



**GLOBAL
INSIGHT**

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

Final Report

PREPARED FOR:

Independent Petroleum Association of America

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THE POWER OF PERSPECTIVE

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***The Economic Contribution of the Onshore Independent
Oil and Natural Gas Producers to the U.S. Economy***

Foreword

Since the drilling of the Drake well in 1859, independents have played a major role in the development of America's oil and natural gas industry. Independents were the first to drill offshore. They were the first to drill and open many of America's major hydrocarbon provinces, including areas such as East Texas Basin, the Williston Basin, the Denver-Julesberg Basin, and Permian Basin. Independents also have been important in extending the life in many U.S. hydrocarbon producing basins or areas by developing new plays - such as Alpine on Alaska's North Slope, Bakken in North Dakota and the shelf of the Gulf of Mexico. More recently, it was the independents that opened the shale plays, beginning with Mitchell Energy's entry into the Barnett. These shale plays are now spreading across North America and the globe. Much of this is a result of independents' entrepreneurial spirit and willingness to take on risk. It is this spirit which earned independents the early name of 'wildcatters'.

But who are these independents, which number close to 18,000 and operate in 32 states? IHS Herold categorizes independents based on two criteria: market capitalization and operational activity – upstream, midstream, and downstream. For this study, we defined independents as those companies with only upstream activities. Midstream and downstream effects were considered via indirect investment and jobs (i.e., anything downstream of the wellhead). Owing to their nature, these downstream jobs and investment are much more capital intensive than upstream activities. This allowed us to use the IHS Herold tracking of small, medium and large independents. Generally the medium and large are better known to a wider public; but the small independents also play an important role as they operate most of America's marginal wells (less than 16 barrels of oil equivalent per day) which account for about 80 percent of America's 800,000 producing wells.

Independents' share of production and investment in the United States has been rising steadily over the last five years, both in liquids and natural natural gas. Currently, onshore independents account for 65% of total natural gas production and close to 45% of total oil production in the United States. Over the next ten years these figures are expected to continue to increase as shale plays ramp up. The rise in production, particularly liquids, is also due to the development of tight formations such as the Granite Wash, Niobrara, Wolfberry and Bakken. Factors such as new technology, regulation, taxes, investment or new discoveries could influence the future growth, positively or negatively.

As a result, independents now drill close to 94% of America's oil and natural gas wells, a figure which is forecasted to remain steady over the next ten years. The unconventional resource plays have reset the marginal cost of America's hydrocarbons, and also have increased the average production rate and estimated ultimate recovery per well. The result of this new productivity is that it takes fewer wells to produce the same amount as before. For example, prior to 2008, more than 31,000 annual new natural gas wells were required to sustain 58 BCF/d of natural gas production; now it is possible to produce almost 63 BCF/d with the drilling of only 19,000 new natural gas wells per year. When one looks at the ten-year forecast, the independents' share of drilling activity will drop slightly from their peak in 2010. This is due to the individual well productivity increase, maturity of the plays, and entry of majors and national oil companies into the plays.

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In their search for hydrocarbons, independents often have been among the first to adopt and develop new technologies. Onshore independents drove many of the key innovations in drilling, completion and seismic technology during the 1990s. For instance, Union Pacific introduced horizontal drilling and water ‘frac’ techniques to enhance the Austin Chalk-Glen Rose play. Mitchell further refined and innovated those techniques to unlock and start the “shale gale” in the Barnett formation.

All of these activities translate into investment, jobs, and economic impacts, which we measure three ways - directly, indirectly and via induced. The direct impact is measured in upstream (production, drilling, seismic and site preparation) and for the relative components in the midstream/downstream (transportation, processing and marketing from wellhead to consumer); while indirect has many manifestations from the auxiliary services related to the supply chain support of the operations. Induced impact is from activity or spending that results from income derived from both the direct and indirect impact.

The independents’ direct upstream value of output is thus expected to grow from \$263 billion today to \$351 billion in 2020 while midstream/downstream will increase from \$518 billion today to \$685 billion in 2020. Total upstream jobs are expected to increase from 2.1 million in 2010 to 2.6 million in 2020.

Independents, thus, play a key role in America’s hydrocarbon production and make a strong contribution overall to jobs growth and economic expansion in the United States.

Executive Summary

The Independent Petroleum Association of America (IPAA) commissioned IHS Global Insight to assess the full spectrum of economic contributions onshore independents make to the U.S. economy. Quantifying the contribution in terms of jobs, economic value added, and government revenue, the study demonstrates the contribution of the onshore independents from upstream activities as well as the resultant impact on the mid/downstream sectors from the sale, processing and transportation of the discovered hydrocarbons.

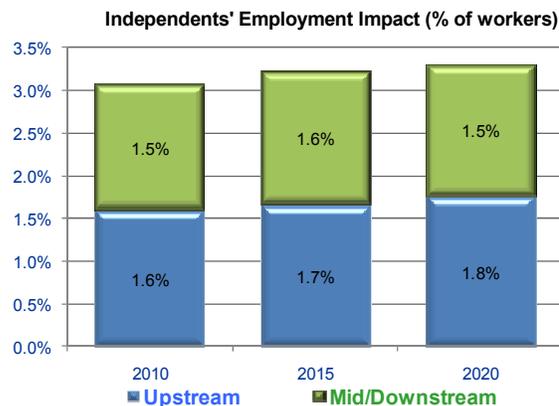
Onshore independents' share of drilling activity and production in the United States has been rising steadily over the last five years, both in liquids and natural gas. Currently, onshore independents account for 65% of total natural gas production and close to 45% of total oil production in the United States. Over the next ten years, we expect the onshore independents' share to continue to increase. Natural gas liquids (NGLs), in particular, are predicted to rise over the next five years as NGL-rich shales such as the Eagle Ford and Marcellus are developed. The rise in production, particularly liquids, is also due to the development of tight formations such as the Granite Wash, Niobrara, Wolfberry and Bakken. Factors such as new technology, regulation, taxes, investment or new discoveries could influence the future growth, positively or negatively.

As a result, independents now drill close to 94% of the wells in the United States, an estimate which is forecasted to remain steady over the next ten years. The unconventional resource plays have reset the marginal cost of hydrocarbons, and also have increased the average production rate and estimated ultimate recovery per well.

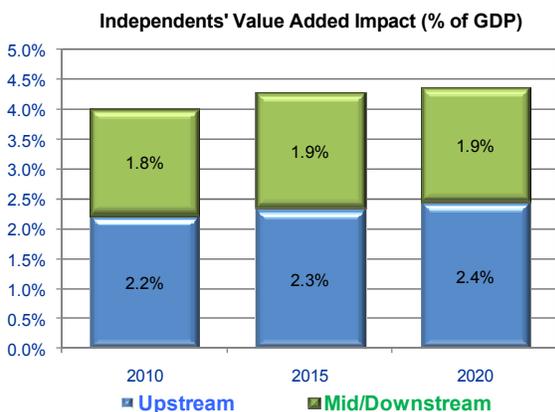
This study presents the current and future economic significance of onshore independent oil and natural gas producers in the United States. IHS Global Insight assessed three levels of economic contribution: **direct** contributions of the onshore independents; **indirect** contributions from their supplier networks; and those contributions **induced** via spending of income by the direct and indirect employees. Within each level of economic contribution, we examined three specific types of impact: employment, value added (contribution to Gross Domestic Product (GDP)), and labor income.

The IHS Global Insight assessment demonstrates the vital role onshore independents play in the U.S. economy. Significant findings of the study include:

Employment: In 2010, almost 4 million direct, indirect and induced jobs were supported by the onshore independents' business ecosystem, accounting for over 3% of all U.S. jobs. Of this, upstream activities supported 2.1 million jobs or 1.6% of U.S. jobs, while the remaining 1.5% or 1.9 million jobs were attributable to mid/downstream activities. In percentage terms, the contribution of upstream jobs as well as mid/downstream jobs to U.S. employment is sustained from 2010 to 2020.



The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy



Value Added to GDP: The independents' business ecosystem contributed \$579 billion (4.0%) of U.S. GDP in 2010. The upstream branch posited 2.2% or \$321 billion while the mid/downstream contributed 1.8% or \$258 billion. By 2020, those contributions are expected to increase to 2.4% and 1.9%, respectively.

Labor Income: In 2010, the independents' (upstream) employees as well as those whose downstream employment is attributable to the independents' upstream activities received \$281 billion in compensation.

Taxes: In 2010, independents' (upstream) activity generated \$30.7 billion in income taxes (federal and state), sales tax and excise taxes. Additionally, independents' upstream activity led to \$38.4 billion in corporate taxes, severance taxes and federal royalty payments in 2010. The entire direct/indirect/induced ecosystem of the independents generated \$131 billion of federal and state taxes in 2010, a figure that will increase to \$189 billion by 2020.

Return on Capital Investment: In 2010, upstream independents are estimated to have spent \$62.6 billion on capital expenditures (capex). This translates to the creation of 6 direct and 33 total upstream jobs for every \$1 million dollars of capex. In value added terms, every \$1 million dollars of capital expenditure results in \$2.4 million of direct and \$5.1 million of overall contribution to GDP. In terms of taxes, every \$1 million dollars of capex results to \$1.1 million of total taxes generated in the upstream sector.

Summary of the Economic Impact of Onshore Independents

| Upstream Onshore Economic Impact | | | | | |
|--|---------------|-----------------|----------------|--------------|-------------------|
| | Direct | Indirect | Induced | Total | Multiplier |
| Employment (average annual workers) | | | | | |
| 2010 | 399,508 | 626,443 | 1,051,778 | 2,077,729 | 5.20 |
| 2015 | 504,381 | 699,501 | 1,161,945 | 2,365,826 | 4.69 |
| 2020 | 609,832 | 759,439 | 1,265,672 | 2,634,943 | 4.32 |
| Value Added (billions of dollars) | | | | | |
| 2010 | \$154.5 | \$79.1 | \$87.0 | \$320.6 | 2.08 |
| 2015 | \$185.6 | \$97.5 | \$107.3 | \$390.4 | 2.10 |
| 2020 | \$220.7 | \$116.9 | \$129.1 | \$466.7 | 2.11 |
| Labor Income (billions of dollars) | | | | | |
| 2010 | \$55.5 | \$44.3 | \$48.9 | \$148.7 | 2.68 |
| 2015 | \$68.2 | \$54.8 | \$60.4 | \$183.4 | 2.69 |
| 2020 | \$82.4 | \$65.7 | \$72.6 | \$220.7 | 2.68 |

Source: Results generated by IHS Global Insight from the IMPLAN model
Numbers may not sum exactly due to rounding

| Taxes Paid (billions of dollars) - Upstream Onshore Operations | | | | |
|---|---------------|---------------|----------------|-------------------------|
| | 2010 | 2015 | 2020 | Total 2010-2020* |
| Federal Taxes | \$36.3 | \$44.5 | \$53.4 | \$489.5 |
| Personal Taxes | \$26.2 | \$32.3 | \$38.8 | \$355.3 |
| Corporate Taxes | \$10.1 | \$12.2 | \$14.6 | \$134.2 |
| State and Local Taxes | \$31.4 | \$38.4 | \$46.1 | \$422.4 |
| Personal Taxes | \$4.5 | \$5.6 | \$6.7 | \$61.6 |
| Corporate Taxes | \$26.4 | \$32.2 | \$38.7 | \$354.2 |
| Severance Taxes | \$0.5 | \$0.6 | \$0.7 | \$6.6 |
| Total, Federal, State, and Local Taxes | \$67.7 | \$82.9 | \$99.5 | \$911.9 |
| Federal Royalty Payments | \$1.4 | \$1.8 | \$2.4 | \$19.8 |
| Bonus and Rent Payments** | | | | \$1.6 |
| Grand Total | \$69.1 | \$84.7 | \$101.9 | \$933.3 |

Source: Results generated by IHS Global Insight from the IMPLAN model

* This column was estimated by multiplying the 2015 figure by 11

** Derived by multiplying by two the MMS 2011-2015 onshore bonus and rent payment estimates of \$809.3M

Numbers may not sum exactly due to rounding

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

| Midstream and Downstream Economic Impact | | | | | |
|---|---------------|-----------------|----------------|--------------|-------------------|
| | Direct | Indirect | Induced | Total | Multiplier |
| Employment (average annual workers) | | | | | |
| 2010 | 428,136 | 538,479 | 935,759 | 1,902,374 | 4.44 |
| 2015 | 506,284 | 630,242 | 1,064,367 | 2,200,894 | 4.35 |
| 2020 | 567,360 | 648,478 | 1,088,094 | 2,303,931 | 4.06 |
| Value Added (billions of dollars) | | | | | |
| 2010 | \$74.9 | \$105.8 | \$77.4 | \$258.1 | 3.45 |
| 2015 | \$90.0 | \$138.1 | \$98.3 | \$326.4 | 3.63 |
| 2020 | \$101.0 | \$155.0 | \$110.9 | \$366.9 | 3.63 |
| Labor Income (billions of dollars) | | | | | |
| 2010 | \$38.6 | \$50.2 | \$43.5 | \$132.3 | 3.43 |
| 2015 | \$47.3 | \$65.5 | \$55.3 | \$168.1 | 3.55 |
| 2020 | \$53.6 | \$73.8 | \$62.4 | \$189.8 | 3.54 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Numbers may not sum exactly due to rounding

| Taxes Paid (billions of dollars) - Mid/Downstream Operations | | | | |
|---|---------------|---------------|---------------|-------------------------|
| | 2010 | 2015 | 2020 | Total 2010-2020* |
| Federal Taxes | \$31.4 | \$39.7 | \$44.8 | \$436.7 |
| Personal Taxes | \$23.2 | \$29.5 | \$33.3 | \$324.5 |
| Corporate Taxes | \$8.2 | \$10.2 | \$11.5 | \$112.2 |
| State and Local Taxes | \$32.0 | \$40.1 | \$45.0 | \$441.1 |
| Personal Taxes | \$4.0 | \$5.1 | \$5.8 | \$56.1 |
| Corporate Taxes | \$27.5 | \$34.3 | \$38.5 | \$377.3 |
| Severance Taxes | \$0.5 | \$0.7 | \$0.7 | \$7.7 |
| Total, Federal, State, and Local Taxes | \$63.4 | \$79.8 | \$89.8 | \$877.8 |

Source: Results generated by IHS Global Insight from the IMPLAN model

* This column was estimated by multiplying the 2015 figure by 11

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Introduction

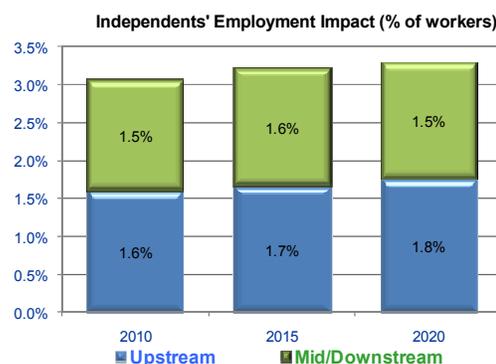
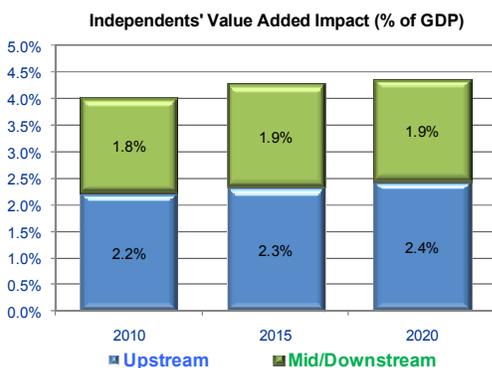
Onshore independent oil and natural gas producers make a significant contribution to the U.S. economy, particularly when considering the relative relationships and economic impacts of other industry segments. This study separately presents the economic significance of the independents' participation in the upstream segment and the resultant impact on midstream/downstream sectors.

