



UNIVERSITY OF  
ARKANSAS

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# Executive Summary Revisiting the Economic Impact of the Natural Gas Activity in the Fayetteville Shale: 2008-2012

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## **Independence of Results**

This study was conducted by the research staff at the Center for Business and Economic Research in the Sam M. Walton College of Business at the University of Arkansas. This project could not have been completed without the data provision from companies who are actively involved in the Fayetteville Shale natural gas industry. However, the choice of methodology, the type of analysis, and the conclusions reached in this report are the authors' own and have not been directed by any outside party.

## Executive Summary

In 2008, the Center for Business and Economic Research released a study that estimated the economic impact of projected Fayetteville Shale activities from 2008 to 2012. This updated report revisits the assumptions of the initial study, reviews the impact of actual activities in the Fayetteville Shale from 2008 to 2011, and delivers some insights into projected impacts for 2012.

Exploration and production of natural gas in the Fayetteville Shale area generates direct effects from drilling wells and causes the need for supporting activities such as construction, transportation, storage, and distribution. Moreover, investments made by oil and gas companies produce indirect (supply chain oriented) and induced (personal expenditure related) economic impacts.

**Fayetteville Shale activities and the oil and gas industry** have been **important to the state of Arkansas** because:

- **Average annual pay in the oil and gas extraction industry** was **\$74,555 in 2010**, twice the average pay of all industries in the state. High paying jobs are essential for the economic development of the state because Arkansas consistently ranks in the lowest quintile among all states in terms of annual per capita personal income.
- **Mineral leases and royalty payments** provide **additional income** to Arkansas residents. These are important sources of income to citizens of a state that depends more on personal current transfer receipts than the average in the United States: 24.0 percent of total personal income in Arkansas was contributed by transfer receipts as compared with 18.0 percent in the country in 2011.
- **Higher average annual pay, additional income received from mineral leases and royalty payments, and other induced impacts result in higher personal incomes, which lead to larger personal expenditures.** As the growth rates of state sales tax collections declined during the recession from the growth rates of 2004 to 2006, additional personal expenditures helped bring sales tax revenues to the state and local governments.
- **The mining, quarrying, and oil and gas extraction industry had the highest growth rate in payroll employment** among all other industries in Arkansas. This industry contains the oil and gas extraction sector and support activities for the mining sector (which, in turn, includes drilling oil and gas wells and support activities for oil and gas operations). **From 2001 to 2010, mining, quarrying, and oil and gas extraction industry employment increased from 3,855 to 8,358 payroll employees or by 116.8 percent**, while overall employment in the state increased only by 0.6 percent or by 6,920 employees. Similarly, from September 2010 to September 2011, payroll employment in the mining, quarrying,

and oil and gas extraction industry increased by 11.1 percent or by 942 employees, while overall payroll employment in the state increased by 0.4 percent (or by 4,022 employees).

Fayetteville Shale development generated **additional activities in the state**. For example, the construction of the Fayetteville Express Pipeline cost **\$1.0 billion**. Also, Welspun Corporation opened its pipe manufacturing factory in Little Rock in 2009 and plans to expand in 2012, raising the company's total overall investment in the state to **\$280 million**. Saint-Gobain Group built a new plant in Saline County costing \$100 million that manufactures ceramic proppants, used in underground fractures in oil and gas wells, and expanded an existing plant in Fort Smith. During 2011, American Railcar Industries, Inc. added 1,000 employees to its two plants in Arkansas and one plant in Missouri that build cars for hauling sand used in hydraulic fracturing.

From 2008 to 2011, natural gas production occurred in the following nine counties<sup>1</sup>: Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White County.

