

# The Economic Impact of the Natural Gas Industry in West Virginia

August 21, 2008

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## FINAL REPORT

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## Natural Gas and the West Virginia Economy

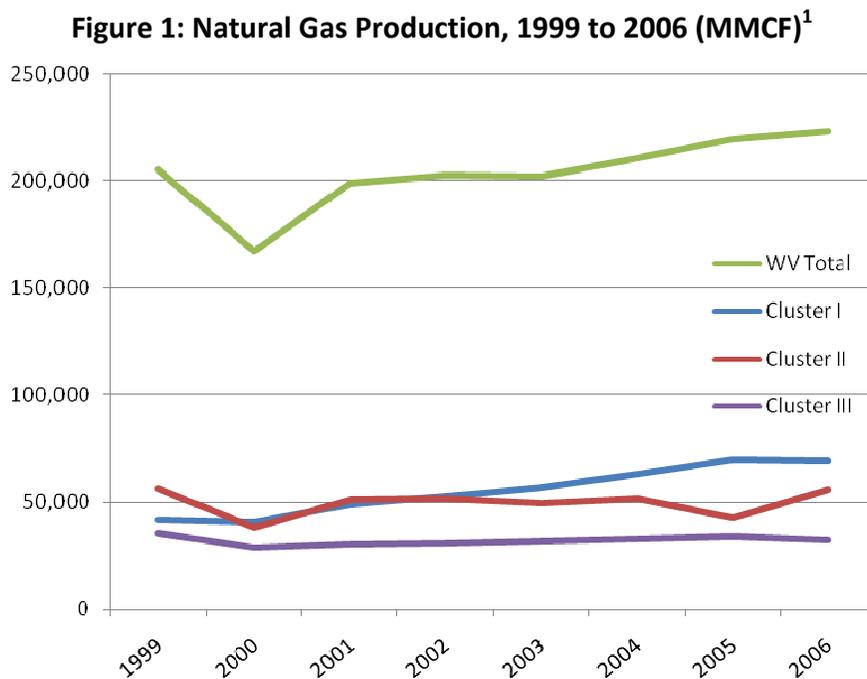
Economic activity surrounding natural gas is dominated by extraction and support for those operations. Significant activity also exists related to pipeline transport of gas, both for local distribution and for long-distance transmission out of and through the State. Construction activity related to facilities that support production and transmission provides a third type of significant activity. Utility gas-fired power generation is a small and recently added component of the gas-related economy in West Virginia.

### Production

Between 1999 and 2006 West Virginia's production of natural gas rose by about nine percent, with most of that growing occurring since 2003. Since 2003, production rose from 202,000 million cubic feet (MMCF) to 223,000 MMCF in 2006. Production supplies demand for gas by both in-state and out-of-state customers. Presently, about half of production is consumed in West Virginia with the other half supplying markets largely east of the State.

Three county clusters that dominate overall production in West Virginia are worth noting and are shown in Figure 1. These counties each produced more than 6,000 MMCF of gas in 2006:

- McDowell, Wyoming, Mingo, Logan - Cluster I
- Doddridge, Harrison, Lewis, Ritchie, Gilmer - Cluster II
- Kanawha, Boone, Lincoln - Cluster III



<sup>1</sup> West Virginia Department of Environmental Protection, Office of Oil & Gas.

In 2006, these three clusters were the source of 71 percent of all natural gas produced in West Virginia. Production growth in Cluster I was driven largely by coal-bed methane production in McDowell and Wyoming Counties. Because of coal-bed methane Wyoming County is now the leading producer of gas in the State, with 27,000 MMCF in 2006. McDowell County is second at over 19,000 MMCF. Between 2000 and 2006 total gas production more than doubled in McDowell County and nearly doubled in Wyoming County.

Several of the large gas-producing counties are largely rural with relatively low levels of economic activity. For example, natural resources and mining account for about 30 percent of private sector employment in McDowell and Wyoming Counties, but about 56 percent of private sector wages. Natural gas is a contributor to the above-average wages seen in the extractive industries throughout West Virginia.