Through upstream activities (extraction, drilling, etc.) the independents supported 399,500 direct workers and generated \$263 billion in gross economic output in 2010. At the same time in 2010 midstream/downstream activities (distribution, refining, wholesale, etc) supported 428,000 direct workers while generating \$518 billion in gross economic output. The influence and breadth of economic contribution by the independents extend well beyond direct industry employment and industry activities. The independents support extensive, multi-tiered supplier networks. In addition, consumer spending by employees of the independents' business ecosystems serves as a driver of home sales, consumer goods, food and services, for example.

The Independent Petroleum Association of America (IPAA) commissioned IHS Global Insight to assess the full spectrum of economic contributions onshore independents make to the U.S. economy. IHS Global Insight assessed three levels of economic contribution: **direct** contributions of the independents; **indirect** contributions from their supplier networks; and, those contributions **induced** by income of the direct and indirect employees. Within each level of economic contribution, we examined three specific types of impact: employment, value added (contribution to GDP), and labor income.

As the research and analysis presented in this document demonstrates, the onshore independents play a vital role in the U.S. economy. Significant findings include:

Employment: In 2010, 4.0 million direct, indirect and induced jobs were supported by the independents' business ecosystem, accounting for over 3% of all U.S. jobs. Upstream activities – the primary focus of the independents – supported 1.6% of U.S. jobs, while triggering an additional 1.5% in the midstream/downstream sector. The percentage contribution of the independents to both upstream jobs and mid/downstream jobs is expected to remain relatively stable from 2010 to 2020.

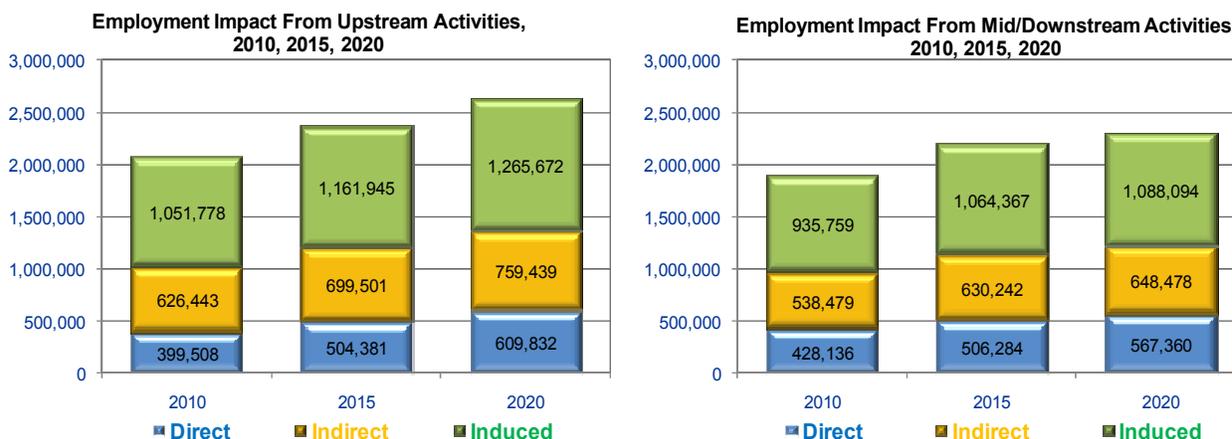


Value Added to GDP: The independents' business ecosystem contributed \$579 billion (4.0%) of U.S. GDP in 2010. The upstream branch posited 2.2% (\$321B) while the mid/downstream contributed 1.8% (\$258B). By 2020, those contributions are expected to increase to 2.4% and 1.9%, respectively.

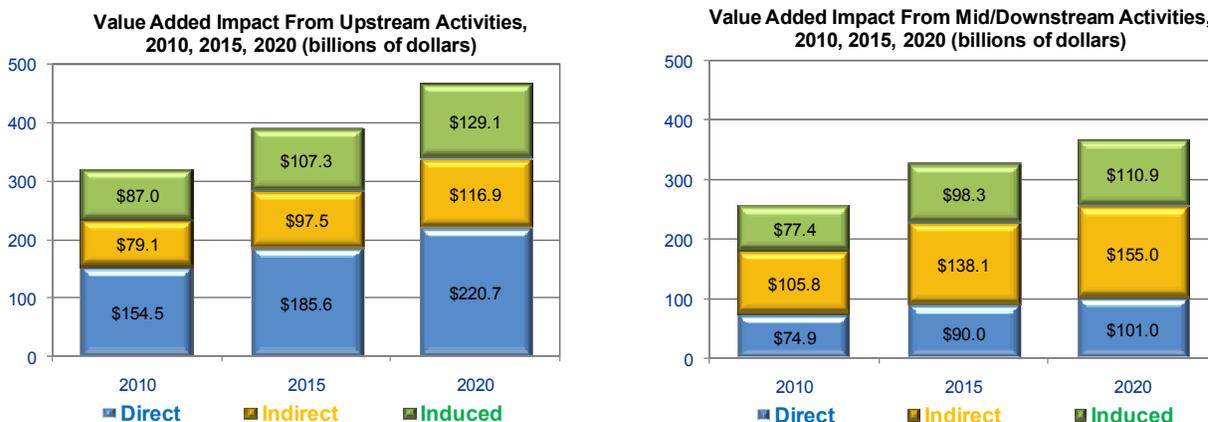
The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

Labor Income: In 2010, the independents' (upstream) employees as well as those whose downstream employment is attributable to the independents' upstream activities received \$281 billion in compensation.

Taxes: In 2010, independents' (upstream) activity generated \$30.7 billion in income taxes (federal and state), sales tax and excise taxes. Additionally, independents' upstream activity led to \$38.4 billion in corporate taxes, severance taxes and federal royalty payments in 2010. The entire direct/indirect/induced ecosystem of the independents generated \$131 billion of federal and state taxes in 2010, a figure that will increase to \$189 billion by 2020.



Onshore independents supported nearly 4.0 million U.S. jobs in 2010 and are expected to expand to 4.6 million and 4.9 million in 2015 and 2020, respectively. In 2010, more than 399,500 jobs are estimated to have been directly involved in upstream industry activities and 428,000 jobs were directly involved in midstream/downstream industry activities. Nearly 1.2 million additional indirect jobs are attributable to the supply chain supporting independents (over 626,000 in upstream and 538,000 in mid/downstream). Finally, just under 2.0 million induced jobs are estimated as a result of wage expenditure activity by employees of independents.



Onshore independents contributed \$579 billion to U.S. GDP in 2010, rising to \$834 billion by 2020. The direct economic impact of the onshore independents in the upstream sectors, as

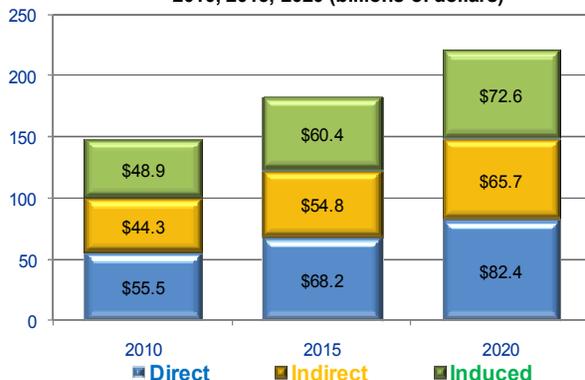
The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

measured by their value added, is estimated at approximately \$155 billion in 2010, reaching \$221 billion by 2020. Indirect and induced impacts bring their total value added contribution to the economy to \$321 billion and \$467 billion in 2010 and 2020, respectively.

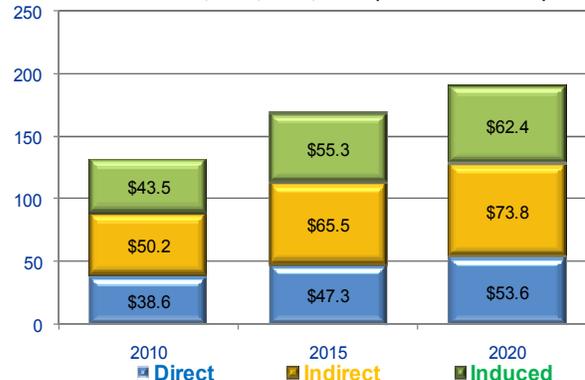
The total GDP impact of mid/downstream sectors is estimated at \$258 billion in 2010 and \$367 billion in 2020. The total impact of the combined upstream and mid/downstream reached \$579 billion in 2010 and is expected to rise to \$834 billion by 2020.

The total impact of onshore independent oil and natural gas producers on U.S. labor income during 2010 was \$281 billion and is expected to rise to \$411 billion by 2020. On average, the direct output per employee is significantly higher in upstream than it is in mid/downstream (\$650K/worker versus \$120K/worker in 2010). Therefore, to deliver the same level of output, mid/downstream players require more employees than their upstream counterparts. This disparity in productivity exerts downward pressure on the salaries and benefits offered to mid/downstream employees. Thus, despite having a slightly lower level of direct employment in 2010, upstream workers collectively attained labor income of \$55.6 billion compared with \$38.7 billion for mid/downstream workers.

Labor Income Impact From Upstream Activities, 2010, 2015, 2020 (billions of dollars)



Labor Income Impact From Mid/Downstream Activities, 2010, 2015, 2020 (billions of dollars)



The Influence of the Onshore Independents Transcends Many Industries. The first table on the following page exhibits onshore independents' direct gross value of output by detailed sector. Independents' upstream participation results in significant industrial activity in the mid/downstream sectors. Due to the current market dynamics in the upstream sectors and the impact of the recent recession, growth is expected to be stronger during the next five years compared to 2015-2020. A notable exception is NGL extraction, which is expected to gain additional momentum as NGL-rich shales, such as the Eagle Ford and Marcellus, are developed.

The second table on the following page shows the distribution of direct jobs by detailed sector.

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

Value of Direct Output Level (dollars) and Compound Annual Growth Rate (CAGR) by Major Activity Class

| | CAGR | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------|-------------|
| | 2010 | 2015 | 2020 | 2010-15 | 2015-20 |
| Upstream | | | | | |
| Crude petroleum and natural gas extraction | \$134,771,120,677 | \$148,648,872,800 | \$162,635,249,603 | 2.0% | 1.8% |
| Natural gas liquid extraction | \$32,866,532,022 | \$44,818,985,397 | \$64,343,449,805 | 6.4% | 7.5% |
| Drilling of oil and natural gas wells | \$52,154,270,664 | \$56,684,134,703 | \$58,735,708,329 | 1.7% | 0.7% |
| Support activities for oil and gas operations | \$31,354,331,576 | \$34,059,498,583 | \$37,034,473,907 | 1.7% | 1.7% |
| Oil and gas site preparation contractors | \$9,594,877,398 | \$18,301,766,425 | \$24,827,332,205 | 13.8% | 6.3% |
| Geophysical surveying and mapping services | \$1,950,327,304 | \$2,741,222,148 | \$3,468,087,291 | 7.0% | 4.8% |
| Total, Upstream | \$262,691,459,641 | \$305,254,480,056 | \$351,044,301,140 | 3.0% | 2.8% |
| Mid/Downstream | | | | | |
| Natural gas distribution | \$86,348,619,159 | \$100,931,470,794 | \$114,194,989,037 | 3.2% | 2.5% |
| Oil and gas pipeline construction | \$19,451,848,444 | \$28,317,485,150 | \$36,313,512,717 | 7.8% | 5.1% |
| Pipeline transportation (oil, gas and refined products) | \$14,572,724,932 | \$19,409,777,991 | \$23,957,533,831 | 5.9% | 4.3% |
| Petroleum refineries | \$133,274,680,507 | \$169,882,936,696 | \$176,907,141,121 | 5.0% | 0.8% |
| Petroleum lubricating oil and greases | \$2,615,326,644 | \$2,951,127,513 | \$3,405,562,840 | 2.4% | 2.9% |
| Petroleum merchant wholesalers | \$168,505,767,409 | \$190,987,464,027 | \$213,014,866,391 | 2.5% | 2.2% |
| Gasoline stations | \$93,256,452,625 | \$105,272,232,451 | \$117,465,811,835 | 2.5% | 2.2% |
| Total, Mid/Downstream | \$518,025,419,720 | \$617,752,494,622 | \$685,259,417,772 | 3.6% | 2.1% |

Source: IHS Global Insight

Numbers may not sum exactly due to rounding

Direct Employment by Major Activity Class (average annual number of workers)

| Direct Employment Summary | | | |
|---|----------------|----------------|----------------|
| | 2010 | 2015 | 2020 |
| Upstream | | | |
| Oil and natural gas extraction | 188,579 | 227,326 | 275,554 |
| Drilling of oil and natural gas wells | 62,966 | 68,780 | 70,851 |
| Support activities for oil and gas operations | 100,341 | 130,438 | 167,886 |
| Oil and gas site preparation contractors | 33,501 | 59,512 | 74,368 |
| Geophysical surveying and mapping services | 14,121 | 18,325 | 21,173 |
| Overall, Upstream | 399,508 | 504,381 | 609,832 |
| Mid/Downstream | | | |
| Natural gas distribution | 88,776 | 101,642 | 111,419 |
| Oil and gas pipeline construction | 60,205 | 81,623 | 96,421 |
| Pipeline transportation (oil, gas and refined products) | 19,149 | 25,755 | 31,752 |
| Petroleum refineries | 18,119 | 24,867 | 27,578 |
| Petroleum lubricating oil and greases | 2,235 | 2,715 | 3,337 |
| Petroleum merchant wholesalers | 24,223 | 29,814 | 35,719 |
| Gasoline stations | 215,429 | 239,868 | 261,134 |
| Overall, Mid/Downstream | 428,136 | 506,284 | 567,360 |

Source: Results generated by IHS Global Insight from the IMPLAN model

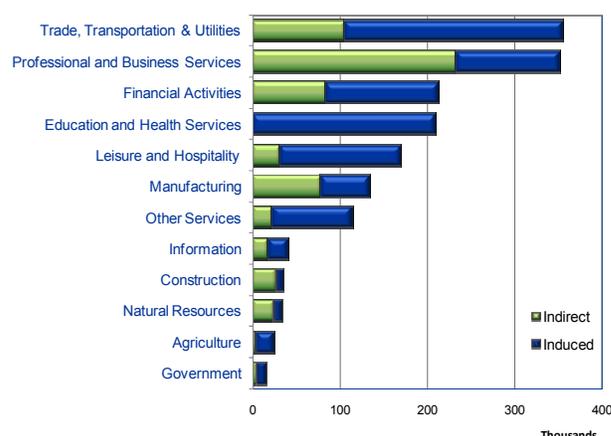
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The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

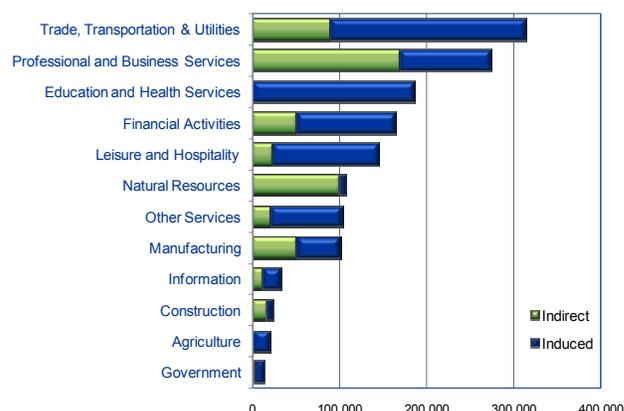
As depicted in the chart below, well over two-thirds of the indirect and induced jobs stimulated by the independents' upstream activity falls into four broad industry super-sectors: Trade, Transportation & Utilities; Professional and Business Services; Education and Health Services; and Financial Activities. At first, Education and Health Services may appear incongruous among the three other sectors that are, indeed, fundamental to day-to-day operations. Closer investigation indicates that virtually all of these jobs are induced. In other words, they were created in response to the (direct and indirect) employees' demand for education and health services. Similarly, most jobs in the Leisure and Hospitality sector are induced but can be linked to economic activity such as business travel. The following graphics illustrate precisely how far-reaching an influence the onshore independents have on other sectors.