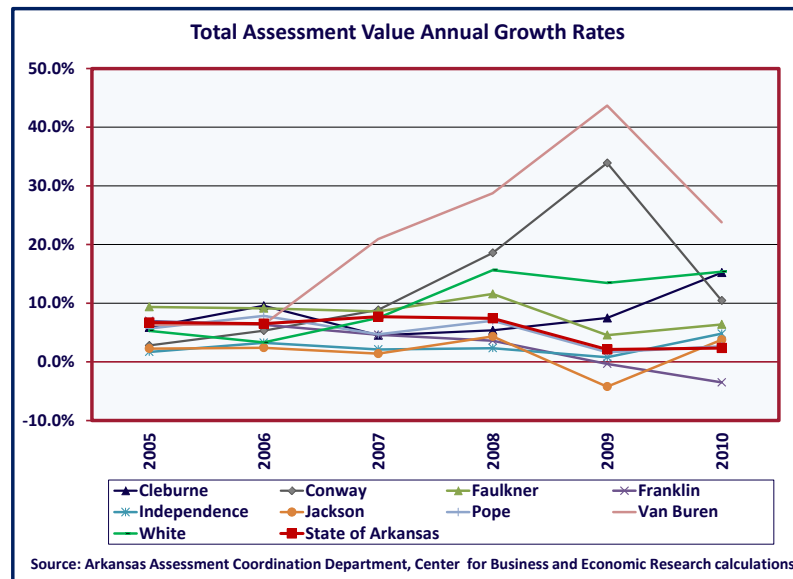
Historically, Fayetteville Shale counties had lower per capita personal income and average annual pay than the state. Fayetteville Shale activities have helped to improve the economic situation in these counties, providing necessary industrial diversification and supplementing personal income. **The local economic benefits from the development of the natural gas industry in the Fayetteville Shale** include:

- **The number of business establishments** in Fayetteville Shale counties **increased at a higher rate than in the state overall** for the past ten years: by 20.2 percent as compared with 17.0 percent in the state from 2001 to 2010.
- Fayetteville Shale counties depended on manufacturing jobs to provide the backbones of their economies for much of the past century. Due to the recession and structural economic change, a large number of manufacturing jobs were lost from 2001 to 2010 in these counties (9,558 jobs) and the share of manufacturing employment out of total employment declined from 21.8 percent to 13.5 percent during this time. Despite this significant obstacle, **five out of nine Fayetteville Shale counties** experienced **higher than the state payroll employment growth from 2001 to 2010**. These five counties were Cleburne, Conway, Faulkner, Pope, and White County with 5.5 percent, 3.2 percent, 15.5 percent, 5.7 percent, and 7.1 percent employment growth rate, respectively (compared with the growth rate of 0.6 percent in the state during this time period). Increased natural gas production and supporting activities such as pipeline construction created new jobs in the counties.

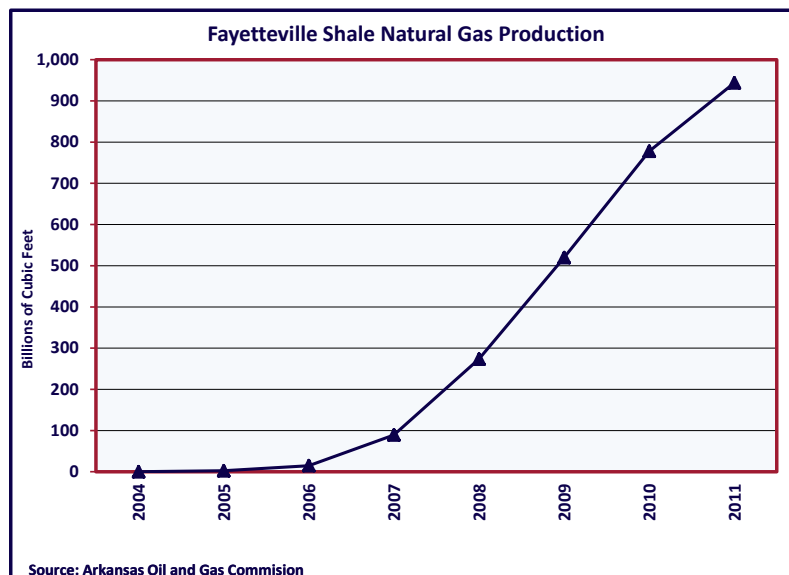
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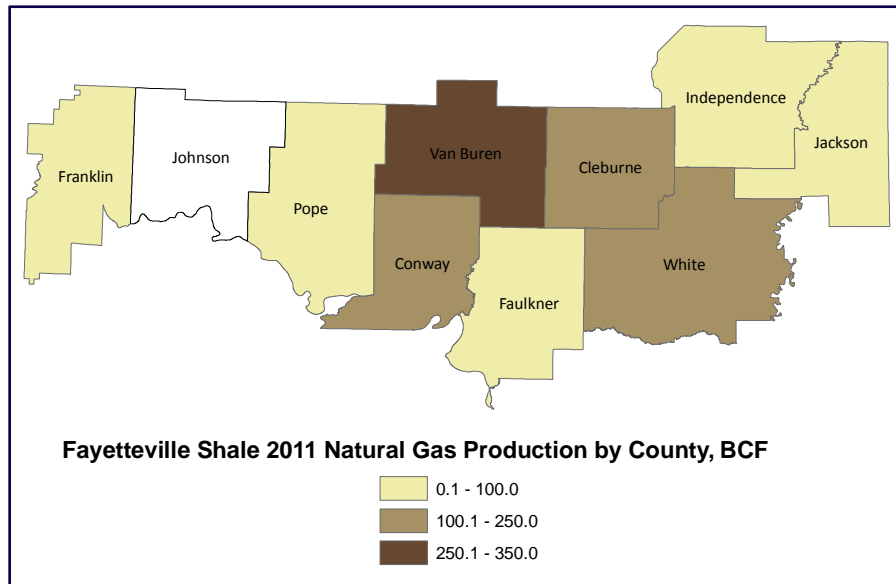
<sup>1</sup> These counties are defined as Fayetteville Shale counties for the purpose of this report. Although production occurred also in Johnson County in 2008, that total accounted for only 0.01 percent of total natural gas produced that year in the Fayetteville Shale area.

