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Pennsylvania's unheralded benefit from shale gas production

Summary: Over the years opponents of shale gas drilling have debated its economic benefits, yet recent evidence suggests it still provides considerable value to the commonwealth. In 2013 *Policy Brief Vol. 13, No. 27* demonstrated that royalty income had financially benefited many Pennsylvanians. That Brief evaluated years 2006 (pre-drilling) to 2010. This Brief will provide an updated assessment of those royalty payments and production from 2011 through 2018.

Both royalty payments and shale gas production continued to increase across the state over the 2011-2018 period. This Brief looks at counties in the Pittsburgh area as well as some in the northern tier of the state that are among the busiest producers of natural gas from the shale formations (Marcellus and Utica), namely, Allegheny, Armstrong, Beaver, Bradford, Butler, Greene, Fayette, Sullivan, Susquehanna, Tioga, Washington, and Westmoreland. This natural gas is extracted from the shale formations through wells known as unconventional wells.

Landowners who own property over natural gas pools can earn lease payments from their land along with royalty payments on the gas extracted from their property. Royalty payments are paid to the landowner based on the value of gas extracted from the wells on leased property. Each lease is established by an individual contract. However, the Pennsylvania Oil and Gas Lease Act, which was amended in July 2013, sets a minimum royalty payment of 12.5 percent of the value of the natural gas removed from the property.

The lease varies by landowner/property and is the legal contract that allows the natural gas company to drill on the property. The lease will define the time-period for drilling and the royalty payments rate. Also, the lease usually specifies a one-time bonus payment. Included in the lease will be the details of the rental payment. Typically, the rental payment is made annually but it varies with each contract.

The most recent Pennsylvania income tax revenue data available is from 2018. Of particular interest is the category of "rent, royalties, patents, and copyrights" which is defined as "income received for the use of real or tangible property, the use of a patent or copyright, or the extraction of coal, oil, gas or other minerals." This would capture any taxable income associated with the royalties from natural gas activity.

The majority of counties in the study group continued to show increases to this category on state tax returns, demonstrating the enduring economic benefit of natural gas drilling. The table below displays the total amount of taxable income from "rent, royalties, patents, and copyrights" for 2011 and 2018 for Pittsburgh's Metropolitan Statistical Area (MSA). The last column shows the dollar change between 2011 and 2018. Every county except Beaver had an increase. Therefore, it is evident that drilling of natural gas in the shale formations has continued over the years to generate revenue for many landowners in Pittsburgh's MSA.

	rent, royalty, patent & copyright taxable income (millions)			shale natural gas production (millions of mcf)		
County	**2011**	**2018**	**Change**	**2011**	**2018**	**Change**
Allegheny	$ 475.8	$ 588.3	$ 112.50	2.48	106.72	104.24
Armstrong	$ 26.4	$ 27.5	$ 1.10	6.23	56.54	50.31
Beaver	$ 85.8	$ 72.0	$ (13.80)	-	38.10	38.10
Butler	$ 143.4	$ 190.0	$ 46.60	11.64	216.61	204.97
Fayette	$ 60.5	$ 68.7	$ 8.20	25.60	60.16	34.56
Washington	$ 274.6	$ 425.7	$ 151.10	113.92	1,164.39	1,050.47
Westmoreland	$ 144.9	$ 153.4	$ 8.50	21.77	77.92	56.15
Bradford	$ 167.3	$ 125.5	$ (41.80)	287.70	765.24	477.54
Greene	$ 61.1	$ 135.2	$ 74.10	118.92	798.35	679.43
Susquehanna	$ 83.3	$ 248.3	$ 165.00	201.47	1,464.73	1,263.26
Tioga	$ 74.6	$ 62.2	$ (12.40)	126.61	301.43	174.82
Statewide	$ 5,830.9	$ 7,518.8	$ 1,687.90	1,066	6,123	5,057.60

The table also shows the total amount of taxable income from "rent, royalties, patents, and copyrights" for four counties outside Pittsburgh's MSA. Two of these counties experienced increases to this income tax category, with two showing declines.

Susquehanna County's total amounts rose by an astonishing by $165 million between 2011 and 2018. Greene County also rose by an impressive $74 million for the same period.

Beaver, Bradford and Tioga counties were outliers. These counties had a small drop to the total amount of taxable income from "rent, royalties, patents, and copyrights" from 2011 to 2018. However, they still had a higher amount in 2018 than in 2006 (pre-drilling).

For example, Beaver County's total amount of taxable income from "rent, royalties, patents, and copyrights" was $22.1 million in 2006. By 2011 it had grown to $85.8 million. In 2012 the county's highest reported amount was $102.9 million. In 2018 the total amount reported was $72 million. Although a decrease from previous years, it is still significantly higher than pre-drilling years. Bradford ($15.7 million in 2006) and Tioga ($8.5 million) counties follow a similar pattern.

Royalty payments are based on the price of natural gas and the amount of gas produced. The price of natural gas has varied throughout the years. In 2011 the yearly average price was $4.01 (Henry Hub price on the New York Mercantile Exchange in dollars per million Btu). From 2012 to 2017 the range went from a high of $4.12 (2014) to a low of $2.56 (2015). In 2018 the average price was $3.12, a difference of 22 percent from 2011. The past price fluctuations are reflected in the varied royalty payments throughout the years.

And, of course, royalty payments also depend upon production levels. Natural gas production numbers from unconventional shale wells in Pennsylvania, reported by the Department of Environmental Protection, continue to increase annually. Total statewide production from unconventional wells increased from 1.065 billion MCF (thousand cubic feet) in 2011 to 6.123 billion MCF in 2018—an increase of 5.057 billion MCF.

In Pittsburgh's MSA, Washington County had the highest production with 1.164 billion MCF in 2018—an increase of 1.05 billion MCF from the 113.9 million MCF produced in 2011. Butler County produced 216.6 million MCF in 2018—up 204.97 million MCF from the 11.6 million MCF in 2011. Allegheny County's jump was also impressive, rising from just 2.48 million MCF in 2011 to 106.72 million MCF in 2018. Comparing 2018 production to 2011, indicates the surge in production levels substantiates the increase in royalty payments to landowners. Even in the counties where taxable income on royalties had fallen, there were increased production levels from unconventional wells within their borders.

It is evident that during the 2011-2018 period Pennsylvania continued to benefit financially from natural gas drilling in the shale formations. One of the often-overlooked benefits occurs with the increase in royalty payments to landowners and the state benefits from the taxes on that income.

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