Industry-level U.S. Indirect and Induced Employment Attributable to the Independents in 2010
(Tables: average annual workers; Graphs: thousands of average annual workers)

| Upstream Indirect and Induced Employment, 2010 | | | |
|--|----------------|------------------|------------------|
| | Indirect | Induced | Total |
| Trade, Transportation & Utilities | 104,068 | 250,096 | 354,164 |
| Professional and Business Services | 232,849 | 116,688 | 349,537 |
| Financial Activities | 83,691 | 127,336 | 211,027 |
| Education and Health Services | 378 | 207,222 | 207,600 |
| Leisure and Hospitality | 30,513 | 137,989 | 168,502 |
| Manufacturing | 76,349 | 55,717 | 132,067 |
| Other Services | 21,695 | 91,103 | 112,798 |
| Information | 16,921 | 22,593 | 39,513 |
| Construction | 26,873 | 6,994 | 33,867 |
| Natural Resources | 24,139 | 7,710 | 31,848 |
| Agriculture | 3,799 | 19,110 | 22,910 |
| Government | 5,169 | 9,219 | 14,388 |
| Total | 626,443 | 1,051,778 | 1,678,221 |



| Mid/Downstream Direct and Induced Employment, 2010 | | | |
|--|----------------|----------------|------------------|
| | Indirect | Induced | Total |
| Trade, Transportation & Utilities | 90,376 | 222,561 | 312,936 |
| Professional and Business Services | 169,593 | 103,794 | 273,387 |
| Education and Health Services | 758 | 184,378 | 185,136 |
| Financial Activities | 50,943 | 113,232 | 164,176 |
| Leisure and Hospitality | 22,289 | 122,775 | 145,063 |
| Natural Resources | 99,851 | 6,854 | 106,704 |
| Other Services | 20,897 | 81,119 | 102,016 |
| Manufacturing | 50,358 | 49,547 | 99,906 |
| Information | 11,793 | 20,093 | 31,886 |
| Construction | 16,372 | 6,225 | 22,597 |
| Agriculture | 1,345 | 16,984 | 18,328 |
| Government | 3,905 | 8,198 | 12,103 |
| Total | 538,479 | 935,759 | 1,474,238 |



SUMMARY OF THE ECONOMIC IMPACT OF ONSHORE INDEPENDENTS

The tables presented on the following page summarize the direct, indirect and induced economic contributions attributable to the onshore independents for 2010 as well as forecasts for 2015 and 2020, segmented by upstream and mid/downstream. The federal and state taxes that result from the direct, indirect and induced impact of independents are summarized as well.

| Upstream Onshore Economic Impact | | | | | |
|--|---------------|-----------------|----------------|--------------|-------------------|
| | Direct | Indirect | Induced | Total | Multiplier |
| Employment (average annual workers) | | | | | |
| 2010 | 399,508 | 626,443 | 1,051,778 | 2,077,729 | 5.20 |
| 2015 | 504,381 | 699,501 | 1,161,945 | 2,365,826 | 4.69 |
| 2020 | 609,832 | 759,439 | 1,265,672 | 2,634,943 | 4.32 |
| Value Added (billions of dollars) | | | | | |
| 2010 | \$154.5 | \$79.1 | \$87.0 | \$320.6 | 2.08 |
| 2015 | \$185.6 | \$97.5 | \$107.3 | \$390.4 | 2.10 |
| 2020 | \$220.7 | \$116.9 | \$129.1 | \$466.7 | 2.11 |
| Labor Income (billions of dollars) | | | | | |
| 2010 | \$55.5 | \$44.3 | \$48.9 | \$148.7 | 2.68 |
| 2015 | \$68.2 | \$54.8 | \$60.4 | \$183.4 | 2.69 |
| 2020 | \$82.4 | \$65.7 | \$72.6 | \$220.7 | 2.68 |

Source: Results generated by IHS Global Insight from the IMPLAN model
Numbers may not sum exactly due to rounding

| Taxes Paid (billions of dollars) - Upstream Onshore Operations | | | | |
|---|---------------|---------------|----------------|-------------------------|
| | 2010 | 2015 | 2020 | Total 2010-2020* |
| Federal Taxes | \$36.3 | \$44.5 | \$53.4 | \$489.5 |
| Personal Taxes | \$26.2 | \$32.3 | \$38.8 | \$355.3 |
| Corporate Taxes | \$10.1 | \$12.2 | \$14.6 | \$134.2 |
| State and Local Taxes | \$31.4 | \$38.4 | \$46.1 | \$422.4 |
| Personal Taxes | \$4.5 | \$5.6 | \$6.7 | \$61.6 |
| Corporate Taxes | \$26.4 | \$32.2 | \$38.7 | \$354.2 |
| Severance Taxes | \$0.5 | \$0.6 | \$0.7 | \$6.6 |
| Total, Federal, State, and Local Taxes | \$67.7 | \$82.9 | \$99.5 | \$911.9 |
| Federal Royalty Payments | \$1.4 | \$1.8 | \$2.4 | \$19.8 |
| Bonus and Rent Payments** | | | | \$1.6 |
| Grand Total | \$69.1 | \$84.7 | \$101.9 | \$933.3 |

Source: Results generated by IHS Global Insight from the IMPLAN model

* This column was estimated by multiplying the 2015 figure by 11

** Derived by multiplying by two the MMS 2011-2015 onshore bonus and rent payment estimates of \$809.3M

Numbers may not sum exactly due to rounding

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

| Midstream and Downstream Economic Impact | | | | | |
|---|---------------|-----------------|----------------|--------------|-------------------|
| | Direct | Indirect | Induced | Total | Multiplier |
| Employment (average annual workers) | | | | | |
| 2010 | 428,136 | 538,479 | 935,759 | 1,902,374 | 4.44 |
| 2015 | 506,284 | 630,242 | 1,064,367 | 2,200,894 | 4.35 |
| 2020 | 567,360 | 648,478 | 1,088,094 | 2,303,931 | 4.06 |
| Value Added (billions of dollars) | | | | | |
| 2010 | \$74.9 | \$105.8 | \$77.4 | \$258.1 | 3.45 |
| 2015 | \$90.0 | \$138.1 | \$98.3 | \$326.4 | 3.63 |
| 2020 | \$101.0 | \$155.0 | \$110.9 | \$366.9 | 3.63 |
| Labor Income (billions of dollars) | | | | | |
| 2010 | \$38.6 | \$50.2 | \$43.5 | \$132.3 | 3.43 |
| 2015 | \$47.3 | \$65.5 | \$55.3 | \$168.1 | 3.55 |
| 2020 | \$53.6 | \$73.8 | \$62.4 | \$189.8 | 3.54 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Numbers may not sum exactly due to rounding

| Taxes Paid (billions of dollars) - Mid/Downstream Operations | | | | |
|---|---------------|---------------|---------------|-------------------------|
| | 2010 | 2015 | 2020 | Total 2010-2020* |
| Federal Taxes | \$31.4 | \$39.7 | \$44.8 | \$436.7 |
| Personal Taxes | \$23.2 | \$29.5 | \$33.3 | \$324.5 |
| Corporate Taxes | \$8.2 | \$10.2 | \$11.5 | \$112.2 |
| State and Local Taxes | \$32.0 | \$40.1 | \$45.0 | \$441.1 |
| Personal Taxes | \$4.0 | \$5.1 | \$5.8 | \$56.1 |
| Corporate Taxes | \$27.5 | \$34.3 | \$38.5 | \$377.3 |
| Severance Taxes | \$0.5 | \$0.7 | \$0.7 | \$7.7 |
| Total, Federal, State, and Local Taxes | \$63.4 | \$79.8 | \$89.8 | \$877.8 |

Source: Results generated by IHS Global Insight from the IMPLAN model

* This column was estimated by multiplying the 2015 figure by 11

Numbers may not sum exactly due to rounding

Approach

The total economic impact of an activity has three distinct parts: direct, indirect, and induced. The **direct impact** represents economic activities that interact directly with the sector under study. The **indirect impact** represents the benefit to suppliers to those direct sectors. This would include, for example, steel tube suppliers to a drill operator. The **induced impact** adds the effect of spending from wage and other income derived from the direct and indirect sectors.

In assessing the economic contribution of the onshore independent oil and natural gas producers industry, IHS Global Insight has utilized the following measures:

- The value of output and total number of jobs **directly** attributable to upstream onshore independent oil and gas producers. These jobs involve upstream onshore activities including exploring, drilling, and production of oil and natural gas.
- The value of output and total number of jobs **indirectly** involved in supporting the onshore independent oil and gas producers. Indirect employment is defined as the employment in other industries that supply material and labor to the onshore independent producers' industry.
- The value of output and total number of jobs **induced** by the expenditure of direct and indirect workers' income.
- The economic value of the onshore independent oil and natural gas industry as measured by **value added** and labor income associated with these direct, indirect, and induced jobs.

The total economic impact incorporates the sum embedded in each of the aforementioned elements, so that total employment (direct, indirect, and induced), corresponding total labor income, and total value added are the most precise measures of the economic contribution of this industry.¹

These measures form the foundation of the IHS Global Insight economic impact assessment. We fully describe the estimated economic contribution during the 2010–2020 period of (1) the upstream onshore independents, and (2) the midstream and downstream activity resulting from the upstream independents' participation.

The first analysis involves an assessment of the upstream sector for 2010 (the most recent year for complete data), as well as for 2015 and for 2020. The analysis is then extended to include the midstream and downstream activities generated due to independents' participation and their economic contribution. The dimensions of employment and value added as well as labor income are presented on an individual basis. All aspects of the onshore independent oil and natural gas producer industry are incorporated in our analysis, including exploration, production, drilling, support services, and related construction and pipeline activity. The study also presents information on estimated tax receipts for federal and state and local.

¹ IHS Global Insight used the IMPLAN model to quantify the contribution of the onshore oil and natural gas independents to the US economy. The IMPLAN model closely follows the accounting conventions used in the U.S. Department of Commerce Bureau of Economic Analysis (BEA) definitive 1980 study, *Input-Output Study of the U.S. Economy*, and is flexible enough to evaluate the change via the value of output or employment from the source industry. (Additional details related to this modeling approach are presented in Appendix D).

Results: Upstream Impact by Industry

| Upstream Direct Economic Impact Summary by Major Activity Class | | | |
|--|----------------|----------------|----------------|
| | 2010 | 2015 | 2020 |
| Upstream Direct Employment (average annual workers) | | | |
| Oil and natural gas extraction | 188,579 | 227,326 | 275,554 |
| Drilling of oil and natural gas wells | 62,966 | 68,780 | 70,851 |
| Support activities for oil and gas operations | 100,341 | 130,438 | 167,886 |
| Oil and gas site preparation contractors | 33,501 | 59,512 | 74,368 |
| Geophysical surveying and mapping services | 14,121 | 18,325 | 21,173 |
| Overall, Upstream Direct Employment | 399,508 | 504,381 | 609,832 |
| Upstream Direct Value Added (billions of dollars) | | | |
| Oil and natural gas extraction | \$105.7 | \$127.4 | \$154.4 |
| Drilling of oil and natural gas wells | \$29.8 | \$32.5 | \$33.6 |
| Support activities for oil and gas operations | \$15.9 | \$20.7 | \$26.6 |
| Oil and gas site preparation contractors | \$2.0 | \$3.6 | \$4.5 |
| Geophysical surveying and mapping services | \$1.1 | \$1.4 | \$1.6 |
| Overall, Upstream Direct Value Added | \$154.5 | \$185.6 | \$220.7 |
| Upstream Direct Labor Income (billions of dollars) | | | |
| Oil and natural gas extraction | \$37.9 | \$45.7 | \$55.3 |
| Drilling of oil and natural gas wells | \$6.1 | \$6.6 | \$6.9 |
| Support activities for oil and gas operations | \$8.5 | \$11.1 | \$14.3 |
| Oil and gas site preparation contractors | \$1.9 | \$3.4 | \$4.3 |
| Geophysical surveying and mapping services | \$1.1 | \$1.4 | \$1.6 |
| Overall, Upstream Direct Labor Income | \$55.5 | \$68.2 | \$82.4 |

*Source: Results generated by IHS Global Insight from the IMPLAN model
Numbers may not sum exactly due to rounding*

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

Upstream Indirect Employment (average annual workers)

| | 2010 | 2015 | 2020 |
|------------------------------------|----------------|----------------|----------------|
| Agriculture | 3,799 | 4,154 | 4,364 |
| Construction | 26,873 | 29,105 | 31,899 |
| Education and Health Services | 378 | 427 | 465 |
| Financial Activities | 83,691 | 92,774 | 101,394 |
| Government | 5,169 | 5,705 | 6,184 |
| Information | 16,921 | 18,834 | 20,546 |
| Leisure and Hospitality | 30,513 | 34,425 | 37,773 |
| Manufacturing | 76,349 | 85,198 | 91,350 |
| Natural Resources | 24,139 | 26,726 | 28,967 |
| Professional and Business Services | 232,849 | 258,363 | 280,737 |
| Trade, Transportation & Utilities | 104,068 | 119,117 | 128,826 |
| Other Services | 21,695 | 24,673 | 26,934 |
| Total | 626,443 | 699,501 | 759,439 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Upstream Induced Employment (average annual workers)

| | 2010 | 2015 | 2020 |
|------------------------------------|------------------|------------------|------------------|
| Agriculture | 19,110 | 21,119 | 23,002 |
| Construction | 6,994 | 7,726 | 8,416 |
| Education and Health Services | 207,222 | 228,922 | 249,359 |
| Financial Activities | 127,336 | 140,696 | 153,248 |
| Government | 9,219 | 10,186 | 11,095 |
| Information | 22,593 | 24,962 | 27,190 |
| Leisure and Hospitality | 137,989 | 152,440 | 166,049 |
| Manufacturing | 55,717 | 61,562 | 67,055 |
| Natural Resources | 7,710 | 8,519 | 9,279 |
| Professional and Business Services | 116,688 | 128,919 | 140,424 |
| Trade, Transportation & Utilities | 250,096 | 276,273 | 300,942 |
| Other Services | 91,103 | 100,621 | 109,612 |
| Total | 1,051,778 | 1,161,945 | 1,265,672 |

Source: Results generated by IHS Global Insight from the IMPLAN model

***The Economic Contribution of the Onshore Independent
Oil and Natural Gas Producers to the U.S. Economy***

| Upstream Indirect Total Value Added (billions of dollars) | | | |
|--|-----------------|-----------------|------------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$239 | \$292 | \$338 |
| Construction | \$1,696 | \$2,051 | \$2,482 |
| Education and Health Services | \$15 | \$19 | \$22 |
| Financial Activities | \$20,209 | \$24,771 | \$29,941 |
| Government | \$461 | \$564 | \$674 |
| Information | \$3,180 | \$3,955 | \$4,765 |
| Leisure and Hospitality | \$1,155 | \$1,456 | \$1,765 |
| Manufacturing | \$10,057 | \$12,409 | \$14,622 |
| Natural Resources | \$7,191 | \$8,817 | \$10,587 |
| Professional and Business Services | \$20,938 | \$25,815 | \$30,940 |
| Trade, Transportation & Utilities | \$12,860 | \$16,033 | \$19,089 |
| Other Services | \$1,099 | \$1,417 | \$1,707 |
| Total | \$79,101 | \$97,597 | \$116,933 |