- While taxable sales in the state increased by 5.7 percent, **taxable sales in Fayetteville Shale counties increased by 20.0 percent from 2006 to 2011**. Although the economic recovery following the national recession was slow, seven out of nine Fayetteville Shale counties experienced an increase in taxable sales from 2010 to 2011.
- In 2010, all Fayetteville Shale counties except Franklin County had faster **than state average growth** in their **total property assessment values**.



- **Production of natural gas** in Fayetteville Shale counties increased significantly from 100.6 million cubic feet in 2004 to **almost 943.6 billion cubic feet in 2011**. The highest level of natural gas production in 2011 occurred in Van Buren County, followed by White, Conway, and Cleburne counties.





Sources: Arkansas Oil and Gas Commission, Center for Business and Economic Research calculations

- In 2008, exploration and production (E&P) companies planned to invest almost \$9.9 billion in Fayetteville Shale activities from 2008 to 2011. According to the 2012 survey of E&P companies, **more than \$12.7 billion were invested** during that time or **29.0 percent more than was planned** in 2008. This indicates that companies made conservative estimates in 2008 and natural gas production in Fayetteville Shale increased more than projected, despite lower than expected gas prices.

| <i>Year</i>  | <i>Expenditures Projected in 2008</i> | <i>Actual Expenditures</i> | <i>Increase/Decrease in Actual Expenditures</i> |
|--------------|---------------------------------------|----------------------------|---|
| 2008         | \$2,403,100,000                       | \$2,826,305,746            | 17.6%   |
| 2009         | \$2,312,800,000                       | \$3,132,245,509            | 35.4%   |
| 2010         | \$2,548,020,000                       | \$3,228,336,598            | 26.7%   |
| 2011         | \$2,634,312,000                       | \$3,583,976,111            | 36.0%   |
| <b>Total</b> | <b>\$9,898,232,000</b>                | <b>\$12,770,863,965</b>    | <b>29.0%</b>                                    |

Source: 2008 and 2012 Center for Business and Economic Research surveys

- According to the Center for Business and Economic Research Survey, from 2008 to 2011 **more than \$1.2 billion of mineral leases and royalty payments** were made by E&P companies to mineral owners residing in all 75 Arkansas counties.

**Mineral Leases and Royalty Payments Made by Oil and Gas Companies for Production from the Fayetteville Shale**

|                                    | <i>2008</i>   | <i>2009</i>   | <i>2010</i>   | <i>2011</i>   | <i>Total 2008-2011</i> |
|------------------------------------|---------------|---------------|---------------|---------------|------------------------|
| <b>Fayetteville Shale Counties</b> | \$244,264,556 | \$247,664,393 | \$373,536,452 | \$346,443,172 | \$1,211,908,574        |

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

- **From 2008 to 2011, total economic activity of more than \$18.5 billion** was generated as a result of Fayetteville Shale activities in the state. **Value added** from Fayetteville Shale activities was **more than \$12.4 billion** during that time.<sup>2</sup> **Total annual state employment** impacts increased **from more than 14,500 people to more than 22,000 people** during that time period. Among Fayetteville Shale counties, total employment impacts were largest in Faulkner County, followed by White, Cleburne, and Conway counties.
- The estimated total output impacts were consistently higher than the impacts projected in 2008 (projected total output impact of about \$14.2 billion and annual total employment impacts between 11,000 and 12,000 people), following higher than projected expenditures in the Fayetteville Shale.

