department of Environmental Protection (DEP) by natural gas operators to compute statewide totals for 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 volume and well count data pertain only to gas produced from unconventional sources (e.g., shale) and data used by this report focus on horizontal wells, which comprise over 99% of total production in Pennsylvania. The report also includes (1) county-level production and well count comparisons, (2) state production comparisons from the U.S. Energy Information Administration (EIA) and (3) natural gas hub spot 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 1,856 billion cubic feet (bcf) in the fourth quarter of 2022 (see **Table 1**). This output represents a 5.1% decrease from the fourth quarter of 2021, the fourth consecutive quarter in which production did not increase year-over-year. It also represents the strongest year-over-year decline in quarterly production since monthly production data have been published (2015). Full year horizontal production totaled 7,439 bcf, a 1.6% decline from the prior year. This is the first annual decline since unconventional production volume data became available (2012).

There were 136 new horizontal wells spud in the fourth quarter of 2022. This figure represents a decrease of 18 wells (-11.7%) compared to the same period in the prior year. For the year, new wells totaled 574, an increase of 56 wells (10.8%) from the prior year and the second consecutive year there was an annual increase in drilling.

Table 1: Production Volume and New Wells Spud

	2021		2022			
	Q3	Q4	Q1	Q2	Q3	Q4
Production Volume	1,892	1,956	1,852	1,852	1,879	1,856
Growth Rate	7.2%	7.1%	-0.6%	0.0%	-0.7%	-5.1%
New Wells Spud	111	154	147	133	158	136
Growth Rate	0.0%	55.6%	10.5%	10.8%	42.3%	-11.7%

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 year-over-year growth rates for horizontal well production over the last 16 quarters. Annual growth in quarterly production fell to the lowest rate on record in the fourth quarter.

Figure 1 - Annual Growth in Production by Quarter

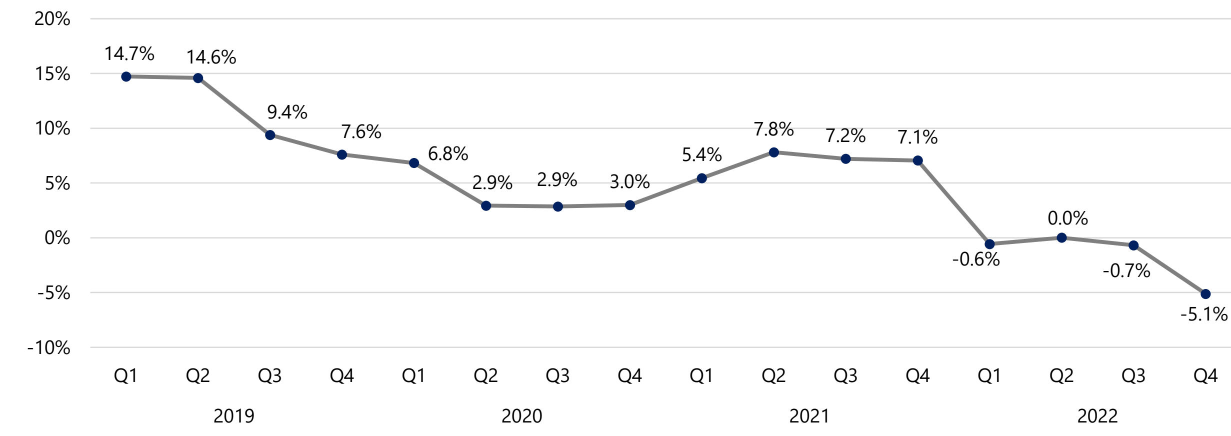
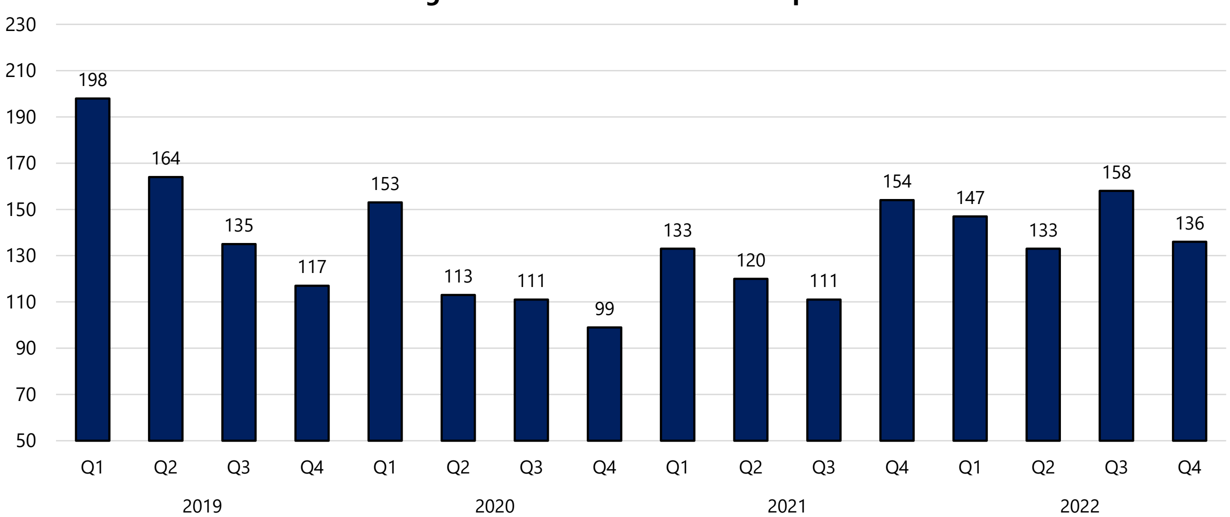


