

# Shale Gas & New Petrochemicals Investment in West Virginia

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This analysis is an addendum to the previous ACC analysis completed in March 2011, titled *Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs, and US Manufacturing*. That report presented the results of an analysis conducted to quantify the economic impact of the additional production of petrochemicals and downstream chemical products stimulated by an increase in ethane availability. This present analysis focuses on the benefits to the state of West Virginia should a new petrochemicals complex be constructed in that state. It specifically examines the additional output, jobs and tax revenues generated from a private sector investment in petrochemicals.

That West Virginia could be the site of a new petrochemicals complex to take advantage of the lower feedstock costs arising from shale gas is obvious. West Virginia features the twenty-third largest state chemical industry in the United States, with revenues of \$8.5 billion and employing nearly 10,000 people. Logistical and other significant infrastructure is present as well. The state features access to the Ohio River and major rail as well as excellent universities (West Virginia University, Marshall University, and West Virginia Institute of Technology) with strong chemistry, materials science, polymer science, and chemicals engineering departments. With much of the state over the Marcellus formation, West Virginia also has considerable shale gas deposits. Furthermore, West Virginia is within 500 miles of most of the US industrial base.

Because petrochemical investment has shifted towards the Gulf Coast in recent decades, there is little excess petrochemicals capacity in West Virginia that could be restarted to take advantage of shale gas developments. The analysis thus assumes the construction of “greenfield” facility, including a hypothetical 1.0 million metric ton per year world-class ethylene cracker as well as affiliated polyethylene and other downstream derivative plants. In addition to these battery limit process plants, investment for site development, utilities, logistics and other site-affiliated infrastructure is included. In total, such a petrochemicals complex would necessitate a \$3.2 billion investment. In addition, the renewed availability of these basic chemicals would also likely foster additional output of high value-added chemistry products as well. In the long-term, this would add \$4.8 billion in additional chemical industry output. The IMPLAN model was employed to assess the direct, indirect and induced effects of petrochemicals investment in West Virginia. It was found that the benefits to the West Virginia economy would be manifold.

The output and employment generated by additional ethane utilization in the petrochemical and derivative industries would be significant. The additional \$4.8 billion in chemical industry activity would generate nearly 2,500 high-paying, desirable jobs in the West Virginia chemical industry. Innovative, creative and pacesetting, the business of chemistry is one of the most knowledge-intensive industries in the manufacturing sector.

**Table 1: On-Going Economic Impact in West Virginia from New Petrochemical Production in West Virginia**

<b>Impact Type</b>	<b>Employment</b>	<b>Payroll (\$ Million)</b>	<b>Output (\$ Billion)</b>
Direct Effect	2,484	\$278	\$4.8
Indirect Effect	6,262	\$332	\$1.9
Induced Effect	3,524	\$119	\$0.4
<b>Total Effect</b>	<b>12,271</b>	<b>\$729</b>	<b>\$7.0</b>

In addition, new petrochemical production in West Virginia would generate purchases of raw materials, services, and other purchases throughout the supply chain<sup>1</sup>. Thus, an additional nearly 6,300 indirect jobs would be supported by the boost in ethane utilization

<sup>1</sup> While much of the supplies and materials are sourced from West Virginia businesses, other purchases come from outside the state. Because this analysis focuses on the impact to the state of West Virginia, those impacts are not considered.

in the state. Finally, the wages earned by new workers in the chemical industry and workers throughout the supply chain are spent on household purchases and taxes generating about 3,500 payroll-induced jobs in the state. All told, the additional \$4.8 billion in West Virginia chemical industry output could generate \$7.0 billion in output to the West Virginia economy and more than 12,000 new jobs in West Virginia generating a payroll of nearly \$730 million.

**Table 2: Economic Impact in West Virginia from New Investment in Plant and Equipment in West Virginia**

<b>Impact Type</b>	<b>Employment</b>	<b>Payroll (\$ Million)</b>	<b>Output (\$ Million)</b>
Direct Effect	5,559	\$264	\$661
Indirect Effect	818	\$38	108
Induced Effect	1,778	\$60	181
<b>Total Effect</b>	<b>8,155</b>	<b>\$363</b>	<b>\$949</b>

The one-time \$3.2 billion investment in a West Virginia petrochemical complex would result in nearly \$700 million in spending inside the state of West Virginia. The remaining \$2.5 billion is used to purchase equipment and supplies produced outside the state. This investment in plant and equipment generates over 5,600 jobs in West Virginia, mostly in the construction and capital equipment-producing industries. Indirectly, another \$108 million in output and 800 jobs would be generated throughout the supply chain. Finally, a further \$181 million in output and more than 1,800 jobs would be created through the household spending of the workers employed building, making, and installing the new plant and equipment as well as those employed throughout the supply chain. All told, a \$3.2 billion investment in the West Virginia chemical industry would support nearly 8,200 jobs and \$363 million in payrolls in West Virginia.

**Table 3: Tax Impact in West Virginia from New Petrochemical Production in West Virginia (\$ Million)**

<b>Impact Type</b>	<b>Payroll</b>	<b>Households and Proprietors</b>	<b>Corporations and Indirect</b>	<b>Total</b>
			<b>Business Taxes</b>	
Federal	\$67.5	\$21.0	\$50.1	\$138.6
State and Local	\$0.2	\$1.3	\$93.1	\$94.6

**Table 4: Tax Impact in West Virginia from New Investment in Plant and Equipment in West Virginia (\$ Million)**

<b>Impact Type</b>	<b>Payroll</b>	<b>Households and Proprietors</b>	<b>Corporations and Indirect</b>	<b>Total</b>
			<b>Business Taxes</b>	
Federal	\$38.6	\$14.6	\$9.9	\$63.1
State and Local	\$0.1	\$0.7	\$14.4	\$15.2

The IMPLAN model (for West Virginia) also allows a comprehensive estimation of additional tax revenues that would be generated across all sectors as the result of increased economic activity. With new petrochemical production in the state, the additional jobs created and added output would lead to a gain in tax receipts. State and local taxes on payrolls, households, and corporations would yield about \$95 million per year to West Virginia governments. Furthermore, West Virginia revenues would rise by \$15 million during the investment phase of the project.