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<sup>2</sup> Value added is defined as the difference between an industry's total output and the cost of its intermediate inputs.

| <i>Year</i>  | <i>Direct Output Impact</i> | <i>Indirect Output Impact</i> | <i>Induced Output Impact</i> | <i>Total Output Impact</i> | <i>Average Multiplier</i> |
|--------------|-----------------------------|-------------------------------|------------------------------|----------------------------|---------------------------|
| 2008         | \$2,826,305,639             | \$276,217,212                 | \$662,650,133                | \$3,765,172,984            | 1.33                      |
| 2009         | \$3,132,245,416             | \$499,040,374                 | \$1,067,517,206              | \$4,698,802,996            | 1.50                      |
| 2010         | \$3,228,336,640             | \$494,614,363                 | \$1,076,406,937              | \$4,799,357,940            | 1.49                      |
| 2011         | \$3,583,975,967             | \$528,293,873                 | \$1,159,086,862              | \$5,271,356,703            | 1.47                      |
| <b>Total</b> | <b>\$12,770,863,662</b>     | <b>\$1,798,165,822</b>        | <b>\$3,965,661,138</b>       | <b>\$18,534,690,623</b>    | <b>1.45</b>               |

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

| <i>Year</i>  | <i>Direct Value Added Impact</i> | <i>Indirect Value Added Impact</i> | <i>Induced Value Added Impact</i> | <i>Total Value Added Impact</i> | <i>Average Multiplier</i> |
|--------------|----------------------------------|------------------------------------|-----------------------------------|---------------------------------|---------------------------|
| 2008         | \$1,499,092,806                  | \$140,907,743                      | \$393,800,483                     | \$2,033,801,031                 | 1.36                      |
| 2009         | \$2,478,709,392                  | \$268,881,297                      | \$640,642,475                     | \$3,388,233,164                 | 1.37                      |
| 2010         | \$2,470,791,675                  | \$262,281,682                      | \$644,969,414                     | \$3,378,042,771                 | 1.37                      |
| 2011         | \$2,661,345,036                  | \$278,003,865                      | \$698,949,732                     | \$3,638,298,633                 | 1.37                      |
| <b>Total</b> | <b>\$9,109,938,909</b>           | <b>\$950,074,587</b>               | <b>\$2,378,362,104</b>            | <b>\$12,438,375,599</b>         | <b>1.36</b>               |

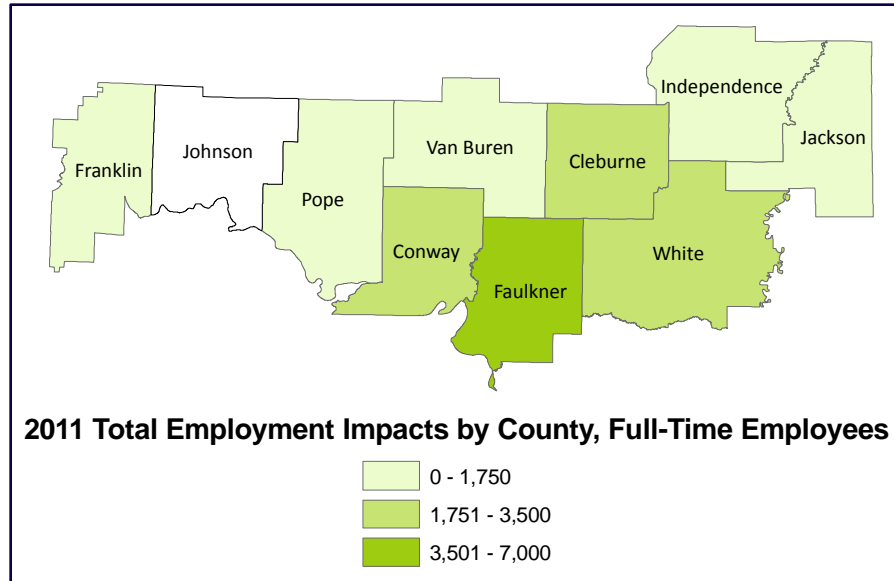
Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