Figure 2 shows the quarterly number of new horizontal wells spud over the last 16 quarters. The quarter-to-quarter decline in new wells from the third to fourth quarter was the largest such decline since the second quarter of 2020. Preliminary data for January and February show that wells spud declined 10.8% from same period in the prior year.

Figure 2 - New Horizontal Wells Spud



Well Count Trends

Table 2 displays the number of producing wells over the last six quarters. There were 11,346 total producing wells in the fourth quarter of 2022, an increase of 5.3% from the prior year. Horizontal producing wells, which account for over 99% of production, increased by 5.5%.

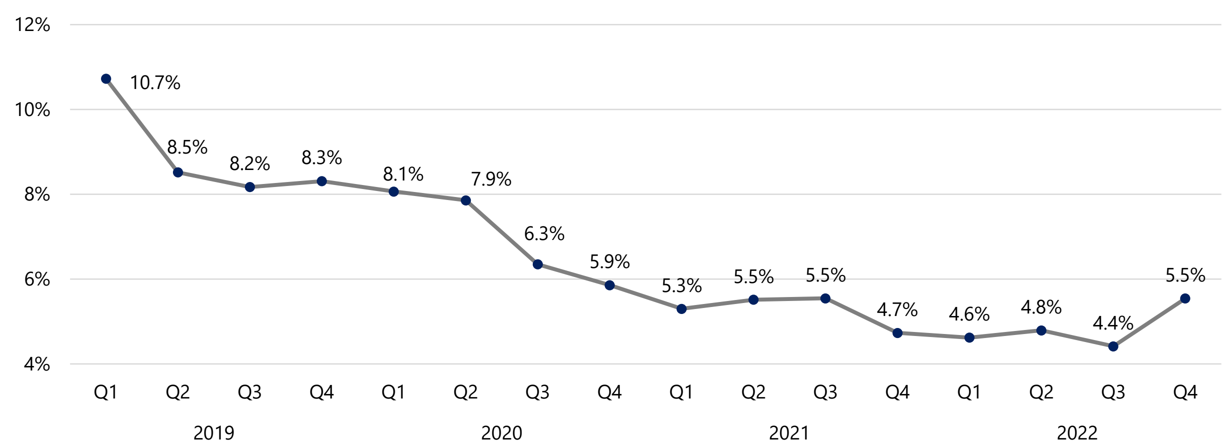
Table 2: Quarterly Producing Well Count

	2021		2022			
	Q3	Q4	Q1	Q2	Q3	Q4
Horizontal	10,238	10,334	10,438	10,613	10,690	10,907
Growth Rate	5.5%	4.7%	4.6%	4.8%	4.4%	5.5%
Total	10,685	10,780	10,878	11,053	11,126	11,346
Growth Rate	5.1%	4.3%	4.1%	4.4%	4.1%	5.3%

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 for the fourth quarter represented a notable uptick compared to recent quarters. The acceleration from the third to fourth quarter was the largest since the second quarter of 2018. The uptick in producing wells was likely the result of increased drilling in 2022, which should lead to further increases in producing well growth.

Figure 3 - Annual Growth in Producing Well Counts by Quarter



County and State Comparison

Table 3 shows county-level production volume and producing wells for calendar year (CY) 2022 and CY 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) remaining counties as a third group. The top five counties accounted for 74.0% of production and 66.6% of producing wells statewide. The top five producing counties recorded a year-over-year decline in production volume. Some smaller production counties (not shown separately) recorded strong production gains, such as Westmoreland (+89.5%), Sullivan (+55.2%), Armstrong (+32.2%) and Tioga (+18.6%).