### **Employment and Wages**

Separating the economic activity surrounding oil and gas requires estimation. Official government employment statistics do not separate extraction and construction activity for the two resources because of overlapping activity. For this analysis the share of activity estimated to belong to natural gas in West Virginia is based on well counts. In 2006, 41,488 wells produced only gas and 1,634 wells produced only oil. An additional 7,069 wells produced both oil and gas. This is a simple methodology that could be refined with extensive data collection but results in reasonable proportions. The share of production activity is thus 85 percent gas and 15 percent oil if wells with joint production are attributed to both resources.

Natural gas-related employment increased by around 15 percent between 2003 and 2006. In 2003, approximately 7,500 were employed by the industry compared to 6,500 in 2006. The figures for 2006 are shown in Table 1 for each of the sub-industries that are related to gas. In 2006 the average gas-related salary was \$52,000 compared to the State private sector average of \$32,000. Overall, gas-related salaries in West Virginia saw an annual average increase of 4.2 percent, exceeding the national rate of increase.

**Extraction:** The extraction phase of gas production includes activities undertaken by well operators such as exploration, drilling and equipping wells. West Virginia wages in this sub-industry increased by nearly six percent per year between 2003 and 2006.

**Contract Drilling and Support Services:** Growth was also seen in support services for operations, including contract drilling. Increased demand for employees in these sub-industries caused average wage increases of seven percent per year between 2003 and 2006.

**Gas-related construction:** Construction of gas facilities was also a strong component of employment growth. Large projects that occurred in 2006 included an underground storage facility and small compressor station, both located in Hardy County. Average wages increased by 14 percent between 2003 and 2006.

Transmission and Distribution: Wages in natural gas transmission and distribution rose by two and a half percent, comparable to national extraction wages but lower than utilities overall.<sup>2</sup> Employment in these areas declined from 2003 to 2006 with wages reflecting lower demand.

Gas-Fired Power Generation and T&D: Three gas-fired peaker plants (Pleasants Energy, Ceredo Generating Station and Big Sandy Peaker) together directly employ about 18 people.

**Table 1: Natural Gas-Related Employment by Sub-Industry in 2006**

Sub-Industry	Employment in 2006	Average Salary in 2006	Salary Increase 03 to 06	Employment Growth 03 to 06
<b>Extraction</b>	1,901	\$50,780	5.7%	32%
<b>Drilling<sup>3</sup></b>	850	\$47,582	7.1%	30%
<b>Support Activities for Operations</b>	1,784	\$41,550	6.7%	41%
<b>Power Generation</b>	18	\$73,592	Not estimated in 2003	
<b>Electric Power T&amp;D<sup>4</sup></b>	3	\$63,966	Not estimated in 2003	
<b>Natural Gas Distribution</b>	928	\$60,083	2.6%	-12%
<b>Pipeline/Related Structures Construction</b>	702	\$49,394	13.9%	32%
<b>Pipeline Transportation</b>	1,334	\$67,961	2.2%	-13%
<b>TOTAL</b>	<b>7,520</b>	<b>\$52,360</b>	<b>4.2%</b>	<b>15%</b>

Table 2 provides comparison of average salaries for select industries. Gas industry salaries exceed most industries. Exceptions include coal mining, all utilities and chemical manufacturing.

**Table 2: Average Salary Comparisons for West Virginia**

Comparison Industry in 2006	Average Salary
<b>All Mining</b>	\$59,979
<b>All Construction</b>	\$37,989
<b>All Manufacturing</b>	\$44,234
<b>Chemical Manufacturing</b>	\$70,763
<b>Fabricated Metal Product Manufacturing</b>	\$39,355
<b>All Utilities</b>	\$68,096
<b>Retail</b>	\$20,391
<b>Finance and Insurance</b>	\$37,061
<b>Government</b>	\$35,726

<sup>2</sup> Construction and extraction salaries rose 2.5% from 1Q of 2004 through 3Q of 2006. Trade, transportation and utilities rose by 3.5%. SOURCE: "Employer Cost for Employee Compensation," National Compensation Survey - Employment Cost Trends, U.S. Bureau of Labor Statistics.

<sup>3</sup> Drilling employment was not reported in WORKFORCE West Virginia's 2006 data. These figures are based on the shares reported in 2003. Wages are assumed to have risen at the same rate as did other support activities.