| <i>Year</i> | <i>Direct Employment Impact</i> | <i>Indirect Employment Impact</i> | <i>Induced Employment Impact</i> | <i>Total Employment Impact</i> | <i>Average Multiplier</i> |
|-------------|---------------------------------|-----------------------------------|----------------------------------|--------------------------------|---------------------------|
| 2008        | 5,948                           | 1,934                             | 6,629                            | 14,511                         | 2.44                      |
| 2009        | 6,592                           | 3,669                             | 10,673                           | 20,933 <sup>3</sup>            | 3.18                      |
| 2010        | 6,794                           | 3,537                             | 10,622                           | 20,953                         | 3.08                      |
| 2011        | 7,544                           | 3,674                             | 11,282                           | 22,499                         | 2.98                      |

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

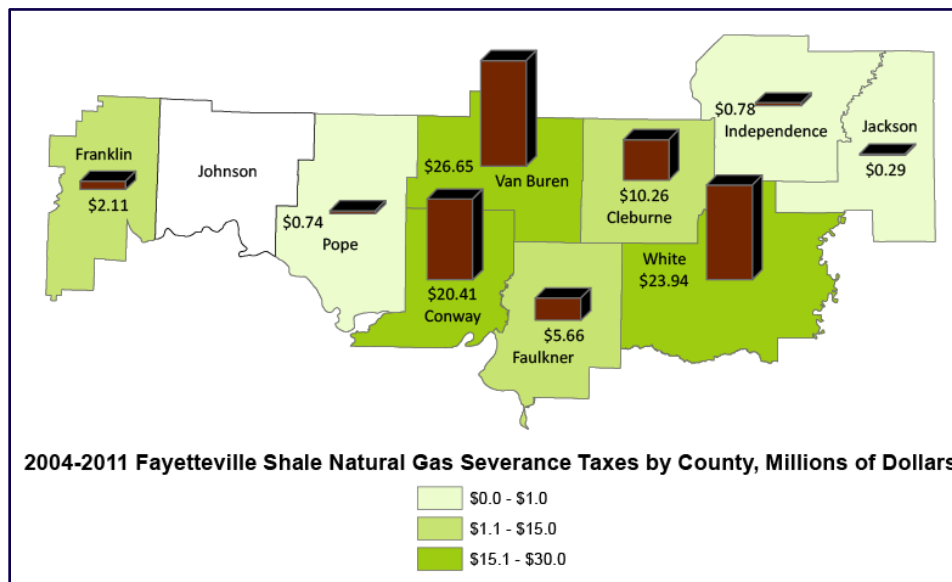
<sup>3</sup> Due to rounding, the sum of direct, indirect, and induced impacts differs from the total employment impact.





Sources: IMPLAN, Center for Business and Economic Research estimates

- From 2004 to 2011, a total of **4,878 drilling permits** were issued in Fayetteville Shale counties by the Arkansas Oil and Gas Commission, generating fees to the state of **almost \$1.5 million**.
- From 2004 to 2011, the state of Arkansas received **more than \$90.8 million** in **severance tax revenues from Fayetteville Shale activities**.



Source: 2012 Center survey, Center for Business and Economic Research calculations

- From 2008 to 2011, almost **\$109.2 million** in total property tax revenues were generated from natural gas production in the Fayetteville Shale.

| <u>Property Taxes from Fayetteville Shale Production, 2008-2011 Assessment Years</u> |                                       |                             |
|--|---------------------------------------|-----------------------------|
| <i>County</i>  | <i>School District Property Taxes</i> | <i>Total Property Taxes</i> |
| Cleburne   | \$9,530,545                           | \$10,913,725                |
| Conway   | \$19,852,594                          | \$25,252,338                |
| Faulkner   | \$6,158,965                           | \$7,699,301                 |
| Franklin   | \$23,906                              | \$31,728                    |
| Independence   | \$768,033                             | \$987,692                   |
| Jackson  | \$268,629                             | \$345,068                   |
| Pope   | \$419,179                             | \$480,885                   |
| Van Buren  | \$27,532,017                          | \$35,180,426                |
| White  | \$25,145,277                          | \$28,290,543                |
| <b>Fayetteville Shale Counties</b>   | <b>\$89,700,048*</b>                  | <b>\$109,182,898*</b>       |

\*Totals include property taxes that occurred from natural gas production in Johnson County in 2008.