Source: Results generated by IHS Global Insight from the IMPLAN model

| Upstream Induced Total Value Added (billions of dollars) | | | |
|---|-----------------|------------------|------------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$930 | \$1,147 | \$1,379 |
| Construction | \$460 | \$567 | \$682 |
| Education and Health Services | \$11,407 | \$14,068 | \$16,920 |
| Financial Activities | \$26,368 | \$32,517 | \$39,110 |
| Government | \$762 | \$940 | \$1,131 |
| Information | \$3,870 | \$4,774 | \$5,741 |
| Leisure and Hospitality | \$4,959 | \$6,115 | \$7,355 |
| Manufacturing | \$7,052 | \$8,698 | \$10,461 |
| Natural Resources | \$1,324 | \$1,633 | \$1,964 |
| Professional and Business Services | \$8,624 | \$10,637 | \$12,793 |
| Trade, Transportation & Utilities | \$18,309 | \$22,581 | \$27,159 |
| Other Services | \$2,979 | \$3,674 | \$4,419 |
| Total | \$87,045 | \$107,352 | \$129,116 |

Source: Results generated by IHS Global Insight from the IMPLAN model

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

| Upstream Indirect Labor Income (billions of dollars) | | | |
|---|-----------------|-----------------|-----------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$93 | \$113 | \$130 |
| Construction | \$1,610 | \$1,947 | \$2,356 |
| Education and Health Services | \$13 | \$16 | \$19 |
| Financial Activities | \$5,976 | \$7,396 | \$8,951 |
| Government | \$396 | \$487 | \$583 |
| Information | \$1,678 | \$2,085 | \$2,510 |
| Leisure and Hospitality | \$761 | \$958 | \$1,161 |
| Manufacturing | \$6,245 | \$7,725 | \$9,111 |
| Natural Resources | \$3,002 | \$3,686 | \$4,424 |
| Professional and Business Services | \$16,797 | \$20,742 | \$24,869 |
| Trade, Transportation & Utilities | \$6,924 | \$8,667 | \$10,313 |
| Other Services | \$841 | \$1,072 | \$1,292 |
| Total | \$44,335 | \$54,893 | \$65,719 |

Source: Results generated by IHS Global Insight from the IMPLAN model

| Upstream Induced Labor Income (billions of dollars) | | | |
|--|-----------------|-----------------|-----------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$317 | \$390 | \$470 |
| Construction | \$347 | \$427 | \$514 |
| Education and Health Services | \$9,847 | \$12,144 | \$14,606 |
| Financial Activities | \$7,960 | \$9,817 | \$11,808 |
| Government | \$681 | \$840 | \$1,010 |
| Information | \$2,075 | \$2,559 | \$3,078 |
| Leisure and Hospitality | \$3,220 | \$3,971 | \$4,776 |
| Manufacturing | \$4,179 | \$5,155 | \$6,200 |
| Natural Resources | \$594 | \$732 | \$881 |
| Professional and Business Services | \$6,750 | \$8,325 | \$10,013 |
| Trade, Transportation & Utilities | \$10,699 | \$13,195 | \$15,870 |
| Other Services | \$2,308 | \$2,845 | \$3,422 |
| Total | \$48,975 | \$60,401 | \$72,647 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Results: Mid/Downstream Impact by Industry

Mid/Downstream Direct Economic Impact Summary by Major Activity Class

| | 2010 | 2015 | 2020 |
|--|----------------|----------------|----------------|
| Mid/Downstream Direct Employment (average annual workers) | | | |
| Natural gas distribution | 88,776 | 101,642 | 111,419 |
| Oil and gas pipeline construction | 60,205 | 81,623 | 96,421 |
| Pipeline transportation (oil, gas and refined) | 19,149 | 25,755 | 31,752 |
| Petroleum refineries | 18,119 | 24,867 | 27,578 |
| Petroleum lubricating oil and greases | 2,235 | 2,715 | 3,337 |
| Petroleum merchant wholesalers | 24,223 | 29,814 | 35,719 |
| Gasoline stations | 215,429 | 239,868 | 261,134 |
| Overall, Mid/Downstream Direct Employment | 428,136 | 506,284 | 567,360 |
| Mid/Downstream Direct Value Added (billions of dollars) | | | |
| Natural gas distribution | \$36.2 | \$41.5 | \$45.4 |
| Oil and gas pipeline construction | \$3.3 | \$4.5 | \$5.4 |
| Pipeline transportation (oil, gas and refined) | \$7.4 | \$9.9 | \$12.3 |
| Petroleum refineries | \$9.5 | \$13.0 | \$14.4 |
| Petroleum lubricating oil and greases | \$1.0 | \$1.3 | \$1.5 |
| Petroleum merchant wholesalers | \$3.1 | \$3.8 | \$4.6 |
| Gasoline stations | \$14.4 | \$16.0 | \$17.4 |
| Overall, Mid/Downstream Direct Value Added | \$74.9 | \$90.0 | \$101.0 |
| Mid/Downstream Direct Labor Income (billions of dollars) | | | |
| Natural gas distribution | \$15.4 | \$17.7 | \$19.3 |
| Oil and gas pipeline construction | \$3.2 | \$4.3 | \$5.1 |
| Pipeline transportation (oil, gas and refined products) | \$5.1 | \$6.9 | \$8.4 |
| Petroleum refineries | \$6.2 | \$8.5 | \$9.5 |
| Petroleum lubricating oil and greases | \$0.6 | \$0.7 | \$0.9 |
| Petroleum merchant wholesalers | \$1.8 | \$2.2 | \$2.7 |
| Gasoline stations | \$6.3 | \$7.0 | \$7.7 |
| Overall, Mid/Downstream Direct Labor Income | \$38.6 | \$47.3 | \$53.6 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Numbers may not sum exactly due to rounding

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| Midstream and Downstream Indirect Employment (average annual workers) | | | |
|--|----------------|----------------|----------------|
| | 2010 | 2015 | 2020 |
| Agriculture | 1,345 | 1,584 | 1,647 |
| Construction | 16,372 | 19,197 | 19,520 |
| Education and Health Services | 758 | 828 | 842 |
| Financial Activities | 50,943 | 58,948 | 60,625 |
| Government | 3,905 | 4,587 | 4,702 |
| Information | 11,793 | 13,716 | 14,152 |
| Leisure and Hospitality | 22,289 | 26,006 | 26,800 |
| Manufacturing | 50,358 | 59,378 | 61,800 |
| Natural Resources | 99,851 | 117,186 | 117,984 |
| Professional and Business Services | 169,593 | 198,580 | 205,826 |
| Trade, Transportation & Utilities | 90,376 | 105,679 | 109,086 |
| Other Services | 20,897 | 24,552 | 25,494 |
| Total | 538,479 | 630,242 | 648,478 |

Source: Results generated by IHS Global Insight from the IMPLAN model

| Midstream and Downstream Induced Employment (average annual workers) | | | |
|---|----------------|------------------|------------------|
| | 2010 | 2015 | 2020 |
| Agriculture | 16,984 | 19,315 | 19,747 |
| Construction | 6,225 | 7,081 | 7,239 |
| Education and Health Services | 184,378 | 209,720 | 214,394 |
| Financial Activities | 113,232 | 128,786 | 131,661 |
| Government | 8,198 | 9,324 | 9,532 |
| Information | 20,093 | 22,854 | 23,364 |
| Leisure and Hospitality | 122,775 | 139,649 | 142,762 |
| Manufacturing | 49,547 | 56,354 | 57,612 |
| Natural Resources | 6,854 | 7,795 | 7,969 |
| Professional and Business Services | 103,794 | 118,056 | 120,689 |
| Trade, Transportation & Utilities | 222,561 | 253,157 | 258,796 |
| Other Services | 81,119 | 92,278 | 94,329 |
| Total | 935,759 | 1,064,367 | 1,088,094 |

Source: Results generated by IHS Global Insight from the IMPLAN model

***The Economic Contribution of the Onshore Independent
Oil and Natural Gas Producers to the U.S. Economy***

| Mid/Downstream Indirect Total Value Added (billions of dollars) | | | |
|--|------------------|------------------|------------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$79 | \$104 | \$120 |
| Construction | \$1,033 | \$1,352 | \$1,518 |
| Education and Health Services | \$32 | \$38 | \$43 |
| Financial Activities | \$11,378 | \$14,758 | \$16,628 |
| Government | \$346 | \$455 | \$515 |
| Information | \$2,208 | \$2,871 | \$3,272 |
| Leisure and Hospitality | \$834 | \$1,086 | \$1,236 |
| Manufacturing | \$6,672 | \$8,801 | \$10,080 |
| Natural Resources | \$54,887 | \$71,875 | \$79,806 |
| Professional and Business Services | \$13,897 | \$18,174 | \$20,738 |
| Trade, Transportation & Utilities | \$13,299 | \$17,089 | \$19,277 |
| Other Services | \$1,193 | \$1,571 | \$1,810 |
| Total | \$105,858 | \$138,175 | \$155,042 |

Source: Results generated by IHS Global Insight from the IMPLAN model

| Mid/Downstream Induced Total Value Added (billions of dollars) | | | |
|---|-----------------|-----------------|------------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$826 | \$1,049 | \$1,184 |
| Construction | \$409 | \$520 | \$587 |
| Education and Health Services | \$10,146 | \$12,882 | \$14,541 |
| Financial Activities | \$23,459 | \$29,787 | \$33,623 |
| Government | \$678 | \$861 | \$972 |
| Information | \$3,442 | \$4,370 | \$4,933 |
| Leisure and Hospitality | \$4,413 | \$5,603 | \$6,325 |
| Manufacturing | \$6,269 | \$7,959 | \$8,984 |
| Natural Resources | \$1,177 | \$1,495 | \$1,687 |
| Professional and Business Services | \$7,671 | \$9,739 | \$10,994 |
| Trade, Transportation & Utilities | \$16,287 | \$20,680 | \$23,344 |
| Other Services | \$2,652 | \$3,367 | \$3,801 |
| Total | \$77,429 | \$98,311 | \$110,975 |

Source: Results generated by IHS Global Insight from the IMPLAN model

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

| Mid/Downstream Indirect Labor Income (billions of dollars) | | | |
|---|-----------------|-----------------|-----------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$28 | \$37 | \$43 |
| Construction | \$981 | \$1,283 | \$1,441 |
| Education and Health Services | \$28 | \$35 | \$39 |
| Financial Activities | \$3,342 | \$4,323 | \$4,903 |
| Government | \$295 | \$387 | \$438 |
| Information | \$1,169 | \$1,517 | \$1,728 |
| Leisure and Hospitality | \$552 | \$719 | \$818 |
| Manufacturing | \$4,213 | \$5,557 | \$6,372 |
| Natural Resources | \$19,887 | \$26,044 | \$28,923 |
| Professional and Business Services | \$11,060 | \$14,480 | \$16,527 |
| Trade, Transportation & Utilities | \$7,859 | \$10,046 | \$11,330 |
| Other Services | \$832 | \$1,093 | \$1,255 |
| Total | \$50,247 | \$65,522 | \$73,817 |

Source: Results generated by IHS Global Insight from the IMPLAN model

| Mid/Downstream Induced Labor Income (billions of dollars) | | | |
|--|-----------------|-----------------|-----------------|
| | 2010 | 2015 | 2020 |
| Agriculture | \$281 | \$357 | \$403 |
| Construction | \$308 | \$392 | \$442 |
| Education and Health Services | \$8,758 | \$11,120 | \$12,553 |
| Financial Activities | \$7,081 | \$8,991 | \$10,149 |
| Government | \$605 | \$769 | \$868 |
| Information | \$1,845 | \$2,343 | \$2,645 |
| Leisure and Hospitality | \$2,865 | \$3,638 | \$4,106 |
| Manufacturing | \$3,716 | \$4,718 | \$5,326 |
| Natural Resources | \$528 | \$670 | \$756 |
| Professional and Business Services | \$6,003 | \$7,622 | \$8,604 |
| Trade, Transportation & Utilities | \$9,518 | \$12,086 | \$13,642 |
| Other Services | \$2,054 | \$2,608 | \$2,944 |
| Total | \$43,565 | \$55,314 | \$62,439 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Conclusions

The intent of this study has been to quantify the economic contributions resulting from onshore independent oil and natural gas producers' activity in the United States. Our analysis indicates that the onshore independents represent a significant and growing portion of the economic value of the upstream oil and gas onshore industry, and a large portion of the mid/downstream activities the oil and gas industry. Furthermore, in a forward-looking framework, taking into account the baseline forecasts during the 2010–20 period, the onshore independent producers of the industry are projected to remain significant participants in the overall industry.

In this study, we analyzed the economic contribution of onshore independents' participation in the upstream sectors and the resulting mid/downstream economic impact. Our analysis for the 2010–20 forecast periods indicates that onshore participation of the independents exhibit a significant impact on the U.S. economy and would mean:

- The following jobs in the United States -- direct, indirect, and induced:
 - 2010 – Upstream: 2,077,729; Mid/downstream: 1,902,374
 - 2015 – Upstream: 2,365,826; Mid/downstream: 2,200,894
 - 2020 – Upstream: 2,634,943; Mid/downstream: 2,303,931

- The following value added contribution to the U.S. Gross Domestic Product – direct, indirect, and induced:
 - 2010 – Upstream: \$321 billion; Mid/downstream: \$258 billion
 - 2015 – Upstream: \$391 billion; Mid/downstream: \$327 billion
 - 2020 – Upstream: \$467 billion; Mid/downstream: \$367 billion

- The following taxes and royalties to the federal, state and local governments:
 - 2010 – Federal: Upstream: \$37.7 billion; Mid/downstream: \$31.4 billion
 - 2010 – State/Local: Upstream: \$31.4 billion; Mid/downstream: \$32.0 billion

 - 2015 – Federal: Upstream: \$46.3 billion; Mid/downstream: \$39.7 billion
 - 2015 – State/Local: Upstream: \$38.4 billion; Mid/downstream: \$40.1 billion

 - 2020 – Federal: Upstream: \$55.8 billion; Mid/downstream: \$44.8 billion
 - 2020 – State/Local: Upstream: \$46.1 billion; Mid/downstream: \$45.0 billion

Appendices

Appendix A: Tracing the Impact of Onshore Independent Oil & Natural Gas Producers through the U.S. Economy

The economic importance and impact of an industry can be traced through all regional industrial sectors as well as through the aggregate regional economy and the macroeconomy. In this appendix, we define key terms and the conceptual framework that underlie the analysis of the impact of onshore independent oil and natural gas industry on the U.S. economy. Documentation of the models used is provided in Appendix C.

The primary objective of this type of study is to present a complete accounting of how various activities of a given industry—in this case, onshore independent oil and natural gas producers—flow through the U.S. economy. Any dollar of industrial revenue results in both direct and indirect repercussions on final demand; furthermore, any dollar of trade expenditure also results in indirect repercussions on final demand.

- For example, a theoretical reduction of oil and natural gas production, keeping everything else constant, would lead to less revenue and output in many supplier industries. This decline would then result in lower U.S. demand for mining equipment and support services, which in turn require less fabricated metal products such as steel and inputs to the iron and steel industry. These repercussions are only a few in the chain resulting from the isolated initial change in an industry.

Since oil and natural gas are major sources of energy for many of the primary goods industries, virtually all services, mining, and manufacturing sectors would be indirectly affected by a change in the oil and natural gas industry. The impact on each industry would have repercussions on all other producing industries, magnifying the indirect effects due to this chain process.

- The change in primary goods industries would impact U.S. production and affect trade.
- Limiting imports could increase U.S. production; however, due to the short-term adjustment period, purchasers of import products would experience a shortage of inputs and a reduction in their output.
- Purchasers of import products can be final users such as consumers and investors, or intermediate good users of primary products. In both cases, purchasers will experience a change in usage.

The net effects of these changes on the U.S. economy and its industrial sectors, due to these direct effects, are divided into two stages: the indirect impact and the expenditure-induced impact.