Table 3: County Production Comparison

		Production Volume				Producing Wells			
		Calendar Year		2022 Metrics		Calendar Year		2022 Metrics	
Rank	County	2021	2022	Share	Growth	2021	2022	Share	Growth
1	Susquehanna	1,619	1,556	20.9%	-3.9%	1,708	1,820	16.4%	6.6%
2	Washington	1,393	1,322	17.8%	-5.1%	1,821	1,866	16.9%	2.5%
3	Bradford	1,153	1,116	15.0%	-3.2%	1,412	1,467	13.3%	3.9%
4	Greene	1,087	1,084	14.6%	-0.3%	1,230	1,282	11.6%	4.2%
5	Lycoming	488	428	5.7%	-12.4%	925	932	8.4%	0.8%
6-10	Next 5 Counties	1,243	1,259	16.9%	1.3%	1,886	2,006	18.1%	6.4%
	All Other	580	675	9.1%	16.3%	1,547	1,694	15.3%	9.5%

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

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) remaining states combined into a third group. After relatively strong production growth compared to other major producing states in CY 2021, Pennsylvania is the only major producing state to record negative growth for CY 2022.

Table 4: State Production Comparison

		Production Volume			Annual Growth Rate		
Rank	State	CY 2020	CY 2021	CY 2022	CY 2020	CY 2021	CY 2022
1	Texas	10,410	10,669	11,304	-0.2%	2.5%	5.9%
2	Pennsylvania	7,148	7,627	7,484	3.6%	6.7%	-1.9%
3	Louisiana	3,212	3,436	4,029	-0.2%	7.0%	17.3%
4	Alaska	3,429	3,486	3,587	5.5%	1.7%	2.9%
5	West Virginia	2,592	2,760	2,921	20.3%	6.5%	5.8%
6-10	Next 5 States	10,522	10,386	10,796	-4.7%	-1.3%	3.9%
	All Other	3,300	3,302	3,250	-12.7%	0.1%	-1.6%

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 Oklahoma, New Mexico, Ohio, Colorado and Wyoming.

Price Trends

Table 5 displays recent trends in natural gas spot prices for the Henry Hub and an average price for two major Pennsylvania hubs. Data for the fourth quarter of 2022 show that, although higher than the prior year, the Henry Hub and PA Average price both declined significantly. The decline was largely due to mild winter weather which constrained the typical demand for heating and led to increased natural gas inventory throughout the country. There is typically a draw-down of inventories during the winter months to fulfill heating demand.

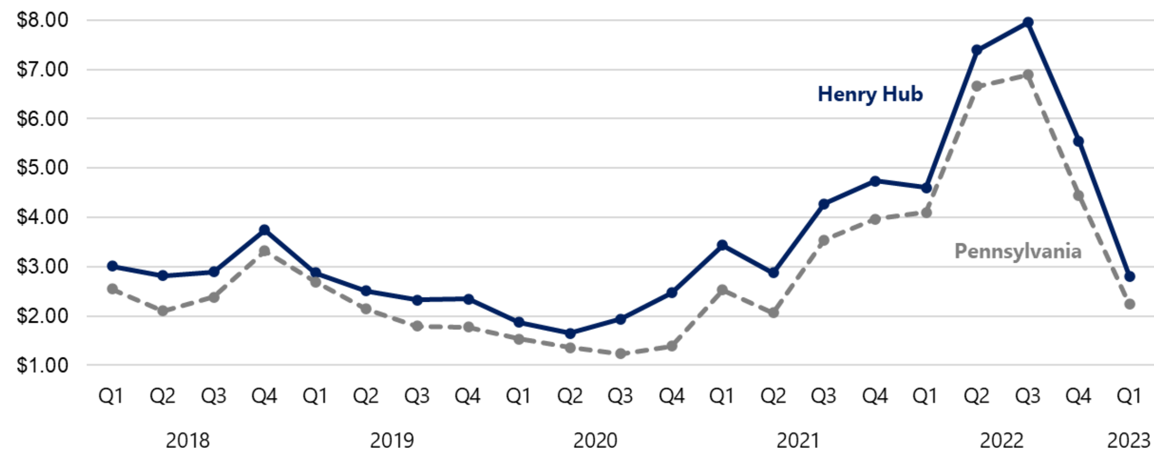
Table 5: Regional Spot Price Trends

	2021		2022			
	Q3	Q4	Q1	Q2	Q3	Q4
Henry Hub	$4.28	$4.74	$4.60	$7.39	$7.96	$5.55
Growth Rate	120.1%	91.7%	33.8%	156.8%	85.8%	17.0%
PA Average	$3.54	$3.97	$4.10	$6.66	$6.89	$4.45
Growth Rate	187.1%	186.0%	62.1%	221.8%	94.7%	12.0%

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 including preliminary data for the first quarter of 2023. These preliminary data show that the average Henry Hub price for the first quarter is $2.81, and the PA Average price is $2.24. The Henry Hub is currently projected to remain below $3.50 for the rest of the year.

Figure 4 - Regional Spot Price Trends ($/MMBtu)



Staff Acknowledgements

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