<sup>4</sup> The estimated share of electric power transmission and distribution attributable to gas is 0.4%, equal to the share of total electricity produced with gas in WV.

## Total Economic Impact

The combined effect of the natural gas industry on economic activity is shown in Table 2. The additional impact includes indirect business spending and household spending. Indirect business spending results from initial spending as a business requires goods and services from other businesses. Induced spending is household spending by employees of businesses in the both the direct and indirect categories.

The 15,000 jobs that existed in 2006 because of the gas industry were two percent of the State's total employment and two and a half percent of private sector employment. In terms of direct employment the number of jobs is similar to those employed by heavy and civil engineering construction (7,581 jobs), department stores (7,535 jobs) and telephone call centers (7,209 jobs).

**Table 3: Economic Impacts of Natural Gas in West Virginia**

<b>Annual Impact in 2006</b>	
	<b>Local Employment</b>
<b>Direct Impact</b>	7,520 jobs in gas & related industries
<b>Additional Impact</b>	7,480 jobs in other industries
<b>TOTAL EMPLOYMENT</b>	<b>15,000 jobs</b>
	<b>Personal Income (local wages)</b>
<b>Direct Impact</b>	\$397 million
<b>Additional Impact</b>	\$230 million
<b>TOTAL INCOME</b>	<b>\$627 million</b>
	<b>Output (spending)</b>
<b>Direct Impact</b>	\$1.8 billion (est \$898 million local)
<b>Additional Impact</b>	\$663 million local
<b>TOTAL OUTPUT</b>	<b>\$2.5 billion (\$1.56 billion local)</b>

West Virginia had a gross state product of around \$45 billion in 2006, a measure of all economic activity within the state. With \$1.56 billion in local output the gas industry is responsible for 3.5 percent of the State's gross product.

## Tax Impact

The gas industry contributes to state and local taxes via direct property and severance tax as well as by taxes paid by its employees and business partners. The amount of tax paid to the State of West Virginia and its counties is estimated at \$209.6 million. Table 4 shows the break-

down of these taxes as a function of the 15,000 individuals employed as a result of the industry and by the shares of severance and county property tax associated with natural gas.<sup>5</sup>

**Table 4: Estimated Tax Impact of the Natural Gas Industry in West Virginia**

	<u>State Taxes</u>		<u>Natural Gas</u>	
	<u>FY2006</u>	<u>\$ Per</u>	<u>Related</u>	
Employment, July 2006	767,100		15,000	
<b>Initial Business Taxes</b>				
Business Registration	\$ 1,818,860	2	\$	35,566
Corporate License	\$ 5,361,113	7	\$	104,832
<b>Business Taxes</b>				
Corporation Net Income and Business Franchise	\$ 347,569,611	453	\$	6,796,434
Severance	\$ 314,726,682		\$	61,936,406
Business & Occupation	\$ 185,456,897	242	\$	3,626,455
Telecommunications	\$ (430,021)			
Insurance	\$ 97,711,652	127	\$	1,910,670
Health Care Provider	\$ 172,459,353	225	\$	3,372,299
<b>Consumer Sales &amp; Use Taxes</b>				
Consumer Sales	\$ 1,012,450,612	1,320	\$	19,797,626
Use	\$ 113,315,058	148	\$	2,215,781
<b>Personal Taxes</b>				
Personal Income Tax	\$ 1,297,720,394	1,692	\$	25,375,839
Estate & Inheritance	\$ 591,724	1		
<b>Excise Taxes</b>				
Motor Fuel Excise	\$ 320,757,360	418	\$	6,272,142
Liquor Profit Transfers	\$ 11,508,649	15	\$	225,042
Beer Tax & Licenses	\$ 8,547,760	11	\$	167,144
Wine Liter Tax	\$ 1,421,151	2	\$	27,789
Tobacco Products Excise Tax	\$ 112,027,627	146	\$	2,190,607
Soft Drinks	\$ 14,970,961	20	\$	292,745
<b>Miscellaneous Fees and Transfers</b>				
Solid Waste Assessment Fee	\$ 14,445,964	19	\$	282,479
Racing Fees	\$ 1,089,011	1		
<b>Taxes Collected by Counties</b>				
Property (County Shares)			\$	74,907,070
Property (State Share Only)	\$ 4,783,635	6	\$	93,540
Property Transfer (State Share Only)	\$ 13,658,145	18		
<b>Total</b>	<b>\$ 4,051,962,198</b>	<b>\$ 4,872</b>	<b>\$</b>	<b>209,630,465</b>
Telecommunications reimbursements have been excluded				

<sup>5</sup> Gas severance taxes were calculated at a rate of 5.9 cents per MCF in 2006. Property taxes estimated to be attributable to natural gas are 85 percent of combined taxes paid by oil and gas.