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

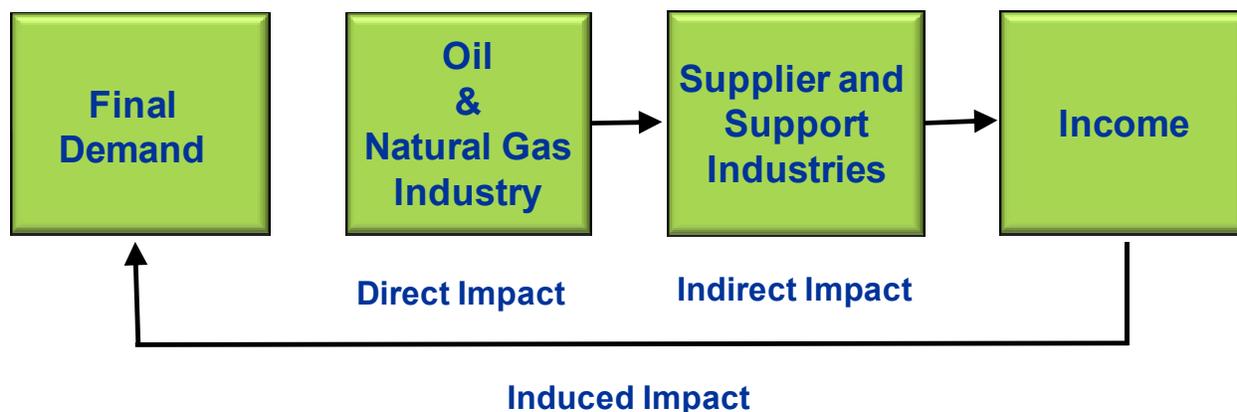
The direct impact, as explained in previous chapters, is the effect of an industrial sector on the core industry's output, employment, and income. A detailed industry model (IHS Global Insight utilized the IMPLAN model) can evaluate that change in the context of a linked comprehensive industrial structure of a given economy.

- For instance, the total value of production of onshore oil and natural gas in the upstream sector is the direct impact and was calculated for 2010, 2015, and 2020, as described in the body of the paper. The mechanism through which these direct output values are analyzed in the context of input-output modeling is through an inputted or estimated change.

The change in purchasing activities of an industry and immediate impact on the services, mining, and manufacturing sectors leads to indirect effects on output, employment, and income that are attributable to those sectors, their suppliers, and suppliers' inter-industry linkages. Supplier activities will include the majority of industries in the U.S. economy.

Finally, because workers and their families in both the direct and indirect industries spend their income on food, housing, autos, household appliances, furniture, clothing, and other consumer items, additional output, employment, and income effects are part of the expenditure-induced impact. The following chart depicts this flow.

The Flow of Onshore Independent Oil and Natural Gas Sector through the U.S. Economy



The direct and indirect impacts represent all of the production, marketing, and sales activities that are required to bring the primary products to the marketplace in a consumable form. The use of input/output analysis allows one to analyze and quantify indirect and induced impacts. The sum of all effects relative to the total size of the economy provides initial benchmark estimates to evaluate the importance of a given industry.

METHODOLOGY FOR THIS STUDY

IHS Global Insight used the IMPLAN regional models to quantify the contribution of onshore independent oil and natural gas producers on the U.S. economy. The IMPLAN model closely follows the accounting conventions used in the Bureau of Economic Analysis (BEA) study,

Input-Output Study of the U.S. Economy, and is flexible enough to evaluate the change through the value of output or employment from the source industry.

Appendix B: Data and Data Sources

Independent Onshore Oil & Natural Gas Producer Industry Definition

The Onshore Independent Oil and Natural Gas Producer industry consists of all North American operators in the lower-48 states and Alaska, excluding: BG, BP, Chevron, ConocoPhillips, ENI, ExxonMobil, Hess, Marathon, Murphy, Occidental, Petrobras, Repsol, Shell, Statoil, and Total.

Data Sources and Data Construction Process

IPAA recognizes a variety of upstream, midstream, and downstream sectors within the Onshore Independent Oil and Natural Gas Producer industry. In this study we attempt to define the existing contribution of the onshore independent oil and gas industry and project that contribution through 2020.

Data Sources

A variety of data sources were used to assemble the historical data from 2006 through 2010 and to derive the share of onshore independents in the total U.S. oil and natural gas industry.

- American Petroleum Institute
- Bureau of Economic Analysis
- Bureau of Labor Statistics
- Census Bureau
- CERA Cost Service
- EIA – Energy Information Administration
- IPAA
- IHS Global Insight Business Market Insight Database
- IHS Energy North American Wells and Production Database
- IMPLAN Model
- Joint Association Survey on Drilling Costs, API
- Que\$tor – IHS drilling database
- IHS Herold Capital Expenditure data

Data Construction Process

The first step in the data construction process was to identify the target sectors, using IPAA's own evaluation of industry employment together with IHS Global Insight's expertise. Fifteen target sectors were identified in the three subcategories of industry employment. The output and employment data were taken from the Bureau of Labor Statistics (BLS) databases using the NAICS (National Industrial Classification System) industry codes.

Upstream Sectors

211111 - Crude Petroleum and Natural Gas Extraction: Establishments that explore, develop, and/or produce natural gas or petroleum, including oils from shales or tar sands.

211112 - Natural Gas Liquid Extraction: Establishments that recover liquid hydrocarbons and sulfur from natural gas.

213111 – Drilling Oil and Gas Wells: Establishments that drill oil and gas wells for others on a contract or fee basis.

213112 – Support Activities for Oil and Gas Operations: Establishments that perform support activities for oil and natural gas operations on a contract or fee basis. Site preparation and geophysical work are excluded.

238912 – Nonresidential Site Preparation Contractors: Establishments that provide site preparation services for all nonresidential purposes.

541360 – Geophysical Surveying and Mapping Services: Establishments engaged in gathering, interpreting, and mapping geophysical data for energy, minerals, or other purposes.

Midstream and Downstream Sectors

221210 – Natural Gas Distribution: Establishments that distribute natural gas delivered to them by companies in industry 486210. Natural gas marketers and brokers are also included.

237120 – Oil and Gas Pipeline Construction: Establishments that build or repair oil and natural gas mainlines and associated structures such as storage tanks and refineries.

324110 – Petroleum Refineries: Establishments primarily engaged in refining crude petroleum into refined petroleum. Petroleum refining involves one or more of the following activities: (1) fractionation; (2) straight distillation of crude oil; and (3) cracking.

324191 – Petroleum Lubricating Oil and Grease Manufacturing: Establishments primarily engaged in blending or compounding refined petroleum to make lubricating oils and greases and/or re-refining used petroleum lubricating oils.

4247 - Petroleum and Petroleum Products Merchant Wholesalers: This industry comprises establishments with bulk liquid storage facilities primarily engaged in the merchant wholesale distribution of crude petroleum and petroleum products, including liquefied petroleum gas.

4471 – Gasoline Stations: Establishments engaged in retailing automotive fuels (e.g., diesel fuel, gasohol, gasoline) only or in combination with convenience store or food mart items. These establishments can either be in a convenience store (i.e., food mart) setting or a gasoline station setting. These establishments may also provide automotive repair services.

486 – Pipeline Transportation

486110 – Pipeline Transportation of Crude Oil: Establishments primarily engaged in the pipeline transportation of crude oil.

486210 – Pipeline Transportation of Natural Gas: Establishments that transport natural gas from processing plants to local distribution systems. Natural gas storage is included in this category.

486910 – Pipeline Transportation of Refined Petroleum Products: Establishments primarily engaged in the pipeline transportation of refined petroleum products.

The second step in the data construction process was to map the NAICS codes to the IMPLAN model sectors, as shown in Table 1.

Table 1

| NAICS Code | Implan Sector | Implan Sector Description |
|------------|---------------|--|
| 211111 | 20 | Oil and gas extraction |
| 211112 | 20 | Oil and gas extraction |
| 213111 | 28 | Drilling oil and gas wells |
| 213112 | 29 | Support activities for oil and gas operations |
| 238910 | 39 | Maintenance and repair construction of nonresidential structures |
| 541360 | 369 | Architectural, engineering, and related services |
| 221210 | 32 | Natural gas distribution |
| 237120 | 36 | Construction of other new nonresidential structures |
| 486110 | 337 | Pipeline transportation |
| 324110 | 115 | Petroleum refineries |
| 324191 | 118 | Petroleum lubricating oil and grease manufacturing |
| 424710 | 319 | Wholesale trade |
| 447110 | 326 | Retail - Gasoline stations |

Sector Definitions

Six of the designated employment sectors are identified with the upstream portion of the industry. The remaining nine sectors are identified with the midstream and downstream portion of the industry, which were aggregated for ease of analysis. The independent onshore oil and gas companies operate in the upstream sector. The nine midstream and downstream industries are responsible for processing crude oil, natural gas, and natural gas liquids produced by both the onshore independents and other companies operating in the upstream industry. The process of deriving the employment and the value of output for these midstream and downstream industries is very similar, as will be discussed in the individual sectors. The historical and forecast values of output for the 15 sectors are shown in Table 2.

Table 2: Value of Output (dollars)

| | CAGR | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------|-------------|
| | 2010 | 2015 | 2020 | 2010-15 | 2015-20 |
| Upstream | | | | | |
| Crude petroleum and natural gas extraction | \$134,771,120,677 | \$148,648,872,800 | \$162,635,249,603 | 2.0% | 1.8% |
| Natural gas liquid extraction | \$32,866,532,022 | \$44,818,985,397 | \$64,343,449,805 | 6.4% | 7.5% |
| Drilling of oil and natural gas wells | \$52,154,270,664 | \$56,684,134,703 | \$58,735,708,329 | 1.7% | 0.7% |
| Support activities for oil and gas operations | \$31,354,331,576 | \$34,059,498,583 | \$37,034,473,907 | 1.7% | 1.7% |
| Oil and gas site preparation contractors | \$9,594,877,398 | \$18,301,766,425 | \$24,827,332,205 | 13.8% | 6.3% |
| Geophysical surveying and mapping services | \$1,950,327,304 | \$2,741,222,148 | \$3,468,087,291 | 7.0% | 4.8% |
| Total, Upstream | \$262,691,459,641 | \$305,254,480,056 | \$351,044,301,140 | 3.0% | 2.8% |
| Mid/Downstream | | | | | |
| Natural gas distribution | \$86,348,619,159 | \$100,931,470,794 | \$114,194,989,037 | 3.2% | 2.5% |
| Oil and gas pipeline construction | \$19,451,848,444 | \$28,317,485,150 | \$36,313,512,717 | 7.8% | 5.1% |
| Pipeline transportation (oil, gas and refined products) | \$14,572,724,932 | \$19,409,777,991 | \$23,957,533,831 | 5.9% | 4.3% |
| Petroleum refineries | \$133,274,680,507 | \$169,882,936,696 | \$176,907,141,121 | 5.0% | 0.8% |
| Petroleum lubricating oil and greases | \$2,615,326,644 | \$2,951,127,513 | \$3,405,562,840 | 2.4% | 2.9% |
| Petroleum merchant wholesalers | \$168,505,767,409 | \$190,987,464,027 | \$213,014,866,391 | 2.5% | 2.2% |
| Gasoline stations | \$93,256,452,625 | \$105,272,232,451 | \$117,465,811,835 | 2.5% | 2.2% |
| Total, Mid/Downstream | \$518,025,419,720 | \$617,752,494,622 | \$685,259,417,772 | 3.6% | 2.1% |

UPSTREAM SECTORS

The combined output value of these six sectors rises to \$305 billion in 2015 and \$351 billion in 2020 compared with \$263 billion in 2010, as shown in Table 2. The share of output is expected to gradually decline from one-third of the combined 15 industries in 2010 to 30% in 2020.

Crude Petroleum and Natural Gas Extraction (211111)

The value of output in this industry sector was allocated to onshore independents using the relative share of the value of liquids and natural gas production. The first step was to allocate production to onshore and offshore areas by independent producers and others. Then production of liquids was multiplied by the price of benchmark West Texas Intermediate crude, and gross withdrawals of natural gas were multiplied by the average wellhead price of natural gas to obtain total value of production.

Onshore independents produce relatively more natural gas than oil. But natural gas prices are lower per barrel of oil equivalent than oil prices are, so the independent onshore share of the value of production is slightly lower than the production share. The price data are shown in Table 3; the production data are shown in Tables 4-11; and the value of production data is shown in Tables 12-18. The value of output share for onshore independents used in this category is given in Table 18.

Natural Gas Liquid Extraction (211112)

The value of output in this industry sector was allocated to onshore independents using the relative share of the value of gross withdrawals of natural gas, as shown in Table 17.

Table 3

| Crude Oil and Natural Gas Prices (current dollars) | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| West Texas Intermediate (\$/bbl) | \$66.05 | \$72.34 | \$99.67 | \$61.95 | \$79.48 |
| Wellhead Natural Gas Price (\$/mcf) | \$6.39 | \$6.25 | \$7.97 | \$3.67 | \$4.18 |

Sources: Energy Information Administration, IHS

Table 4

| U.S. Oil and Gas Production: Crude Oil (million barrels) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 1,175 | 1,170 | 1,186 | 1,171 | 996 |
| Independents | 709 | 710 | 742 | 740 | 644 |
| Other | 466 | 459 | 444 | 431 | 353 |
| Offshore | 494 | 485 | 449 | 587 | 486 |
| Independents | 157 | 173 | 146 | 171 | 152 |
| Other | 336 | 312 | 303 | 417 | 334 |
| Total | 1,669 | 1,654 | 1,635 | 1,758 | 1,482 |
| Independents | 866 | 883 | 888 | 910 | 796 |
| Other | 803 | 771 | 747 | 848 | 687 |
| Independents' Onshore Share of Total | 42.5% | 42.9% | 45.4% | 42.1% | 43.4% |

Source: IHS

Table 5

| U.S. Oil and Gas Production: Condensates (million barrels) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 118 | 127 | 138 | 133 | 106 |
| Independents | 104 | 113 | 125 | 120 | 96 |
| Other | 14 | 14 | 14 | 13 | 9 |
| Offshore | 67 | 67 | 53 | 53 | 46 |
| Independents | 39 | 40 | 35 | 32 | 26 |
| Other | 28 | 27 | 18 | 21 | 20 |
| Total | 185 | 194 | 192 | 186 | 151 |
| Independents | 143 | 153 | 160 | 152 | 122 |
| Other | 41 | 40 | 32 | 34 | 29 |
| Independents' Onshore Share of Total | 56.2% | 58.3% | 65.0% | 64.6% | 63.5% |

Source: IHS

Table 6

| U.S. Oil and Gas Production: Total Liquids (million barrels) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 1,293 | 1,296 | 1,324 | 1,304 | 1,102 |
| Independents | 813 | 823 | 866 | 860 | 740 |
| Other | 480 | 473 | 458 | 444 | 362 |
| Offshore | 561 | 551 | 502 | 640 | 532 |
| Independents | 197 | 213 | 181 | 203 | 178 |
| Other | 364 | 339 | 321 | 438 | 354 |
| Total | 1,853 | 1,848 | 1,826 | 1,945 | 1,634 |
| Independents | 1,010 | 1,036 | 1,047 | 1,063 | 917 |
| Other | 844 | 812 | 779 | 882 | 716 |
| Independents' Onshore Share of Total | 43.8% | 44.6% | 47.4% | 44.2% | 45.3% |

