



America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy

Volume 2 – State Economic Contributions

State Economic Contributions: Highlights

Prepared by:

IHS Inc.
1150 Connecticut Avenue NW, Suite 401
Washington, DC 20036

December 2012

PENNSYLVANIA

OVERVIEW

In 2012, employment in the natural resources and mining sector has leveled off and remained steady after two years of double-digit growth. The adoption of hydraulic fracturing in Pennsylvania was the main driver of double digit job growth in Pennsylvania in 2010 and 2011, providing a bulwark against deep recession at a time when many other sectors of the state economy were struggling. Payrolls in the sector remained stable in 2012. The state is moving to take advantage of the long-term potential of its vast natural resources in a variety of ways, from a proposed ethylene cracker in western Pennsylvania to exports of natural gas liquids from ports along the Delaware River. Pipelines continue to be built to move the gas to where it has the most value, such as the Northeast's US home heating market. Demand for metallurgical coal and its derivatives remain robust, both domestically and overseas. ArcelorMittal will invest \$50 million to retool its Monesson coke plant and restart it in 2014. The renovation will result in construction and other jobs in the interim.

Pennsylvania's economy is expected to add jobs at a 1.2% average annual rate between 2012 and 2017. This growth rate would rank Pennsylvania in the bottom tier of the states, due to a couple of factors. First, although the state certainly lost plenty of jobs to the recession, the magnitude was less than in many other states. As a result, Pennsylvania's employment growth is not expected to snap back as much as it will in states like Florida and Arizona. Second, Pennsylvania's population growth is expected to remain below the national average, limiting its potential job growth, especially in the service sectors. Pennsylvania will return to its pre-recession peak employment level near the end of 2013. Development of natural gas in the Marcellus Shale formation under much of Pennsylvania continues to dominate the economic outlook there, especially in the longer term.

CONTRIBUTION OF UNCONVENTIONAL OIL AND GAS

Pennsylvania's petroleum industry got its start in the mid-19th century, with the first oil well near Titusville. In the 20th century, the state played a much smaller role in the national oil and gas industry, but the recent development of its massive, world-class Marcellus Shale play, using horizontal drilling and hydraulic fracturing, has re-elevated the state into prominence in the energy industry. More transport and processing infrastructure will be needed to fully develop the play, and delays in infrastructure could slow development, but the vast Marcellus play covering about 60% of the state has enormous resource potential.

The Utica shale gas play is located primarily in the neighboring state of Ohio, but it extends into western Pennsylvania and will contribute to Pennsylvania's economy in the future. In addition, supplier networks, trade flows and income effects from earnings related to unconventional gas also create significant employment here, helping to knock the rust off of part of the "Rust Belt" industries that have historically been prominent in the state's economy. The economic activity associated with unconventional gas will directly and indirectly supported nearly 103,000 jobs in the state in 2012, especially in the drilling and completion and steel and metal fabrication manufacturing sectors.¹¹ These two sectors accounted for 22% of the state's total manufacturing jobs in 2012.

The state's unconventional gas-related employment is expected to more than double to nearly 221,000 by 2020 and grow to 387,000 by 2035. These jobs would employ 5.6% of the state labor force by 2035, helping to reduce unemployment and creating a steady source of payroll growth for the next two decades. Unconventional gas activity contributed value-added economic activity of over \$14 billion in Pennsylvania in 2012. We forecast that this contribution will grow to just over \$49.0 billion by 2035. As for labor income, the average annual wage in Pennsylvania in 2012 is \$58,400, while the average wage of direct jobs in unconventional gas activity is much higher, at \$97,000.

There is also the contribution of unconventional gas employment to government revenues. In Pennsylvania in 2012, it generated nearly \$3 billion in taxes for state and federal coffers. This includes almost \$1.3 billion in state and local taxes, or the equivalent of 3.9% of the state's 2011 tax revenues.