## Issues Facing the Gas Industry in West Virginia

Operating costs: Natural gas production in West Virginia has become more expensive as horizontal drilling has expanded over the years in development of Marcellus Shale and to capture coal-bed methane. Much of the higher costs are due to water encountered during production and to costs of seismic exploration. CBM wells currently cost three times that of conventional wells. Loss of the CBM severance tax exemption at the end of 2008 may affect investment decisions related to continued development of this resource, depending on the prevailing price.

Investment in infrastructure: The decision to expand gas transmission capacity in West Virginia will impact total production capability in the State. Dominion Transmission has proposed a \$1 billion investment in gathering, pipeline facilities and processing facilities that will expand by 50 percent the capability to transmit gas through or from the State to eastern markets via southwest Pennsylvania.<sup>6</sup> West Virginia already contributes to supply of gas to the Mid-Atlantic area and continuation of that supply is dependent on maintaining market share. In the next 20 years, demand for gas for electricity production is anticipated to decline although demand from the residential and commercial sectors is expected to increase.<sup>7</sup>

Competition from Western Production: Expansion of transmission pipeline capacity from the West will increase the supply of western gas in eastern markets. The planned Rockies Express Pipeline East will bring western gas to eastern Monroe County, Ohio and is expected to be complete by the end of 2009.<sup>8</sup> The planned capacity of the system to be delivered to eastern Ohio is 1.8 Bcf per day. In 2007 Rocky Mountain production carried a \$4.00 negative differential to Appalachian production value. While the actual price at which Rocky Mountain gas will be sold is to be determined it could be less than what West Virginia gas has historically sold for, allowing capture a share of the eastern market.

## Looking Forward

Natural gas will continue to be a major participant in West Virginia's economy. The Department of Energy's Energy Information Administration (EIA) in their most recent forecast sees total U. S. demand increasing to 20.0 trillion feet in 2022 and then declining slightly to 19.5 trillion feet by 2030. EIA's projections assume that government policies now in effect will continue and only known technological improvements will be employed over the forecast period.

The future will see an interaction between the forces of supply and demand. As demand increases so will price. This price increase will over time cause users to increase efficiency and use substitute fuels

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<sup>6</sup> The State Journal, August 1, 2008. "Dominion Plans \$1 Billion Natural Gas Project."

<sup>7</sup> In its 2008 Annual Energy Outlook the U.S. Department of Energy's Energy Information Administration projects total gas demand to increase by no more than 14 percent by 2030.

<sup>8</sup>The Independent Oil and Gas Association of Pennsylvania. <http://iogapa.org/files/bobeckle.ppt>

dampening demand particularly in electrical generation. Domestic production will be hampered by higher costs associated with exploration and development.

Still prices for natural gas will remain high enough during the forecast period to insure health for the domestic natural gas industry including West Virginia producers. EIA does see a dip in prices from current levels but an increase to \$6.63 (in 2006 dollars) per thousand cubic feet by 2030 with Henry Hub prices at \$7.43. They do note that the natural gas market will become more international as LNG imports continue to enter the market creating additional uncertainty about future prices.

There are other projections which yield both higher and lower figures for both production and prices. Looking at the history of EIA projections they may be on the low side. But there are no facts about the future. Environmental legislation including carbon taxes or tradable credits as well as off shore drilling and pipeline construction, if passed, will alter the projections. But natural gas is in the best position not to be negatively impacted by these proposals due to its clean environmental characteristics. Technological breakthroughs are always a possibility but the variety of uses to which natural gas can be dedicated indicate West Virginia can expect continuing benefits from its natural gas industry.