Source: IHS

Table 7

| U.S. Oil and Gas Production: Marketed Natural Gas (Bcf) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 15,407 | 16,275 | 17,918 | 18,077 | 14,083 |
| Independents | 12,549 | 13,515 | 15,231 | 15,508 | 12,155 |
| Other | 2,858 | 2,760 | 2,687 | 2,569 | 1,928 |
| Offshore | 2,715 | 2,603 | 2,224 | 2,198 | 1,626 |
| Independents | 1,800 | 1,803 | 1,580 | 1,540 | 1,129 |
| Other | 915 | 800 | 644 | 658 | 497 |
| Total | 18,122 | 18,878 | 20,142 | 20,275 | 15,709 |
| Independents | 14,349 | 15,318 | 16,810 | 17,047 | 13,284 |
| Other | 3,773 | 3,559 | 3,331 | 3,227 | 2,426 |
| Independents' Onshore Share of Total | 69.2% | 71.6% | 75.6% | 76.5% | 77.4% |

Source: IHS

Table 8

| U.S. Oil and Gas Production: Casinghead Gas (Bcf) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 4,480 | 4,759 | 4,735 | 4,648 | 3,959 |
| Independents | 1,313 | 1,339 | 1,412 | 1,417 | 1,193 |
| Other | 3,168 | 3,420 | 3,324 | 3,230 | 2,766 |
| Offshore | 906 | 910 | 845 | 917 | 787 |
| Independents | 182 | 213 | 176 | 190 | 173 |
| Other | 724 | 697 | 669 | 727 | 614 |
| Total | 5,386 | 5,669 | 5,580 | 5,565 | 4,746 |
| Independents | 1,495 | 1,553 | 1,587 | 1,608 | 1,365 |
| Other | 3,891 | 4,116 | 3,993 | 3,957 | 3,381 |
| Independents' Onshore Share of Total | 24.4% | 23.6% | 25.3% | 25.5% | 25.1% |

Source: IHS

Table 9

| U.S. Oil and Gas Production: Natural Gas Gross Withdrawals (Bcf) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 19,887 | 21,034 | 22,653 | 22,725 | 18,042 |
| Independents | 13,861 | 14,855 | 16,642 | 16,925 | 13,347 |
| Other | 6,026 | 6,179 | 6,011 | 5,800 | 4,695 |
| Offshore | 3,621 | 3,512 | 3,068 | 3,115 | 2,413 |
| Independents | 1,983 | 2,016 | 1,755 | 1,730 | 1,301 |
| Other | 1,638 | 1,496 | 1,313 | 1,385 | 1,112 |
| Total | 23,508 | 24,546 | 25,721 | 25,840 | 20,455 |
| Independents | 15,844 | 16,871 | 18,398 | 18,655 | 14,649 |
| Other | 7,664 | 7,675 | 7,324 | 7,185 | 5,806 |
| Independents' Onshore Share of Total | 59.0% | 60.5% | 64.7% | 65.5% | 65.3% |

Source: IHS

Table 10

| U.S. Oil and Gas Production: Natural Gas Gross Withdrawals (million Boe) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 3,315 | 3,506 | 3,776 | 3,787 | 3,007 |
| Independents | 2,310 | 2,476 | 2,774 | 2,821 | 2,225 |
| Other | 1,004 | 1,030 | 1,002 | 967 | 782 |
| Offshore | 603 | 585 | 511 | 519 | 402 |
| Independents | 330 | 336 | 293 | 288 | 217 |
| Other | 273 | 249 | 219 | 231 | 185 |
| Total | 3,918 | 4,091 | 4,287 | 4,307 | 3,409 |
| Independents | 2,641 | 2,812 | 3,066 | 3,109 | 2,441 |
| Other | 1,277 | 1,279 | 1,221 | 1,197 | 968 |
| Independents' Onshore Share of Total | 59.0% | 60.5% | 64.7% | 65.5% | 65.3% |

Source: IHS

Table 11

| U.S. Oil and Gas Production: Total Production (million Boe) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| Onshore | 4,607 | 4,802 | 5,100 | 5,092 | 4,109 |
| Independents | 3,123 | 3,299 | 3,640 | 3,681 | 2,964 |
| Other | 1,484 | 1,503 | 1,460 | 1,411 | 1,145 |
| Offshore | 1,164 | 1,137 | 1,013 | 1,160 | 934 |
| Independents | 527 | 549 | 474 | 491 | 395 |
| Other | 637 | 588 | 540 | 669 | 539 |
| Total | 5,771 | 5,939 | 6,113 | 6,251 | 5,043 |
| Independents | 3,650 | 3,848 | 4,113 | 4,172 | 3,359 |
| Other | 2,121 | 2,091 | 2,000 | 2,080 | 1,684 |
| Independents' Onshore Share of Total | 54.1% | 55.6% | 59.5% | 58.9% | 58.8% |

Source: IHS

Table 12

| Value of U.S. Production: Crude Oil (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$77,625 | \$84,602 | \$118,204 | \$72,547 | \$79,186 |
| Independents | \$46,813 | \$51,387 | \$73,909 | \$45,822 | \$51,147 |
| Other | \$30,811 | \$33,215 | \$44,295 | \$26,725 | \$28,039 |
| Offshore | \$32,602 | \$35,053 | \$44,709 | \$36,384 | \$38,641 |
| Independents | \$10,401 | \$12,480 | \$14,550 | \$10,572 | \$12,082 |
| Other | \$22,200 | \$22,573 | \$30,159 | \$25,811 | \$26,559 |
| Total | \$110,226 | \$119,655 | \$162,913 | \$108,930 | \$117,827 |
| Independents | \$57,215 | \$63,867 | \$88,459 | \$56,394 | \$63,230 |
| Other | \$53,012 | \$55,788 | \$74,454 | \$52,536 | \$54,597 |
| Independents' Onshore Share of Total | 42.5% | 42.9% | 45.4% | 42.1% | 43.4% |

Sources: Energy Information Administration, IHS

Table 13

| Value of U.S. Production: Condensates (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$7,764 | \$9,179 | \$13,798 | \$8,250 | \$8,393 |
| Independents | \$6,861 | \$8,173 | \$12,418 | \$7,453 | \$7,639 |
| Other | \$903 | \$1,005 | \$1,380 | \$797 | \$754 |
| Offshore | \$4,433 | \$4,842 | \$5,318 | \$3,290 | \$3,630 |
| Independents | \$2,604 | \$2,923 | \$3,495 | \$1,976 | \$2,051 |
| Other | \$1,829 | \$1,919 | \$1,823 | \$1,313 | \$1,579 |
| Total | \$12,197 | \$14,020 | \$19,116 | \$11,540 | \$12,023 |
| Independents | \$9,464 | \$11,096 | \$15,913 | \$9,429 | \$9,690 |
| Other | \$2,732 | \$2,924 | \$3,203 | \$2,111 | \$2,333 |
| Independents' Onshore Share of Total | 56.2% | 58.3% | 65.0% | 64.6% | 63.5% |

Sources: Energy Information Administration, IHS

Table 14

| Value of U.S. Production: Total Liquids (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$85,388 | \$93,780 | \$132,002 | \$80,797 | \$87,579 |
| Independents | \$53,674 | \$59,560 | \$86,327 | \$53,275 | \$58,787 |
| Other | \$31,714 | \$34,221 | \$45,675 | \$27,522 | \$28,793 |
| Offshore | \$37,035 | \$39,895 | \$50,027 | \$39,673 | \$42,271 |
| Independents | \$13,005 | \$15,403 | \$18,045 | \$12,549 | \$14,133 |
| Other | \$24,030 | \$24,492 | \$31,982 | \$27,125 | \$28,137 |
| Total | \$122,423 | \$133,675 | \$182,029 | \$120,471 | \$129,850 |
| Independents | \$66,679 | \$74,963 | \$104,372 | \$65,823 | \$72,920 |
| Other | \$55,744 | \$58,712 | \$77,657 | \$54,647 | \$56,930 |
| Independents' Onshore Share of Total | 43.8% | 44.6% | 47.4% | 44.2% | 45.3% |

Sources: Energy Information Administration, IHS

Table 15

| Value of U.S. Production: Marketed Natural Gas (million dollars) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$98,450 | \$101,718 | \$142,806 | \$66,343 | \$58,867 |
| Independents | \$80,188 | \$84,470 | \$121,388 | \$56,913 | \$50,807 |
| Other | \$18,262 | \$17,248 | \$21,419 | \$9,429 | \$8,060 |
| Offshore | \$17,348 | \$16,267 | \$17,722 | \$8,065 | \$6,798 |
| Independents | \$11,503 | \$11,270 | \$12,591 | \$5,651 | \$4,718 |
| Other | \$5,844 | \$4,997 | \$5,131 | \$2,414 | \$2,079 |
| Total | \$115,798 | \$117,984 | \$160,528 | \$74,408 | \$65,665 |
| Independents | \$91,691 | \$95,739 | \$133,978 | \$62,564 | \$55,525 |
| Other | \$24,107 | \$22,245 | \$26,550 | \$11,844 | \$10,140 |
| Independents' Onshore Share of Total | 69.2% | 71.6% | 75.6% | 76.5% | 77.4% |

Sources: Energy Information Administration, IHS

Table 16

| Value of U.S. Production: Casinghead Gas (million dollars) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$28,630 | \$29,744 | \$37,740 | \$17,057 | \$16,550 |
| Independents | \$8,387 | \$8,371 | \$11,252 | \$5,202 | \$4,986 |
| Other | \$20,242 | \$21,373 | \$26,489 | \$11,855 | \$11,564 |
| Offshore | \$5,789 | \$5,686 | \$6,732 | \$3,367 | \$3,289 |
| Independents | \$1,166 | \$1,333 | \$1,400 | \$698 | \$722 |
| Other | \$4,623 | \$4,353 | \$5,332 | \$2,669 | \$2,567 |
| Total | \$34,419 | \$35,430 | \$44,472 | \$20,424 | \$19,838 |
| Independents | \$9,553 | \$9,704 | \$12,651 | \$5,900 | \$5,707 |
| Other | \$24,866 | \$25,726 | \$31,821 | \$14,524 | \$14,131 |
| Independents' Onshore Share of Total | 24.4% | 23.6% | 25.3% | 25.5% | 25.1% |

Sources: Energy Information Administration, IHS

Table 17

| Value of U.S. Production: Natural Gas Gross Withdrawals (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$127,080 | \$131,462 | \$180,546 | \$83,400 | \$75,417 |
| Independents | \$88,575 | \$92,841 | \$132,639 | \$62,115 | \$55,792 |
| Other | \$38,505 | \$38,621 | \$47,907 | \$21,285 | \$19,624 |
| Offshore | \$23,137 | \$21,953 | \$24,454 | \$11,432 | \$10,086 |
| Independents | \$12,669 | \$12,603 | \$13,990 | \$6,349 | \$5,440 |
| Other | \$10,468 | \$9,350 | \$10,463 | \$5,083 | \$4,646 |
| Total | \$150,216 | \$153,415 | \$205,000 | \$94,832 | \$85,503 |
| Independents | \$101,244 | \$105,444 | \$146,630 | \$68,465 | \$61,233 |
| Other | \$48,972 | \$47,971 | \$58,371 | \$26,368 | \$24,271 |
| Independents' Onshore Share of Total | 59.0% | 60.5% | 64.7% | 65.5% | 65.3% |

Sources: Energy Information Administration, IHS

Table 18

| Value of U.S. Production: Total Production (million dollars) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$212,468 | \$225,242 | \$312,548 | \$164,197 | \$162,996 |
| Independents | \$142,249 | \$152,401 | \$218,966 | \$115,390 | \$114,579 |
| Other | \$70,219 | \$72,841 | \$93,582 | \$48,807 | \$48,417 |
| Offshore | \$60,171 | \$61,848 | \$74,481 | \$51,106 | \$52,357 |
| Independents | \$25,674 | \$28,006 | \$32,036 | \$18,898 | \$19,573 |
| Other | \$34,498 | \$33,842 | \$42,445 | \$32,208 | \$32,784 |
| Total | \$272,639 | \$287,090 | \$387,029 | \$215,303 | \$215,353 |
| Independents | \$167,923 | \$180,406 | \$251,002 | \$134,288 | \$134,152 |
| Other | \$104,717 | \$106,683 | \$136,028 | \$81,015 | \$81,201 |
| Independents' Onshore Share of Total | 52.2% | 53.1% | 56.6% | 53.6% | 53.2% |

Sources: Energy Information Administration, IHS

Drilling Oil and Gas Wells (213111)

The value of output in this industry sector was allocated to onshore independents using the relative share of the cost of drilling oil and gas wells. Drilling costs in each category were calculated using the number of wells drilled times the average footage per well times the average cost per foot drilled. In the wells and footage categories, onshore independents capture approximately a 90-95% share, as shown in Tables 19-21. But offshore wells are deeper and more expensive per foot than onshore wells, as shown in Table 22. Thus, the onshore independents' share of drilling costs range between 70-80% over the 2006-2010 period, as shown in Table 23.

Table 19

| U.S. Oil and Gas Wells: Number of wells drilled | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 51,013 | 51,501 | 54,526 | 32,054 | 27,092 |
| Independents | 48,234 | 48,813 | 51,582 | 30,160 | 25,809 |
| Other | 2,779 | 2,688 | 2,944 | 1,894 | 1,283 |
| Offshore | 774 | 668 | 570 | 408 | 317 |
| Independents | 624 | 551 | 465 | 291 | 221 |
| Other | 150 | 117 | 105 | 117 | 96 |
| Total | 51,787 | 52,169 | 55,096 | 32,462 | 27,409** |
| Independents | 48,858 | 49,364 | 52,047 | 30,451 | 26,030 |
| Other | 2,929 | 2,805 | 3,049 | 2,011 | 1,379 |
| Independents' Onshore Share of Total | 93.1% | 93.6% | 93.6% | 92.9% | 94.2% |

** This is the number of 2010 wells reported by IHS through the end of January 2011. Due to lags in data availability, we anticipate final year-end 2010 numbers will tally in the range of 38,000 to 41,000 wells.

Source: IHS

Table 20

| U.S. Oil and Gas Wells: Average footage per well drilled | | | | | |
|---|--------|--------|--------|--------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 5,385 | 5,762 | 6,022 | 6,432 | 7,295 |
| Independents | 5,350 | 5,721 | 6,004 | 6,394 | 7,297 |
| Other | 5,992 | 6,507 | 6,337 | 7,037 | 7,255 |
| Offshore | 10,640 | 10,432 | 10,775 | 9,507 | 7,888 |
| Independents | 10,307 | 9,639 | 10,485 | 9,068 | 7,771 |
| Other | 12,025 | 14,167 | 12,059 | 10,599 | 8,157 |
| Total | 5,464 | 5,822 | 6,071 | 6,471 | 7,302 |
| Independents | 5,413 | 5,765 | 6,044 | 6,420 | 7,301 |
| Other | 6,301 | 6,826 | 6,534 | 7,244 | 7,318 |

Source: IHS

Table 21

| U.S. Oil and Gas Wells: Total footage drilled | | | | | |
|--|--------------|--------------|--------------|--------------|---------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | 274,705,005 | 296,748,762 | 328,355,572 | 206,171,328 | 197,636,140 |
| Independents | 258,051,900 | 279,259,173 | 309,698,328 | 192,843,040 | 188,328,273 |
| Other | 16,653,105 | 17,489,589 | 18,657,244 | 13,328,288 | 9,307,867 |
| Offshore | 8,235,360 | 6,968,576 | 6,141,750 | 3,878,856 | 2,500,496 |
| Independents | 6,431,568 | 5,311,089 | 4,875,525 | 2,638,788 | 1,717,391 |
| Other | 1,803,792 | 1,657,487 | 1,266,225 | 1,240,068 | 783,105 |
| Total | 282,940,365 | 303,717,338 | 334,497,322 | 210,050,184 | 200,136,636** |
| Independents | 264,483,468 | 284,570,262 | 314,573,853 | 195,481,828 | 190,045,664 |
| Other | 18,456,897 | 19,147,076 | 19,923,469 | 14,568,356 | 10,090,972 |
| Independents' Onshore Share of Total | 91.2% | 91.9% | 92.6% | 91.8% | 94.1% |

** This is the 2010 total footage drilled reported by IHS through the end of January 2011. Due to lags in data availability, we anticipate the final year-end 2010 numbers will be approximately 45% higher.

