

**Statement of
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Before the

**Committee on Energy and Natural Resources
United States Senate**

The Economic Impact of Marcellus Shale Play Development in West Virginia

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Thank you Mr. Chairman and members of the Committee: I appreciate the opportunity to be here today to discuss the economic impact of the development of the Marcellus Shale Play in West Virginia. I am Tom S. Witt, director of the West Virginia University Bureau of Business and Economic Research, a position which I have held since 1985. I am also a professor of economics in the WVU College of Business and Economics. Since I arrived at WV in 1970, I have had the opportunity to research various dimensions of our state's economy, ranging from manufacturing, coal and chemicals to tourism and biosciences. Most recently our research in the Bureau has focused on the emerging economic development associated with the Marcellus Shale Play in our state.

My testimony today covers the key points from our recent studies on this topic as well as providing my perspectives on the future potential from the development of this energy resource.

Economic Impact of the Marcellus Shale Play in 2009

I co-authored a Bureau report, *Economic Impact of the Marcellus Shale Play in 2009*, that was released in December 2010.¹ I would like to take this time to highlight some of the key elements of this report.

¹ Amy Higginbotham, Adam Pellillo, Tami Gurley-Calvez and Tom S. Witt. *The Economic Impact of the natural Gas Industry and the Marcellus shale Development in West Virginia in 2009*, WVU Bureau of Business and Economic Research, December 2010. Available at www.bber.wvu.edu.

Since 2002, drilling and development operations in the Marcellus Shale play have become an increasingly important component of West Virginia's natural gas industry. The development of the Marcellus Shale play has led to a significant amount of job creation in the state's natural gas industry and has also raised the average wage level for the industry in comparison to the rest of the state.

In order to quantify the economic importance of the Marcellus Shale play in West Virginia, our report started with publicly available data on the natural gas industry from state and federal statistical agencies. Our starting point was the use of NAICS sector definitions for the oil and natural gas industry, which encompasses the following sectors²:

- NAICS 211: Oil and gas extraction
- NAICS 213111: Drilling oil and gas wells
- NAICS 213112: Support activities for oil and gas operations
- NAICS 221210: Natural gas distribution
- NAICS 237120: Oil and gas pipeline and related structures construction
- NAICS 333132: Oil and gas field machinery and equipment manufacturing
- NAICS 486210: Pipeline transportation of natural gas

These NAICS categories capture all aspects of the natural gas extraction, processing and transportation system; however, as we'll soon see this is not the total story.

We surveyed West Virginia operators to obtain information on their operations during 2009. The responses indicated that on average 139 acres were leased per well for Marcellus Shale development at a cost of \$914 per acre. This average acre price estimate from the industry falls in-line with lease estimates touted on landowner websites, such as GoMarcellusShale.com and the Natural Gas Forum for

² The North American Industry Classification System (NAICS) classifies establishments by their primary type of activity. Further information regarding NAICS can be found at <http://www.naics.com>.

Landowners, in which landowners indicate that they have been receiving between \$300 and \$2,500 per acre depending on the area in the state in which their land was located.

Prior to drilling, operators on average spent \$300,000 per well in location setup according to survey responses. Drilling for natural gas in the Marcellus Shale for 2009 in West Virginia cost, on average, \$1.5 million per well and averaged \$2 million per well completed.

We used these survey results to estimate the total expenditures for Marcellus Shale development in 2009. Total expenditures for the 383³ Marcellus Shale wells drilled in West Virginia in 2009 were estimated at \$1.5 billion⁴. Drilling and well completion expenditures accounted for approximately 87 percent of total expenditures.

The total estimated impact of the Marcellus Shale development on the West Virginia economy in 2009 was developed using the IMPLAN modeling software. As shown in Table 1, Marcellus Shale development generated \$2.35 billion in business volume and approximately \$1.16 billion in total value added in the West Virginia economy. In 2009, the economic activities associated with the Marcellus Shale development created approximately 7,600 jobs and \$298 million in employee compensation. Assorted state taxes (sales, use, personal income, corporate net income, and business franchise taxes) associated with Marcellus Shale development totaled \$14.5 million. Other taxes paid include \$65.9 million in severance taxes and \$88.4 million in real and personal property taxes.

Our economic impact estimates are conservative, however, since they exclude the impacts associated with bonuses and royalties paid to mineral owners. It also excludes midstream gathering, processing and

³ Source: West Virginia Geological and Economic Survey
<http://www.wvgs.wvnet.edu/www/datastat/devshales.htm>

⁴ Note that the economic impact of the Marcellus Shale in West Virginia did not include expenditures for bonuses and royalties to landowners, exploration, pipeline, processing, royalties or severance taxes. Data for these expenditures were not available but if added would increase the economic impact on the state.