¹¹ Direct jobs are those created by firms that comprise the oil and gas industry, or by the capital expenditures of related industries; indirect jobs are those created by suppliers of goods and services to industry. Induced jobs are those that meet the new demand for consumer goods created by the increased income generated by the direct and indirect jobs.



Pennsylvania Economic Contribution Summary: Total Unconventional Oil and Gas Activity

| Employment | | | | |
|----------------------------|---------------|-----------------|----------------|--------------|
| (Number of workers) | | | | |
| | Direct | Indirect | Induced | Total |
| 2012 | 25,628 | 33,219 | 43,821 | 102,668 |
| 2020 | 57,956 | 68,876 | 93,803 | 220,635 |
| 2035 | 117,336 | 115,429 | 154,595 | 387,360 |

| Value Added | | | | |
|--------------------|---------------|-----------------|----------------|--------------|
| (2012 \$M) | | | | |
| | Direct | Indirect | Induced | Total |
| 2012 | 6,025 | 4,228 | 3,859 | 14,113 |
| 2020 | 9,532 | 9,002 | 8,180 | 26,714 |
| 2035 | 20,706 | 14,933 | 13,384 | 49,022 |

| Labor Income | | | | |
|---------------------|---------------|-----------------|----------------|--------------|
| (2012 \$M) | | | | |
| | Direct | Indirect | Induced | Total |
| 2012 | 2,486 | 2,568 | 2,276 | 7,330 |
| 2020 | 3,874 | 5,337 | 4,755 | 13,966 |
| 2035 | 8,449 | 8,743 | 7,549 | 24,741 |

NOTES: Numbers may not sum due to rounding.

Source: IHS Global Insight

Contribution of Total Unconventional Oil and Gas Activity to Government Revenue and Private Lease Payments: Pennsylvania

| (\$M) | | | | |
|---|--------------|--------------|--------------|-------------------|
| | 2012 | 2020 | 2035 | 2012-2035* |
| Federal Taxes | 1,716 | 3,266 | 5,915 | 85,991 |
| Personal Taxes | 1,300 | 2,470 | 4,384 | 64,461 |
| Corporate Taxes | 409 | 767 | 1,461 | 20,627 |
| Federal Royalty Payments | 7 | 28 | 70 | 904 |
| Federal Bonus Payments | 0 | 0 | 0 | 0 |
| State and Local Taxes | 1,264 | 2,357 | 3,954 | 60,698 |
| Personal Taxes | 342 | 638 | 965 | 15,811 |
| Corporate Taxes | 909 | 1,669 | 2,864 | 43,275 |
| Severance Taxes | 0 | 0 | 0 | 0 |
| Ad Valorem Taxes | 0 | 0 | 0 | 0 |
| State Royalty Payments | 13 | 50 | 125 | 1,612 |
| State Bonus Payments | 0 | 0 | 0 | 0 |
| Total Government Revenue | 2,980 | 5,623 | 9,869 | 146,689 |
| Lease Payments to Private Landowners | 32 | 60 | 136 | 1,864 |

NOTES: *2012-2035 represents the total for all years including those years not reported.