Source: IHS

Table 22

| U.S. Oil and Gas Wells: Average cost per foot | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$256 | \$322 | \$406 | \$430 | \$473 |
| Independents | \$244 | \$307 | \$388 | \$404 | \$446 |
| Other | \$442 | \$562 | \$705 | \$806 | \$1,019 |
| Offshore | \$3,436 | \$4,096 | \$4,938 | \$4,884 | \$4,961 |
| Independents | \$3,449 | \$4,108 | \$4,956 | \$4,913 | \$4,883 |
| Other | \$3,390 | \$4,058 | \$4,869 | \$4,822 | \$5,132 |
| Total | \$349 | \$409 | \$489 | \$512 | \$529 |
| Independents | \$322 | \$378 | \$459 | \$465 | \$486 |
| Other | \$730 | \$864 | \$969 | \$1,148 | \$1,338 |

Source: IHS

Table 23

| U.S. Oil and Gas Wells: Cost of wells drilled (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Onshore | \$70,324 | \$95,553 | \$133,312 | \$88,654 | \$93,482 |
| Independents | \$62,965 | \$85,733 | \$120,163 | \$77,909 | \$83,994 |
| Other | \$7,360 | \$9,821 | \$13,149 | \$10,745 | \$9,487 |
| Offshore | \$28,297 | \$28,543 | \$30,328 | \$18,944 | \$12,405 |
| Independents | \$22,182 | \$21,818 | \$24,163 | \$12,964 | \$8,386 |
| Other | \$6,114 | \$6,725 | \$6,165 | \$5,980 | \$4,019 |
| Total | \$98,621 | \$124,096 | \$163,640 | \$107,598 | \$105,887 |
| Independents | \$85,147 | \$107,551 | \$144,326 | \$90,873 | \$92,380 |
| Other | \$13,474 | \$16,546 | \$19,314 | \$16,725 | \$13,506 |
| Independents' Onshore Share of Total | 63.8% | 69.1% | 73.4% | 72.4% | 79.3% |

Source: IHS

Support Activities for Oil and Gas Operations (213112)

Support activities for oil and gas operations encompass both drilling of new wells and servicing existing wells. The value of existing wells is difficult to calculate so the value of production from existing wells was used as a proxy for value of the wells. To allocate the value of support activities to onshore independents, a simple average of the shares of production value, as calculated for industry 211111, and cost of drilling, as calculated for industry 213111, was used, as shown in Table 24.

Table 24

| Value of U.S. Production & Cost of Drilling (million dollars) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Value of Production | | | | | |
| Total Industry | \$272,639 | \$287,090 | \$387,029 | \$215,303 | \$215,353 |
| Independents Onshore | \$142,249 | \$152,401 | \$218,966 | \$115,390 | \$114,579 |
| Independents' Onshore Share of Total | 52.2% | 53.1% | 56.6% | 53.6% | 53.2% |
| Cost of Drilling | | | | | |
| Total Industry | \$98,621 | \$124,096 | \$163,640 | \$107,598 | \$105,887 |
| Independents Onshore | \$62,965 | \$85,733 | \$120,163 | \$77,909 | \$83,994 |
| Independents' Onshore Share of Total | 63.8% | 69.1% | 73.4% | 72.4% | 79.3% |
| Simple Average Share | 58.0% | 61.1% | 65.0% | 63.0% | 66.3% |

Sources: Energy Information Administration, IHS

Nonresidential Site Preparation Contractors (238912)

Nonresidential site preparation contractors operate in many industries. Oil and gas drilling is only a small share of the value of output in this sector. Site preparation activities occur when new wells are drilled. We used an IHS survey of drilling costs by categories for a sample year to estimate spending on site preparation for an average well, split between labor and materials. About 5-6% of drilling costs is devoted to site preparation. Drilling expenditures by the onshore independent oil and gas industry in the target year times the site preparation percentage gave total spending on site preparation in that year. Then the site preparation expenditure was multiplied by the labor share and divided by the average wage for contract laborers in the drilling industry in that year, according to the BLS Occupational Wages database, giving an average number of employees per well drilled of 1.05. That average employment rate was multiplied by the number of oil and gas wells drilled to give total employment in each year. Value of output per employee times the total employment gave total value of output in this sector for the onshore independent oil and gas industry. These data are shown in Table 25.

Table 25

| Value of Site Preparation - Onshore Independent Oil & Natural Gas Producers (million dollars) | | | | | |
|--|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Site Preparation | | | | | |
| Cost of Drilling | \$62,965 | \$85,733 | \$120,163 | \$77,909 | \$83,994 |
| Site Preparation Spending | \$3,778 | \$5,144 | \$7,210 | \$4,784 | \$4,200 |
| Site Preparation Spending on Labor | \$2,267 | \$3,086 | \$4,326 | \$2,870 | \$2,520 |
| Wells Drilled | 48,234 | 48,813 | 51,582 | 30,160 | 25,809 |
| Employees | 50,926 | 51,560 | 54,606 | 31,402 | 26,950 |
| Value per Employee | \$357,573 | \$358,557 | \$389,396 | \$391,112 | \$355,949 |
| Value of Site Preparation | \$18,209,835,422 | \$18,487,123,201 | \$21,263,245,960 | \$12,281,755,485 | \$9,592,855,094 |

Sources: Energy Information Administration, IHS

Geophysical Surveying and Mapping Services (541360)

Geophysical surveying and mapping services are primarily conducted in the oil and gas industry, but seismic services also are used in the mining industry to look for minerals and used to search for water as well. According to the BLS employment data, approximately 20% of employees in this category work in states that have no oil and gas drilling. Using a similar approach as the one used for Nonresidential Site Preparation Contractors, IHS estimates that approximately 70% of geophysical employees work for the onshore independent oil and gas industry. About 3.3% of drilling expenditures go toward geophysical surveying and mapping services, leading to \$1-2 billion value of output attributable to this sector from the onshore independent oil and gas industry, as shown in Table 26.

Table 26

| Value of Geophysical Surveying - Onshore Independent Oil & Natural Gas Producers (million dollars) | | | | | |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Site Preparation | | | | | |
| Cost of Drilling | \$62,965 | \$85,733 | \$120,163 | \$77,909 | \$83,994 |
| Geophysical Spending | \$2,078 | \$2,829 | \$3,965 | \$2,571 | \$2,772 |
| Geophysical Spending on Labor | \$1,247 | \$1,698 | \$2,379 | \$1,543 | \$1,663 |
| Wells Drilled | 48,234 | 48,813 | 51,582 | 30,160 | 25,809 |
| Employees | 12,223 | 13,058 | 13,833 | 11,343 | 10,951 |
| Value per Employee | \$128,493 | \$164,487 | \$175,888 | \$183,672 | \$178,094 |
| Value of Geophysical Surveying | \$1,570,517,478 | \$2,147,830,523 | \$2,433,002,467 | \$2,083,317,574 | \$1,950,393,625 |

Sources: Energy Information Administration, IHS

MIDSTREAM AND DOWNSTREAM SECTORS

The seven sectors discussed below represent the midstream and downstream portions of the industry. The combined output value of the mid/downstream sectors is expected to rise to \$618 billion in 2015 and \$685 billion in 2020 compared with \$518 billion in 2010 (shown previously in Table 2.)

Natural Gas Distribution (221210)

To determine the onshore independents' share of the natural gas distribution value of output, the value of gross withdrawals of natural gas was used. These data were shown previously in Table 17 in the Upstream Sector discussion.

Oil and Gas Pipeline Construction (237120)

To derive the market size of independent onshore operators, the output value of total liquid plus natural gas production was used, as shown in Table 18, shown previously in the Upstream Sector discussion.

Pipeline Transportation (486)

There are three pipeline transportation industries in this category, although all three map to the same IMPLAN sector. We used three different types of output values to calculate the onshore independents' shares of activity in each of the three categories.

Pipeline Transportation of Crude Oil (486110)

The value of liquids production was used to derive the share of onshore independents in this category, as shown in Table 14.

Pipeline Transportation of Natural Gas (486210)

The value of gross withdrawals of natural gas was used to derive the share of onshore independents in this category, as shown in Table 17.

Pipeline Transportation of Refined Petroleum Products (486910)

In this category, all of the inputs to the refining process must be accounted for in calculating the value of output. The value of net imports of crude oil and refined products (Table 31) as well as the value of production of natural gas liquids (Table 30) were added to the value of total domestic liquids (Table 14) production to derive the onshore independents' share of pipeline transportation of refined petroleum products. The value of total refinery inputs is shown in Table 32.

Petroleum Refineries (324110)

As with pipeline transportation of refined petroleum products, all of the inputs to the refining process must be accounted for in calculating the value of output in all of the categories related to refined petroleum products. The share of onshore independents is approximately 20% because of the large proportion of refinery inputs from net imports of crude oil and refined products. On a volume basis, net imports account for 60-65% of refinery inputs.

Petroleum Lubricating Oil and Grease Manufacturing (324191)

The same value of total refinery inputs used in the refined product pipelines and petroleum refineries industries is also used to derive the onshore independents' share of lubricating oil and grease manufacturing.

Petroleum and Petroleum Products Merchant Wholesalers (4247)

The same value of total refinery inputs used in the refined product pipelines and petroleum refineries industries is also used to derive the onshore independents' share of petroleum and petroleum products merchant wholesalers.

Gasoline Stations (4471)

The same value of total refinery inputs used in the refined product pipelines and petroleum refineries industries is also used to derive the onshore independents' share of gasoline stations.

Table 27

| Natural Gas Plant Field Production (million barrels) | | | | | |
|---|------|------|------|------|------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | 635 | 651 | 653 | 697 | 730 |
| Independents Onshore | 374 | 394 | 422 | 457 | 476 |

Sources: Energy Information Administration, IHS

Table 28

| Net Crude & Product Imports (million barrels) | | | | | |
|--|-------|-------|-------|-------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | 4,522 | 4,390 | 4,067 | 3,530 | 3,475 |

Sources: Energy Information Administration, IHS

Table 29

| Total Refinery Input (million barrels) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | 7,010 | 6,888 | 6,546 | 6,172 | 5,839 |
| Independents Onshore | 1,187 | 1,217 | 1,289 | 1,317 | 1,216 |
| Independents' Onshore Share of Total | 16.9% | 17.7% | 19.7% | 21.3% | 20.8% |

Sources: Energy Information Administration, IHS

Table 30

| Natural Gas Plant Field Production (million dollars) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | \$41,919 | \$47,078 | \$65,067 | \$43,187 | \$58,027 |
| Independents Onshore | \$24,717 | \$28,490 | \$42,099 | \$28,287 | \$37,864 |
| Independents' Onshore Share of Total | 59.0% | 60.5% | 64.7% | 65.5% | 65.3% |

Sources: Energy Information Administration, IHS

Table 31

| Net Crude & Product Imports (million dollars) | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | \$298,689 | \$317,553 | \$405,339 | \$218,697 | \$276,211 |

Sources: Energy Information Administration, IHS

Table 32

| Total Refinery Input (million dollars) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 2006 | 2007 | 2008 | 2009 | 2010 |
| Total | \$463,031 | \$498,307 | \$652,435 | \$382,354 | \$464,089 |
| Independents Onshore | \$78,391 | \$88,050 | \$128,426 | \$81,562 | \$96,650 |
| Independents' Onshore Share of Total | 16.9% | 17.7% | 19.7% | 21.3% | 20.8% |

Sources: Energy Information Administration, IHS

GLOSSARY

The following definitions of terms used in this report are consistent with U.S. Energy Information Administration (EIA) terminology (<http://www.eia.gov/tools/glossary/>).

CASINGHEAD GAS (OR OIL WELL GAS)

Natural gas produced along with crude oil from oil wells. It contains either dissolved or associated gas or both.

CRUDE OIL

A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Depending upon the characteristics of the crude stream, it may also include:

- Small amounts of hydrocarbons that exist in gaseous phase in natural underground reservoirs but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators and are subsequently commingled with the crude stream without being separately measured. Lease condensate recovered as a liquid from natural gas wells in lease or field separation facilities and later mixed into the crude stream is also included;
- Small amounts of non-hydrocarbons produced with the oil, such as sulfur and various metals;
- Drip gases, and liquid hydrocarbons produced from tar sands, oil sands, gilsonite, and oil shale.

Liquids produced at natural gas processing plants are excluded. Crude oil is refined to produce a wide array of petroleum products, including heating oils; gasoline, diesel and jet fuels; lubricants; asphalt; ethane, propane, and butane; and many other products used for their energy or chemical content.

NATURAL GAS

A gaseous mixture of hydrocarbon compounds, the primary one being methane.

CONDENSATE (LEASE CONDENSATE)

A natural gas liquid recovered from associated and non-associated gas wells from lease separators or field facilities, reported in barrels of 42 U.S. gallons at atmospheric pressure and 60 degrees Fahrenheit.

TOTAL LIQUID HYDROCARBON RESERVES

The sum of crude oil and natural gas liquids reserves volumes.

MARKETED PRODUCTION

Gross withdrawals less gas used for re-pressuring, quantities vented and flared, and non-hydrocarbon gases removed in treating or processing operations. Includes all quantities of gas used in field and processing plant operations.

Appendix C: Comparison of IHS Global Insight's Onshore and Offshore Studies

A few months after the 2010 Macondo accident, IHS Global Insight undertook a study that presented the economic significance of the Gulf of Mexico (GOM) offshore oil and gas industries to the Gulf Region. The analysis also demonstrated the importance of the independent operators to the overall offshore Gulf of Mexico oil and gas industry and, specifically, to the future working of the deepwater, which is a significant growth engine of U.S. oil production. While the study measured the economic impact of the independents' Gulf operations (both overall and deepwater-specific) on the Gulf of Mexico coastal economy, it did not extend the analysis to include the entire United States.