Table 1: Economic Impact of Marcellus Shale Development in West Virginia 2009

	Direct	Indirect & Induced	Total
Business Volume (millions 2009\$)	\$1,500.0	\$850.0	\$2,350.0
Employee Compensation (millions 2009\$)	\$145.2	\$152.7	\$297.9
Employment (jobs)	3,600	4,000	7,600
Total Value Added (millions 2009\$)	\$839.0	\$317.7	\$1,156.7
Assorted Other State Taxes ¹ (millions 2009\$)			\$14.5
1: Assorted Other State Taxes include personal, corporate net income, business franchise, sales and use taxes			
Note: Rows may not equal due to rounding.			

pipeline construction and operation within the state necessary for the delivery of natural gas to ultimate customers. The estimate also excludes the impacts on West Virginia business and consumer budgets resulting from the significant drop in the price of natural gas from earlier period that resulted from the development of these unconventional gas resources.

Economic Impacts From Future Marcellus Shale Play Development

The continued development of the Marcellus Shale represents a game changer for our state’s economy. Our report provided estimates of these impacts for the period 2010 thru 2015 that were again estimated using the IMPLAN modeling software and responses to a survey of West Virginia industry operators. These operators were asked to provide growth estimates for each year (2010-2015) based on 2009 EIA forecasted average wellhead price for natural gas. Based upon these responses three levels of growth were projected and analyzed in more detail: no growth (i.e. same level of development each year as there was in 2009), 5 percent growth each year, and 20 percent growth each year.

The future economic impacts under these three different growth scenarios are shown in Table 2. The levels of employment and employee compensation impacts vary greatly by not only the year but also by

range of growth per year. The employment impact of Marcellus Shale development for 2010 was estimate at between 7,600 and 8,500 additional jobs depending upon the growth rate. By 2015 the number of additional jobs created in 2015 was estimated to be between 6,600 and 19,600. The employee compensation impacts range from less than \$300 million each year with no growth to approximately \$890 million in 2015 with 20 percent growth each year.

Table 2: Future Total Economic Impacts of Marcellus Shale Development in West Virginia 2010-2015					
(Based on 0, 5, and 20 percent growth in drilling activity each year)					
	Employment (Jobs)			Employee Compensation¹	
	0%	5%	20%	(millions 2009\$)	
	0%	5%	20%	5%	20%
2010	7,600	8,000	8,500	\$300	\$330
2011	7,400	8,200	10,700	\$330	\$430
2012	7,200	8,400	12,500	\$350	\$515
2013	7,000	8,500	14,500	\$360	\$615
2014	6,800	8,600	16,900	\$380	\$740
2015	6,600	8,800	19,600	\$400	\$890

1: Note that zero growth in 2009 dollars will be the same impact for each year.

As indicated earlier in my testimony, these impacts are conservative. We are continuing our research on the industry and hope to have updated estimates of its economic contribution soon.

One of the most exciting opportunities from the development of the Marcellus Shale play is the opportunity to use the resulting ethane extracted from the gas stream to attract ethane crackers and associated petrochemical investments back to West Virginia. Earlier this year the American Chemistry Council released a study on the downstream economic impacts associated with new petrochemical production that would make use of the ethane associated with the methane in the wet gas portions of the

Marcellus Shale play⁵. This analysis indicated that the economic impact associated with the construction and operation of a new 1.0 million metric ton per year world-class ethylene cracker as well as affiliated polyethylene and other downstream derivative plants. A \$3.2 billion investment in an ethylene complex would generate a total of \$4.8 billion in additional chemical industry output and 12,000 permanent jobs.

Last week we released our annual West Virginia economic outlook forecasts covering the period 2011-2016⁶. Over this period we project continued growth in employment in the natural gas industry, offsetting employment declines in the coal industry. If the potential of the Marcellus Shale play is realized and downstream development materializes, I anticipate even greater economic growth across a wide range of industries for the foreseeable future. Besides the additional employment and earnings above the statewide averages, West Virginians will benefit from the continued low natural gas prices and state and local tax revenues paid. Future development of the Utica Shale play within the state will only add to the economic contributions associated with this resource. In short, shale gas development is a great economic development opportunity for West Virginians.

Conclusion

I am happy to answer any questions that you may have.

⁵ American Chemistry Council, *Shale Gas and New Petrochemicals Investment*, available from <http://www.americanchemistry.com/shalegasimpact>.

⁶ George W. Hammond, *West Virginia Economic Outlook 2012*, available from the West Virginia University Bureau of Business and Economic Research, www.bber.wvu.edu. These forecasts have been incorporated Executive Budget that have been submitted by five governors to the West Virginia Legislature.