Source: IHS Global Insight

| Pennsylvania Employment Contribution by State and Industry: Total Unconventional Activity (Number of workers) | | | | |
|--|----------------|----------------|----------------|----------------|
| 2012 | Direct | Indirect | Induced | Total |
| Support Activities for Mining | 12,320 | 1,426 | 10 | 13,755 |
| Construction | 5,564 | 2,719 | 431 | 8,713 |
| Professional, Scientific, & Technical Services | 171 | 5,268 | 2,073 | 7,513 |
| Oil and Gas Extraction | 4,946 | 280 | 64 | 5,289 |
| Administrative & Support Services | 0 | 2,949 | 2,042 | 4,991 |
| Food Services & Drinking Places | 0 | 808 | 3,344 | 4,151 |
| Fabricated Metal Product Manufacturing | 499 | 2,491 | 263 | 3,253 |
| Wholesalers | 0 | 1,599 | 1,345 | 2,944 |
| Ambulatory Health Care Services | 0 | 0 | 2,726 | 2,727 |
| Management of Companies & Enterprises | 0 | 2,026 | 577 | 2,603 |
| Real Estate | 0 | 893 | 1,574 | 2,467 |
| Primary Metal Manufacturing | 550 | 1,795 | 104 | 2,448 |
| Hospitals | 0 | 0 | 2,304 | 2,304 |
| Educational Services | 0 | 24 | 2,148 | 2,172 |
| Social Assistance | 0 | 0 | 1,851 | 1,851 |
| <i>All Other Industries</i> | 1,580 | 10,940 | 22,966 | 35,486 |
| State Total | 25,628 | 33,219 | 43,821 | 102,668 |
| 2020 | Direct | Indirect | Induced | Total |
| Support Activities for Mining | 26,809 | 1,217 | 13 | 28,039 |
| Construction | 9,804 | 7,412 | 864 | 18,081 |
| Professional, Scientific, & Technical Services | 512 | 12,339 | 4,210 | 17,061 |
| Oil and Gas Extraction | 15,577 | 757 | 160 | 16,493 |
| Administrative & Support Services | 0 | 6,337 | 4,217 | 10,554 |
| Food Services & Drinking Places | 0 | 1,766 | 7,665 | 9,431 |
| Fabricated Metal Product Manufacturing | 1,399 | 3,668 | 435 | 5,502 |
| Wholesalers | 0 | 3,296 | 2,835 | 6,131 |
| Ambulatory Health Care Services | 0 | 1 | 6,109 | 6,109 |
| Management of Companies & Enterprises | 0 | 4,573 | 1,108 | 5,681 |
| Real Estate | 0 | 2,062 | 3,432 | 5,494 |
| Primary Metal Manufacturing | 1,057 | 2,816 | 169 | 4,042 |
| Hospitals | 0 | 0 | 4,947 | 4,947 |
| Educational Services | 0 | 48 | 4,496 | 4,543 |
| Social Assistance | 0 | 0 | 4,004 | 4,004 |
| <i>All Other Industries</i> | 2,796 | 22,585 | 49,142 | 74,523 |
| State Total | 57,956 | 68,876 | 93,803 | 220,635 |
| 2035 | Direct | Indirect | Induced | Total |
| Support Activities for Mining | 55,974 | 1,901 | 14 | 57,889 |
| Construction | 20,345 | 13,837 | 1,372 | 35,555 |
| Professional, Scientific, & Technical Services | 1,103 | 22,408 | 6,404 | 29,915 |
| Oil and Gas Extraction | 29,383 | 1,037 | 198 | 30,618 |
| Administrative & Support Services | 0 | 11,033 | 6,635 | 17,669 |
| Food Services & Drinking Places | 0 | 3,165 | 13,746 | 16,911 |
| Fabricated Metal Product Manufacturing | 3,444 | 4,576 | 494 | 8,513 |
| Wholesalers | 0 | 5,847 | 4,783 | 10,630 |
| Ambulatory Health Care Services | 0 | 1 | 10,713 | 10,715 |
| Management of Companies & Enterprises | 0 | 7,324 | 1,428 | 8,752 |
| Real Estate | 0 | 3,661 | 5,835 | 9,496 |
| Primary Metal Manufacturing | 1,694 | 3,481 | 177 | 5,352 |
| Hospitals | 0 | 0 | 8,382 | 8,383 |
| Educational Services | 0 | 73 | 7,035 | 7,108 |
| Social Assistance | 0 | 0 | 6,522 | 6,522 |
| <i>All Other Industries</i> | 5,392 | 37,084 | 80,855 | 123,332 |
| State Total | 117,336 | 115,429 | 154,595 | 387,360 |

Source: IHS Global Insight