Sources: Arkansas Oil & Gas Commission, Arkansas Coordination Department, Center for Business and Economic Research calculations

- Overall, from 2008 to 2011, almost **\$2.0 billion** in state and local taxes from **permit fees and severance, property, income, sales, and other taxes** were collected as a result of Fayetteville Shale activities. This amount is higher than \$1.2 billion of state and local taxes projected for this time period in 2008, following higher than projected expenditures of E&P companies in the Fayetteville Shale area and higher total employment.

| <i>Tax Category</i>                | <i>2008</i>          | <i>2009</i>          | <i>2010</i>          | <i>2011</i>          | <i>Total 2008-2011</i> |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|------------------------|
| Employee Compensation              | \$1,690,344          | \$2,305,688          | \$2,395,751          | \$2,653,867          | \$9,045,650            |
| Indirect Business Taxes and Fees   | \$183,726,187        | \$368,667,117        | \$386,055,978        | \$412,720,807        | \$1,351,170,089        |
| Households Taxes                   | \$100,732,153        | \$132,720,679        | \$150,276,443        | \$159,410,819        | \$543,140,094          |
| Corporation Taxes                  | \$8,939,369          | \$14,852,317         | \$14,663,124         | \$15,703,921         | \$54,158,731           |
| <b>Total State and Local Taxes</b> | <b>\$295,088,053</b> | <b>\$518,545,801</b> | <b>\$553,391,296</b> | <b>\$590,489,414</b> | <b>\$1,957,514,564</b> |

Sources: IMPLAN, 2012 Center for Business and Economic Research survey and estimates, Arkansas Oil and Gas Commission

- Enumerating each of the many revenue streams that resulted from the Fayetteville Shale activities is not feasible. Other payments such as overweight permit fees and restricted road fees, motor fuel taxes, and increased hotel, motel, and restaurant taxes were also received by governmental organizations as a result of the Fayetteville Shale development. Additionally, increased residential and commercial property values resulted in increased assessment values and, thus, in increased property taxes.
- According to the 2012 survey responses of E&P companies, expenditures are projected to be lower in 2012 than in 2011 by 23.8 percent due to the sustained low natural gas price environment. However, these projected expenditures are still 5.8 percent higher than the level of expenditures that the companies projected for 2012 in 2008.

| <i>Year</i> | <i>Expenditures<br/>Projected in<br/>2008</i> | <i>Expenditures<br/>Projected in<br/>2012</i> | <i>Increase/Decrease<br/>in Expenditures<br/>Projected in 2012</i> |
|-------------|---|---|--|
| <b>2012</b> | \$2,582,333,200                               | \$2,731,667,478                               | 5.8%   |

Source: 2008 and 2012 Center for Business and Economic Research surveys

- **In 2012, total economic activity of almost \$4.0 billion and value added of almost \$2.7 billion** are projected to occur as a result of Fayetteville Shale activities in the state. **The total annual state employment impact is projected to be more than 16,000 people** during 2012.

Projected Output, Value Added, and Employment Impacts of Fayetteville Shale Activities, 2012

| <i>Impact<br/>Category</i> | <i>Direct Impact</i> | <i>Indirect<br/>Impact</i> | <i>Induced<br/>Impact</i> | <i>Total Impact</i> | <i>Average<br/>Multiplier</i> |
|----------------------------|----------------------|----------------------------|---------------------------|---------------------|-------------------------------|
| Output                     | \$2,731,667,460      | \$387,583,098              | \$858,611,745             | \$3,977,862,303     | 1.46                          |
| Value Added                | \$1,969,864,942      | \$202,328,325              | \$520,679,847             | \$2,692,873,115     | 1.37                          |
| Employment                 | 5,750                | 2,620                      | 8,237                     | 16,607              | 2.89                          |

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

- The biggest risk factor to the 2012 projections continues to be sustained low natural gas prices. While the current low price environment is assumed in the estimates, further price declines and unanticipated operational cost increases could have significant effects on overall economic product and employment impacts statewide.