The following set of tables summarizes the economic impact of the independents in GOM and deepwater on the Gulf region. The data reports the impact for 2009, 2015 and 2020 segmented by direct, indirect, and induced impact on employment, value added and labor income.

| Total Gulf of Mexico -- Independents | | | | |
|---|---------------|-----------------|----------------|--------------|
| | Direct | Indirect | Induced | Total |
| Employment (average annual workers) | | | | |
| 2009 | 46,958 | 63,660 | 91,884 | 202,502 |
| 2015 | 72,861 | 91,571 | 125,284 | 289,716 |
| 2020 | 80,632 | 95,522 | 124,821 | 300,974 |
| Value Added (billions of dollars) | | | | |
| 2009 | \$23.2 | \$7.9 | \$6.8 | \$37.8 |
| 2015 | \$34.6 | \$12.3 | \$10.5 | \$57.4 |
| 2020 | \$36.4 | \$13.6 | \$11.6 | \$61.5 |
| Labor Income (billions of dollars) | | | | |
| 2009 | \$8.4 | \$4.2 | \$3.6 | \$16.2 |
| 2015 | \$12.9 | \$6.8 | \$5.6 | \$25.3 |
| 2020 | \$13.9 | \$7.7 | \$6.2 | \$27.8 |

*Source: Results generated by IHS Global Insight from the IMPLAN model
Numbers may not sum exactly due to rounding*

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

The following chart highlights the deepwater component of total GOM.

| Deepwater Gulf of Mexico -- Independents | | | | |
|---|---------------|-----------------|----------------|--------------|
| | Direct | Indirect | Induced | Total |
| Employment (average annual workers) | | | | |
| 2009 | 30,843 | 38,676 | 51,779 | 121,298 |
| 2015 | 60,506 | 73,214 | 96,522 | 230,241 |
| 2020 | 72,498 | 84,365 | 108,249 | 265,113 |
| Value Added (billions of dollars) | | | | |
| 2009 | \$12.6 | \$4.5 | \$3.8 | \$20.9 |
| 2015 | \$26.0 | \$9.5 | \$8.1 | \$43.7 |
| 2020 | \$31.1 | \$11.8 | \$10.1 | \$53.0 |
| Labor Income (billions of dollars) | | | | |
| 2009 | \$4.6 | \$2.5 | \$2.0 | \$9.1 |
| 2015 | \$9.8 | \$5.4 | \$4.3 | \$19.5 |
| 2020 | \$12.0 | \$6.8 | \$5.4 | \$24.1 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Numbers may not sum exactly due to rounding

The following table exhibits independents' offshore oil and gas industry economic impact on the construction sector in the Gulf of Mexico. These activities include construction of rigs, platforms, pipelines, and production facilities. Project construction was much less predictable on an annual basis, so the analysis of construction cost was conducted over the entire forecast interval. These estimates of employment, value added, and labor income for construction are in addition to the figures presented in the previous two tables.

| Total Gulf of Mexico Construction -- Independents, 2009 | | | | |
|--|---------------|-----------------|----------------|--------------|
| | Direct | Indirect | Induced | Total |
| Employment (average annual workers) | | | | |
| | 15,824 | 11,491 | 12,762 | 40,077 |
| Value Added (billions of dollars) | | | | |
| | \$1.6 | \$1.1 | \$1.0 | \$3.7 |
| Labor Income (billions of dollars) | | | | |
| | \$1.1 | \$0.7 | \$0.5 | \$2.3 |

Source: Results generated by IHS Global Insight from the IMPLAN model

Numbers may not sum exactly due to rounding

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

Finally, presented below are estimated federal, state, and local taxes as well as federal royalty payments for 2009 and expected payments in 2015 and 2020.

| Estimated Tax Receipts from Independents' Offshore Operations in the GOM (billions of dollars) | | | | |
|---|---------------|---------------|---------------|-------------------|
| | 2009 | 2015 | 2020 | 2011-2020* |
| Federal Taxes | \$3.9 | \$6.0 | \$6.5 | \$59.60 |
| Personal Taxes | \$2.6 | \$4.1 | \$4.5 | \$40.62 |
| Corporate Taxes | \$1.3 | \$1.9 | \$2.0 | \$18.98 |
| State and Local Taxes | \$3.2 | \$4.6 | \$4.7 | \$45.87 |
| Personal Taxes | \$0.2 | \$0.3 | \$0.4 | \$3.19 |
| Severance Taxes | \$0.2 | \$0.3 | \$0.3 | \$2.68 |
| Other Business Taxes | \$2.8 | \$4.0 | \$4.1 | \$40.00 |
| Total | \$7.0 | \$10.5 | \$11.2 | \$105.47 |
| Federal Royalty Payments | \$3.5 | \$4.2 | \$3.5 | \$41.65 |
| Grand Total | \$10.5 | \$14.7 | \$14.7 | \$147.12 |

**The total column is estimated by multiplying the 2015 figure by 10*

Source: Federal, state & local tax estimates generated by IHS Global Insight from IMPLAN model.

Federal royalty payments based on IHS Global Insight estimates from MMS data.

The following chart highlights the deepwater component of total GOM.

| Estimated Tax Receipts from Independents' Deepwater Operations in the GOM (billions of dollars) | | | | |
|--|--------------|---------------|---------------|-------------------|
| | 2009 | 2015 | 2020 | 2011-2020* |
| Federal Taxes | \$2.2 | \$4.6 | \$5.6 | \$45.73 |
| Personal Taxes | \$1.5 | \$3.2 | \$3.9 | \$31.55 |
| Corporate Taxes | \$0.7 | \$1.4 | \$1.7 | \$14.18 |
| State and Local Taxes | \$1.6 | \$3.4 | \$3.9 | \$33.51 |
| Personal Taxes | \$0.1 | \$0.2 | \$0.3 | \$2.47 |
| Severance Taxes | \$0.1 | \$0.2 | \$0.2 | \$1.94 |
| Other Business Taxes | \$1.4 | \$2.9 | \$3.4 | \$29.10 |
| Total | \$3.8 | \$7.9 | \$9.6 | \$79.25 |
| Federal Royalty Payments | \$1.5 | \$2.7 | \$2.7 | \$26.91 |
| Grand Total | \$5.3 | \$10.6 | \$12.3 | \$106.15 |

**The total column is estimated by multiplying the 2015 figure by 10*

Source: Federal, state & local tax estimates generated by IHS Global Insight from IMPLAN model.

Federal royalty payments based on IHS Global Insight estimates from MMS data.

The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy

The objective of the current study 'The Economic Contribution of the Onshore Independent Oil and Natural Gas Producers to the U.S. Economy' is to evaluate the impact of onshore independents on the U.S. economy as a whole. Since in the offshore study only the upstream economic activity of independents was evaluated, it is more appropriate to compare the offshore results to only the upstream economic impact of the current study. The following two tables exhibit the economic impact of upstream onshore independents to the U.S. economy in terms of employment, value added, labor income and taxes.

| Upstream Onshore Economic Impact | | | | | |
|--|---------|----------|-----------|-----------|------------|
| | Direct | Indirect | Induced | Total | Multiplier |
| Employment (average annual workers) | | | | | |
| 2010 | 399,508 | 626,443 | 1,051,778 | 2,077,729 | 5.20 |
| 2015 | 504,381 | 699,501 | 1,161,945 | 2,365,826 | 4.69 |
| 2020 | 609,832 | 759,439 | 1,265,672 | 2,634,943 | 4.32 |
| Value Added (billions of dollars) | | | | | |
| 2010 | \$154.5 | \$79.1 | \$87.0 | \$320.7 | 2.08 |
| 2015 | \$185.7 | \$97.6 | \$107.4 | \$390.6 | 2.10 |
| 2020 | \$220.7 | \$116.9 | \$129.1 | \$466.8 | 2.11 |
| Labor Income (billions of dollars) | | | | | |
| 2010 | \$55.6 | \$44.3 | \$49.0 | \$148.9 | 2.68 |
| 2015 | \$68.3 | \$54.9 | \$60.4 | \$183.6 | 2.69 |
| 2020 | \$82.5 | \$65.7 | \$72.6 | \$220.8 | 2.68 |

Source: Results generated by IHS Global Insight from the IMPLAN model
Numbers may not sum exactly due to rounding

| Taxes Paid (billions of dollars) - Upstream Onshore Operations | | | | |
|--|---------------|---------------|----------------|------------------|
| | 2010 | 2015 | 2020 | Total 2010-2020* |
| Federal Taxes | \$36.3 | \$44.5 | \$53.4 | \$489.5 |
| Personal Taxes | \$26.2 | \$32.3 | \$38.8 | \$355.3 |
| Corporate Taxes | \$10.1 | \$12.2 | \$14.6 | \$134.2 |
| State and Local Taxes | \$31.4 | \$38.4 | \$46.1 | \$422.4 |
| Personal Taxes | \$4.5 | \$5.6 | \$6.7 | \$61.6 |
| Corporate Taxes | \$26.4 | \$32.2 | \$38.7 | \$354.2 |
| Severance Taxes | \$0.5 | \$0.6 | \$0.7 | \$6.6 |
| Total, Federal, State, and Local Taxes | \$67.7 | \$82.9 | \$99.5 | \$911.9 |
| Federal Royalty Payments | \$1.4 | \$1.8 | \$2.4 | \$19.8 |
| Bonus and Rent Payments** | | | | \$1.6 |
| Grand Total | \$69.1 | \$84.7 | \$101.9 | \$933.3 |

Source: Results generated by IHS Global Insight from the IMPLAN model

* This column was estimated by multiplying the 2015 figure by 11

** Derived by multiplying by two the MMS 2011-2015 onshore bonus and rent payment estimates of \$809.3M

Numbers may not sum exactly due to rounding

Appendix D: Overview of the IMPLAN Model

The indirect and induced job estimates in this report were quantified through input-output modeling, using the IMPLAN model. This modeling effort also produced estimates of value added and labor income related to direct, indirect, and induced jobs. This appendix provides additional information about the IMPLAN model. The discussion is based in part on descriptions by Minnesota IMPLAN Group, Inc., (MIG), the model's sponsor.²

IMPLAN, short for "Impact Analysis for Planning," is a widely-used commercially available model for input/output analysis. MIG is responsible for the production of the IMPLAN data, model and software. Using classic input/output analysis in combination with regional specific social accounting matrices and multiplier models, IMPLAN provides a highly accurate and adaptable model for its users. The IMPLAN system was designed to serve three functions:

- Data retrieval;
- Data reduction, model development, and;
- Impact analysis.

Comprehensive and detailed data coverage for the U.S. economy and the ability to incorporate user-supplied data at each stage of the model building process provide a high degree of flexibility both in terms of geographic coverage and model formulation. There are two components to the IMPLAN system: the databases and the software. The databases provide information needed to create IMPLAN models. The software performs the calculations and provides an interface for the user to make final demand changes.

The IMPLAN system includes:

- A national-level technology matrix, and;
- Estimates of sectoral activity for final demand, final payments, industry output and employment for the United States.

Input-output accounting describes commodity flows from producers to intermediates and final consumers. The total industry purchases of commodities, services, employment compensation, value added, and imports are equal to the value of the commodities produced.

Purchases for final use (final demand) drive the model. Industries produce goods and services for final demand and purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the region (imports and value added) stop the cycle.

These indirect and induced effects (the effects of household spending) can be mathematically derived. The derivation is called the Leontief inverse. The resulting sets of multipliers describe the change of output for each and every regional industry caused by a one dollar change in final demand for any given industry.

² www.IMPLAN.com

Creating regional input-output models requires a tremendous amount of data. The costs of surveying industries within each region to derive a list of commodity purchases production functions are prohibitive. IMPLAN was developed as a cost-effective means to develop regional input-output models.

IMPLAN easily allows the user to do the following:

- Develop a complete Social Accounting Matrix (SAM) for a regional economy;
- Develop Multiplier Models for predicting economic impacts;
- Modify components of the SAM including:
 - Industry specific information such as employment and income values,
 - Production functions,
 - Byproducts, and
 - Trade flows;
- Create custom impact analyses based on the nature of an event;
- Generate a wide variety of reports describing the Social Accounts, the Multiplier Model, and the Direct, Indirect, and Induced effects of an economic event;
- Examine how the effects of economic impact in a single region ripple into surrounding regions;
- View tax impacts of economic changes.

IMPLAN SOFTWARE

Minnesota IMPLAN Group developed the current version of IMPLAN Version 3.0 in 2009. It is a Windows based software package that performs the calculations necessary to create the predictive model. The software reads the database and creates the complete set of social accounting matrices (SAM) and the I/O accounts. Next, the IMPLAN software derives the predictive multipliers. The software also enables the user to make changes to the data, the trade flows, or technology. It also enables the user to make final demand changes which results in the impact assessment.

Features of the IMPLAN Version 3.0 include:

- Direct export to Excel for ease of report manipulation or printing;
- Advanced data editing functions with balancing features;
- Complete Social Accounting Matrix;
- A choice of trade-flow assumptions:
 - IMPLAN National Trade Flows Model,
 - Econometric regional purchase coefficients,
 - Supply/demand pooling;
- Libraries for storing custom activities and the ability to import pre-created IMPLAN libraries;
- Flexible model aggregation tools - allowing for aggregation of the model or the results;

- Single reports location- all results can be viewed, exported and printed from a single screen;
- Study Area, Social Accounts, Industry Accounts, and Multiplier Reports demonstrating all stages of model building and analysis;
- Activity menu structure for easy intuitive impact analysis;
- Event-based impact databases;
- Built-in and editable margins and deflators;
- Model data in MS Access Database format.

DATABASE

For this project, IHS Global Insight used the 2008 IMPLAN databases. Each database contains information on the following components for each industrial sector in the IMPLAN model.

Employment is total wage, salary jobs as well as self-employment jobs in the U.S. economy.

Value added is an industry's or an establishment's total output less the cost of intermediate inputs. Value added is further divided into three subcomponents:

- **Labor income**, which captures all forms of employment income, including Employee Compensation (wages and benefits, employer-paid payroll taxes, unemployment taxes, etc.) and Proprietor Income (payments received by self-employed individuals and unincorporated business owners).
- **Other property type income**, which consists of payments from rents, royalties, and dividends. This includes payments to individuals in the form of rents received on property, royalties from contracts, and dividends paid by corporations. This also includes corporate profits earned by corporations.
- **Indirect business taxes**, which consist primarily of excise and sales taxes paid by individuals to businesses. These taxes are collected during the normal operation of these businesses but do not include taxes on profit or income.

Final demand includes goods and services purchased for their ultimate use by an end user. For a region, this would include exports as that is a final use for that product. In an input-output framework, final demands are allocated to producing industries, with margins allocated to the service sectors (transportation, wholesale and retail trade, insurance) associated with providing that good to the final user. Thus, final demands are in producer prices, and the model provides them by components of GDP.

Personal consumption expenditures (PCE) consist of payments by individuals/households to industries for goods and services used for personal consumption. Individuals tend to buy little directly from industries other than retail trade. However, in an input-output table, purchases made by individuals for final consumption are shown as payments made directly to the industry producing the good. PCE is the largest component of final demand.

Federal government purchases are divided between military, non-military uses and capital formation. Federal military purchases are those made to support the national defense. Goods range from food for troops to missile launchers. Non-military purchases are made to supply all

other government functions. Payments made to other governmental units are transfers and are not included in federal government purchases.

State (provincial) and local government purchases are divided between public education, non-education and capital formation. Public education purchases are for elementary, high school, and higher education. Non-education purchases are for all other government activities. These include state (provincial) government operations, including police protection and sanitation. Private sector education purchases are not counted here. Private education purchases show up in IMPLAN sectors 495 and 496.

Inventory purchases are made when industries do not sell all output created in one year. This is generally the case. Each year, a portion of output goes to inventory. Inventory sales occur when industries sell more than they produce and need to deplete inventory. Inventory purchases and sales generally involve goods-producing industries (e.g. agriculture, mining, and manufacturing).

Capital formation is private expenditures made to obtain capital equipment. The dollar values in the IMPLAN database are expenditures made to an industrial sector producing the capital equipment. The values are not expenditures by the industrial sector.

Foreign exports are demands made to industries for goods for export beyond national borders. These represent goods and services demanded by foreign parties. Domestic exports are calculated during the IMPLAN model creation and are not part of the database.

IMPLAN MULTIPLIERS

The notion of a multiplier rests upon the difference between the initial effect of a change in final demand and the total effects of that change. Total effects can be calculated either as direct and indirect effects, or as direct, indirect, and induced effects. Direct effects are production changes associated with the immediate effects or final demand changes. Indirect effects are production changes in backward-linked industries cause by the changing input needs of directly affected industries (for example, additional purchases to produce additional output). Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects.

For the U.S. model used in this study, the IMPLAN model estimated Type I and SAM multipliers for direct, indirect, and induced impacts.

Type I Multipliers

A Type I multiplier is the direct effect, produced by a change in final demand, plus the indirect effect divided by the direct effect. Increased demands are assumed to lead to increased employment and population with the average income level remaining constant. The Leontief inverse (Type I multipliers matrix) is derived by inverting the direct coefficients matrix. The result is a matrix of total requirement coefficients, the amount each industry must produce in order for the purchasing industry to deliver one dollar's worth of output to final demand.

Type SAM Multipliers

Type SAM multipliers incorporate "induced" effects resulting from the household expenditures from new labor income. The linear relationship between labor income and household expenditure can be customized in the IMPLAN software. The default relationship is PCE (personal consumption expenditures) and total household expenditures. Each dollar of work-place based income is spent based on the SAM relationship generated by IMPLAN.